麻醉与监护论坛

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中华医学会麻醉学分会
Chinese Society of Anesthesiology

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第18卷 第2期

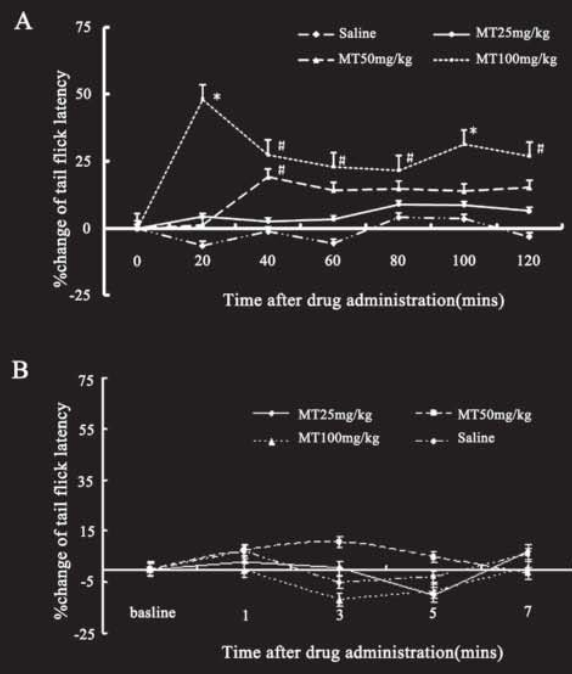

Figure1: The effect of acute (A) and chronic (B) administration of melatonin on antinociceptive responses in Sprague Dawley rats using hot-water tail flick test. Rats received melatonin (25, 50,100mg/kg, i.g.) were tested every 20 min after drug administration(A) or during 10:00am~12:00pm(B). Melatonin (50,100mg/kg, i.g.) can significantly increase thermal thresholds (A). When i.g. with the dose of 100mg/kg, the onset time was about 20 min after drug administration and lasted more than 120 min, and with the dose of 50mg/kg, the onset time was about 40 min and lasted for about 80 min. Chronic treatment with melatonin alone (25, 50, 100mg/kg, i.g. 5:00pm daily for 7 days) have no significantly differences with the baseline thermal nociceptive thresholds ($p>0.05$). (n = 10/per treatment). * $P<0.01$, #$P<0.05$ vs saline group.

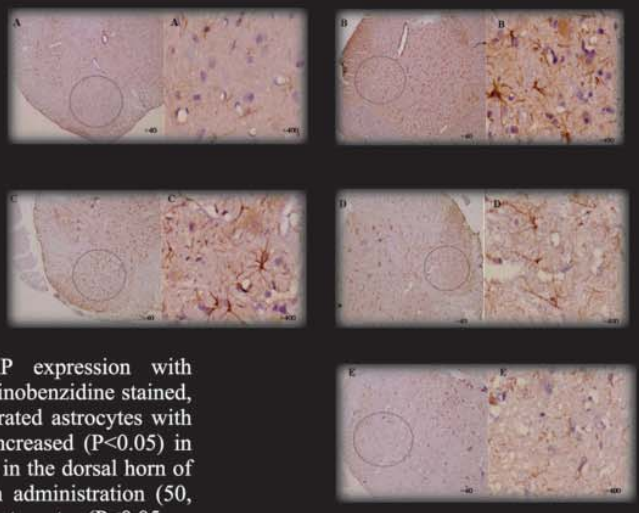

Figure3: Effect of melatonin and morphine on GFAP expression with immunohistochemistry of dosal horn of lumbar spinal cord (diaminobenzidine stained, Figure 3). Compared with saline group, hypertrophic and proliferated astrocytes with enlarged cell body and number of GFAP-immunoreative cells increased ($P<0.05$) in morphine group (10mg/kg s.c. twice daily for 7 consecutive days) in the dorsal horn of the lumbar spinal cord in rats (Fig. B×400). Chronic melatonin administration (50, 100mg/kg, i.g.) reduced the number of GFAP-immunoreative astrocytes.($P<0.05$ vs morphine group.(Fig. D×400, Fig. E×400)

This Study Demonstrated that Melatonin can Prevent Morphine Induced Hyperalgesia and Glial Reactivity Both in Vivo and Vitro. This Effect of Melatonin May Be Mediated by Inhibiting PKC Activity.

Figure related to ""Melatonin Attenuates Morphine Induced Glial Activation and Hyperalgesia in Rats: Involvement of Protein Kinase C Pathway"by Xin Wei, Chun Wang, Ling Lin, Cai Fang, pp.92.

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Types of Papers

Eight types of articles are published.

1.Clinical Investigations

2.Laboratory Investigations

3.Review Articles

4.Case Reports/Case Discussion

5.Technical Communications

6.Clinical Experience

7.Letters to the editors

8.Others (including continuing education, subject construction, comprehensive information, etc.)

Maximum Word Allowance

1.Clinical Investigations: 3000 words (excluding Abstract)

2.Laboratory Investigations: 3000 words (excluding Abstract)

3.Review Articles: 4000 words

4.Case Reports/Case Discussion: 800 words

5.Technical Communications: 1500 words

6.Special Articles: 2000 words

7.Letters to the editors: 200 words

Arrangement of Articles

Arrange all articles in the following order.

1.Title page

2.Abstract and Key Words (not required for all article types)

3.Body Text (Introduction, Materials and Methods, Results, Discussion)

4.References

5.Tables (each table should be a separate file)

6.Figures (each figure should be a separate file) and Figure Legends

Detailed Information

Title Page (Page 1). It includes:

1.Title

2.First name and surname of each author with his or her highest academic degree (M.D., Ph.D., etc.) and academic rank (Professor, Associate Professor, etc.)

3.Mailing address, phone, fax numbers, e-mail address, the department, institution, city, state and country of the corresponding author

4.Individuals or organizations to be acknowledged. Provide complete name, degrees, academic rank, department, institution, city, state and country

5.Abstract and Key Words (new page). Abstract contains for paragraphs of Background, Methods, Results and Conclusions, with the words less than 250 (except for Review Articles and Case Reports)

Text. The body of the manuscript should typically be divided into four parts (except for Case Reports):

1.Introduction (new page). This should rarely exceed one paragraph in length

2.Materials and Methods (new page). A subsection entitled “Statistical Analysis” should appear at the end of the section when appropriate

3.Results (new page)

4.Discussion (new page)

References (new page). Number references in sequence in they appear in the text. Original articles should rarely have more than 25 items. For a review article, up to 35 items are acceptable. Case Reports rarely need more than 10 items. Using the following reference formats:

1.Journal: Carli F, Mayo N, Klubien K, Schricker T, Trudel J, Belliveau P: Epidural analgesia enhances functional exercise capacity and health-related quality of life after colonic surgery: Results of a randomized trial. ANESTHESIOLOGY 2002; 97: 540-9

2.Book: Barash PG, Cullen BF, Stoelting RK: Clinical Anesthesia, 3rd edition. Philadelphia, Lippincott-Raven, 1997, pp23-4

3.Chapter: Blitt C: Monitoring the anesthetized patient, Clinical Anesthesia, 3rd edition. Edited by Barash PG. Cullen BF, Stoelting RK. Philadelphia, Lippincot t-Raven, 1997, pp563-85

Tables. Number tables consecutively in order of appearance (Table 1, etc.). Each Table should be submitted as a separate file. Each Table must have a title and a caption.

Figures and Figure Legends.

1.Each figure should be submitted as a separate file

2.Figures must be clearly labeled and cited in the consecutive numeric order

3.Scan precision≥300dpi, size≥6×8cm

4.Written permission must be obtained from the author and publisher if any figure or table from a previously published document is used

5.Supply a legend for each figure

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3.The units for pressers are mmHg or cmH_2O

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Melatonin Attenuates Morphine Induced Glial Activation and Hyperalgesia in Rats: Involvement of Protein Kinase C Pathway

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Abstract

Background: Opioid withdrawal-induced hyperalgesia (OIH) and tolerance are conditions that negatively affect pain management. Glial activation is believed to cause and maintain pain hypersensitivity state caused by morphine. Melatonin has interactions with opioids such as enhancement of analgesic effect of morphine and reversal tolerance to morphine, melatonin can also reduce brain glial reactivity in toxicity and chemical insults, but the effect of melatonin on morphine induced hyperalgesia and spinal glial reactivity in unknown.

Aims: The present study aims to explore the utility of melatonin in preventing morphine induced hyperalgesia after drug withdrawal using hot water tail-flick test and assess the role of melatonin on glial activation after chronic morphine administration in vitro and vivo in SD rats.

Methods: The present study examined the effect of melatonin on morphine induced tolerance, hyperalgesia using tail flick test; hypertrophic astrocytes in spinal cord using immunohistochemistry and western blot of glial fibrillary acidic protein (GFAP), and tried to verify the above effect in primary cultured spinal astrocytes. This study also measured the protein kinase C (PKC) activity and cAMP levels to investigate the mechanism of these effect of melatonin.

Results: (a) When co-administered with morphine, intragastric (i.g.) melatonin 50,100mg/kg) can prevent hyperalgesia after termination of morphine (MOR: %MPE -37.4%±5.6% and -32.0%±4.2% at 1th and 2th day after termination of morphine respectively, $P<0.05$ vs saline group; MT50: %MPE -24.9%±7.0% and 4.6%±3.4%; MT100: %MPE 22.7%±3.3% and 15.4%±2.6% at 1th and 2th day after termination of morphine respectively, $P>0.05$ vs saline group). (b) Chronic administration with morphine in rats caused glial activation in dorsal horn of spinal cord using immunohistochemistry and western blot of GFAP($P<0.01$). Melatonin (10-6~10-4mmol/L) can also significantly decreased morphine induced over-expression of GFAP in cultured spinal astrocytes ($P<0.05$). (c) By measuring protein kinase C (PKC) activity and cAMP levels both in spinal cord and cultured astrocytes, melatonin (100mg/kg in vivo and 10-4mol/L in vitro) significantly decreased ($P<0.05$) cAMP level (156±18pmol/g in spinal cord and 1.20±0.45 pmol/106cell) compared with that of morphine alone(198±17pmol/g in spinal cord and 1.7±0.06 pmol/106cell); co-administrated with melatonin (25, 50, 100mg/kg and 10-6-10-4mol/L) decreased ($P<0.01$) the PKC activity induced by morphine (545±107, 185±31, and 89±12 pmol/min.mg vs 1273±264 pmol/min.mg in spinal cord and 62.1±11.6, 35.8±14.0 and 9.0±2.2 pmol/min.mg vs 151.8±24.7 pmol/min.mg), the alterations of cAMP were not parallelled with the inhibition of PKC activity and GFAP output after melatonin treatment, suggests that enhancement of GFAP expression caused by morphine and reversal effect of melatonin may through PKC pathway.

Conclusions: This study demonstrated that melatonin can prevent morphine induced hyperalgesia and glial reactivity both in vivo and vitro. This effect of melatonin may be mediated by inhibiting PKC activity.

Key words:Melatonin; Opioid; Morphine; Tolerance; Glia; Hyperalgesia; Glial fibrillary acidic protein; Protein kinase C

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Introduction

Opioids are most commonly used analgesics in pain treatment. Preclinical and clinical evidence have suggested that opioids can not only produce antinociceptive effect, but also increase sensitivity to noxious stimulation. The concept of pain sensitization after chronic administration of opioids is referred to as opioid-induced hyperalgesia (OIH) [1]. OIH is a less recognized side effect in opioid therapy. Opioid induced tolerance and OIH are conditions that negatively affect pain management [2]. The major clinical manifestation of opioid-induced tolerance and OIH is same, that is, increasing opioid dose seems necessary to reach an adequate level of analgesia. Moreover, there are overlaps in the mechanisms of morphine induced tolerance and OIH. Underlying mechanisms involve Gs-protein mediated up-regulation of adenylate cyclase activity resulting in increased intracellular cyclic adenosine monophosphate (cAMP) level, enhanced release of excitatory amino acid

(EAA), activation of intracellular messenger phosphokinase C(PKC) and NMDA receptor[3,4].

Glial cells are recognized as performing important role in various physiological and pathological processes. Glial activation has been observed in many pathological states including Alzheimer's and Parkinson's diseases[5] as well as several persistent pain syndromes[6,7]. A major recently recognized role of astrocytes is that they are key players in pain facilitation and can compromise the efficacy of opioids for pain control[6]. The involvement of spinal astrocytes in the modulation of morphine induced tolerance and hyperalgesia has been demonstrated in both preclinical[8,9] and clinical[10] studies. Glial fibrillary acidic protein (GFAP) is a cytoskeletal intermediate filament protein, is known to present exclusively in astrocytes, the activated astrocytes are well known for high level of GFAP expression[11]. Spinal glial cell activation and high level of GFAP expression have been linked to the development of opioid tolerance[12], suggested that spinal glia may play an important role in mechanisms responsible for opioid tolerance. Protein kinase C(PKC) is an integral part of the cell signaling machinery. Sustained activation of PKC is implicated in the increased level of reactive astrocytes in dorsal horn of the spinal cord followed by repeated morphine administration[13].

Melatonin (N-acetyl-5-methoxytryptamine), a neurohormone synthesized and produced by the pineal gland, has been demonstrated to participate a wide range of physiologic or pathologic processes[14]. Besides its well described effect of regulation of circadian and seasonal rhythm, melatonin has been reported to be involved in some neuropsychopharmacological actions, such as the hypnotic, anticonvulsant and antinociceptive activity[15]. The interaction between melatonin and opioids has been reported, melatonin can not only augment the analgesic effect of opioids[16,17] , but also reverse morphine induced tolerance and dependence[18,19]. Furthermore, melatonin can also protect brain from toxicity of many environmental and chemical insults[20,21,22] by inhibiting free radical generation and reducing glial reactivity[23,24].

The present study aims to explore the utility of melatonin in preventing morphine induced hyperalgesia after drug withdrawal using hot water tail-flick test and assess the role of melatonin on glial activation after chronic morphine delivery in vitro and vivo in rats.

Materials and Methods

Animals

Male Sprague Dawley rats weighing 200–250 g (from Central Animal Facility, Anhui Medical university, China) at the time of testing, were housed six per cage at a controlled temperature (22±1℃), humidity (50±10%) and 12h light/dark cycle in a room. Food and water were made available ad libitum. The protocol had been approved by the Ethic Committee of Institute of Clinical Pharmacology, Anhui Medical University.

Drugs

Melatonin was purchased from Sigma (St Louis, MO, USA). It stocks of 100mg/ml in 100% ethanol, prepared fresh on the days of experiment and diluted with 0.9% NaCl or DMEM to the appropriate concentration. The concentration of ethanol was adjusted to 5% ethanol saline (v/v) before use. Morphine hydrochloride was purchased from THE FIRST SHEN-Yang Pharmaceuticals Inc. (SHEN-Yang, CHINA).

Behavioural tail-flick test

The hot-water tail-flick test was performed by placing the distal third of the tail in a water bath maintained at 50°C and was measured during 10:00-12:00pm. The latency until tail withdrawal from the bath was determined and compared among the treatments. A 15 sec cutoff was used to avoid tissue damage. The antinociceptive effect in the above test is calculated as percentage change of tail flick latency from baseline level according to the formula:

% M.P.E. = (post-drug latency-baseline) ÷ (cut-off latency - baseline) × 100.

Experimental design

To assess the antinociceptive effect of melatonin, 40 SD rats were treated with melatonin (25, 50,100mg/kg) intra gastricly (i.g.) by gavage needle.Tail-flick test was measured every 20 min after drug injection.

Tolerance to morphine were induced in rats by repeated injection of morphine hydrochloride 10 mg/kg subcutaneously (s.c.) twice daily at 8:00am and 6:00pm for 7 days as described previously[25]. To investigate the effect of melatonin on tolerance and OIH induced by morphine, animals were treated with melatonin (25, 50,100mg/kg) by i.g route at 5:00pm for 7 days. 40 rats, 10 in each, were separated into following groups: i) morphine alone, ii) morphine and melatonin (25, 50,100mg/kg), iii) melatonin

(25, 50,100mg/kg) and iv)saline alone (control group). This exposure paradigm was chosen to more closely mimic the natural high level of melatonin throughout the 24 hr cycle as described [26]. Tail-flick test was performed

cAMP and PKC activity assays

Cylic AMP was assayed using a standard radioimmunoassay[27]. To calculate PKC activities, spinal cords and cell samples were collected according to the manufacturer's instruction using the SignaTECT™ Protein Kinase C (PKC) Assay System (Promega, Madison, WI).

Primary astrocytes culture and treatments

Astrocytes primary cultures were prepared from 1- to 2-day-old Sprague Dawley rats, decapitated, and the cells obtained as described previously[28,29]. In brief, the removed spinal cords were mechanically dissociated, centrifuged, and washed. The cells were seeded in Dulbecco's modified Eagle's /F12 medium (DMEM/F12) containing 20% fetal calf serum, 1mM L-glutamine, and antibiotics, and incubated at 37℃ in a humidified 5% CO_2/95% atmosphere. After 7-14 days, when growing to confluence the cells were shaken for at least 12 h on an orbital shaker to remove the microglia and then seeded on multiwell tissue culture dishes. At 60% confluence, the cells were incubated with serum-free DMEM/F12 for 24 h prior to incubation with chemicals. Media was then removed, and the cells were re-fed with F12 media containing vehicle (normal saline), morphine (10-5~10-8mol/L, SHEN-Yang, China), melatonin (10-4~10-7mol/L, Sigma, St. Louis, MO) or combinations of each. The cells were incubated for 4 days at 37°C in 5% CO_2 atmosphere. At mid of this exposure period, the media was removed and cells were re-fed containing above mentioned drugs.

Western blot analysis

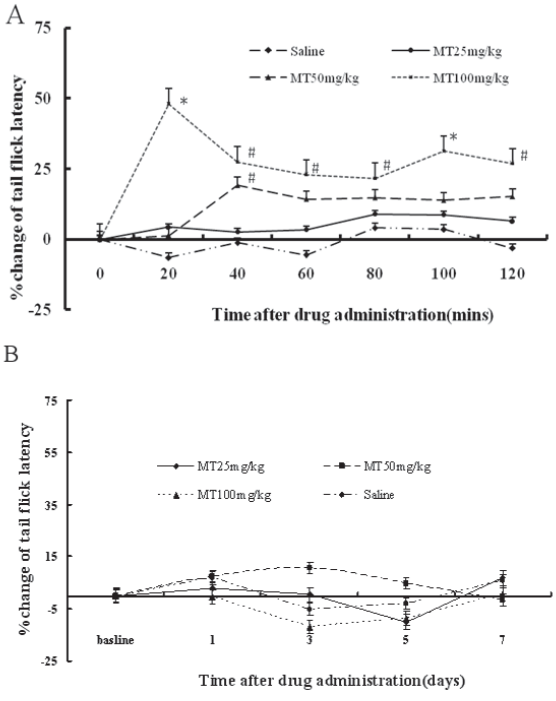
Tissue samples were homogenized and cells were harvested and homogenized on ice using RIPA lysis buffer (Beyotime, China) containing 50mM Tris (pH 7.4), 150mM NaCl, 1% Triton X-100, 1% sodium deoxycholate, 0.1% SDS and protein inhibitors and centrifuged at 40,000g for 60 min at 4°C; supernatants were collected, aliquoted and stored at -70°C until used. Protein concentration was determined as Lowry method using BSA as standard. Twenty micrograms of total proteins were loaded onto 10% SDS-PAGE and transferred to a nitrocellulose membrane. The protein was identified by incubating the membrane

TABEL 1.The effect of acute administration of melatonin on thermal nociceptive thresholds in SD rats using hot-water tail flick test.

%MPE \ time	20min	40min	60min	60min	100min	120min
saline	-6.5±1.4	-1.1±4.2	-5.6±4.1	-5.6±4.1	3.6±2.0	-3.1±5.4
MT_{25}	4.3±3.5	2.7±6.3	3.5±3.7	3.5±3.7	8.8±3.6	6.5±2.6
MT_{50}	1.4±5.6	19.2±8.3#	14.2±6.3	14.2±6.3	13.9±7.4	15.1±5.0
MT_{100}	48.1±8.2*	27.5±7.5#	23.0±5.7#	23.0±5.7#	31.3±7.1*	26.9±6.8#

* P<0.01, #P<0.05 vs basline group. % MPE= (post-drug latency - baseline) ÷ (cut-off latency - baseline) × 100. MT25: Melatoin 25mg/kg, i.g. 5:00pm daily; MT50: Melatoin 50mg/kg, i.g. 5:00pm daily; MT100: Melatoin 100mg/kg, i.g. 5:00pm daily.

Figure 1: The effect of acute (A) and chronic (B) administration of melatonin on antinociceptive responses in Sprague Dawley rats using hot-water tail flick test. Rats received melatonin (25, 50,100mg/kg, i.g.) were tested every 20 min after drug administration(A) or during 10:00am~12:00pm(B). Melatonin (50,100mg/kg, i.g.) can significantly increase thermal thresholds (A). When i.g. with the dose of 100mg/kg, the onset time was about 20 min after drug administration and lasted more than 120 min, and with the dose of 50mg/kg, the onset time was about 40 min and lasted for about 80 min. Chronic treatment with melatonin alone (25, 50, 100mg/kg, i.g. 5:00pm daily for 7 days) have no significantly differences with the baseline thermal nociceptive thresholds (p>0.05). (n = 10/per treatment). * P<0.01 , #P<0.05 vs saline group.



with rabbit anti-GFAP antibody (1:1000, Biotech, China) , and mouse anti-actin antibody (1:3000, ZSGB-Bio, China) respectively overnight at 4°C, followed by HRP-conjugated secondary antibodies and ECL solution (NEN Life Science, Boston, MA). For the quantification of the Western blot data, the developed films were scanned, the immunoreactive bands were digitized, and the densitometry was performed using Image J.

Statistical analysis

All results are expressed as mean±S.E.M. The data from % M.P.E. and cAMP, PKC levels were determined by one-way analysis of variance (ANOVA), if a significant F-value was obtained, post hoc analysis (Tukey-Kramer's multiple comparison tests) were performed to determine the effects of various treatments. Differences with $P<0.05$ between experimental groups at each point were considered statistically significant. The values of GFAP protein subunits and β -actin band density were obtained from band densitometry. These values were expressed as GFAP protein subunit/ β -actin ratio for each sample. Calculations were performed using SPSS statistical package(version 13.0). $P < 0.05$ was considered significant.

Results

Effect of antinociceptive effect of melatonin.

The acute and chronic effects of melatonin on tail flick latencies depicted in Figure 1A and Figure 1B. Intragastric melatonin administration (50,100mg/kg) produced a significantly increase in thermal thresholds, which started about 20 min after drug administration and lasted more than 120 min(Table 1, Fig.1A). But there were no statistically significances between groups receiving chronic melatonin (25, 50, 100mg/kg i.g. 5:00pm daily for 7 days) and saline group in thermal tail flick latencies(10:00-12:00pm)(Fig. 1B).

Effect of chronic administration of melatonin alone or combined with morphine on morphine induced tolerance and hyperalgesia.

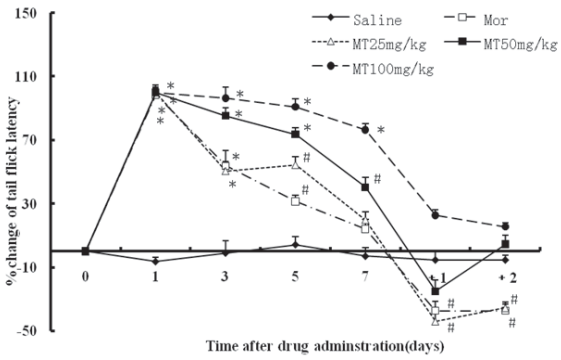
The effects of melatonin on thermal nociceptive thresholds in rats receiving chronic morphine, depicted in Figure 2 and Table 2. Rats received morphine (10mg/kg twice daily for 7 days) showed a maximal antinociceptive response on day 1th to 3th of treatment ($P<0.01$). However, the animals developed decreased in antinociceptive response on the 4th day and almost reached the baseline latency by day 7th of testing. In the 1th and 2th day after morphine

TABEL 2.The effects of melatonin on thermal nociceptive thresholds in SD rats receiving chronic morphine using hot-water tail flick test.

%MPE \ day	1	3	5	7	+1	+2
saline	-6.5±2.7	-2.1±7.0	4.1±5.3	-3.1±5.2	-5.5±5.6	-5.4±3.2
Mor	98.3±4.5*	53.6±10.0*	31.2±4.0#	14.0±5.9	-37.4±5.6#	-32.0±4.2#
MT_{25}	98.5±3.5*	50.6±6.0*	54.4±5.2#	20.0±4.9	-44.0±4.8#	-35.5±3.5#
MT_{50}	100±0*	85.4±5.1*	73.7±3.9*	40.3±6.0#	-24.9±7.0	4.6±3.4
MT_{100}	100±0*	96.3±7.2*	90.9±5.0*	76.5±4.6*	22.7±3.3	15.4±2.6

*P<0.01, # P<0.05 vs baseline group. % MPE= (post-drug latency - baseline) ÷ (cut-off latency - baseline) × 100. Mor: morphine 10mg/kg subcutaneously twice daily for 7 days; MT25: Melatoin 25mg/kg, i.g. 5:00pm daily along with morphine; MT50: Melatoin 50mg/kg, i.g. 5:00pm daily along with morphine; MT100: Melatoin 100mg/kg, i.g. 5:00pm daily along with morphine.

Figure 2: The effects of melatonin on thermal nociceptive thresholds in Sprague Dawley rats receiving chronic morphine using hot-water tail flick test. Rats receiving morphine (10mg/kg subcutaneously twice daily for 7 days) showed a maximal anti-nociceptive response on days 1 and 3 of treatment (P<0.01). However, the animals developed tolerance to morphine after the 4th day and almost reached the baseline latency by day 7th. In the 1th and 2th day after morphine withdrawal, rats became hypersensitive to thermal stimuli, the antinociceptive threshoulds significantly decreased vs saline group (%MPE -37.4%±5.6% and -32.0%±4.2% at +1 and +2 day respectively, P<0.05). Chronic treatment with melatonin (50, 100mg/kg, i.g. 17:00h daily) along with morphine attenuated the development of tolerance and prevent hyperalgesia induced by morphine (MT50: %MPE -24.9%±7.0% and 4.6%±3.4% at +1 and +2 day respectively, P>0.05; MT100: %MPE 22.7%±3.3% and 15.4%±2.6% at +1 and +2 day respectively, P>0.05). n = 10/treatment. *P<0.01, # P<0.05 vs s saline group.



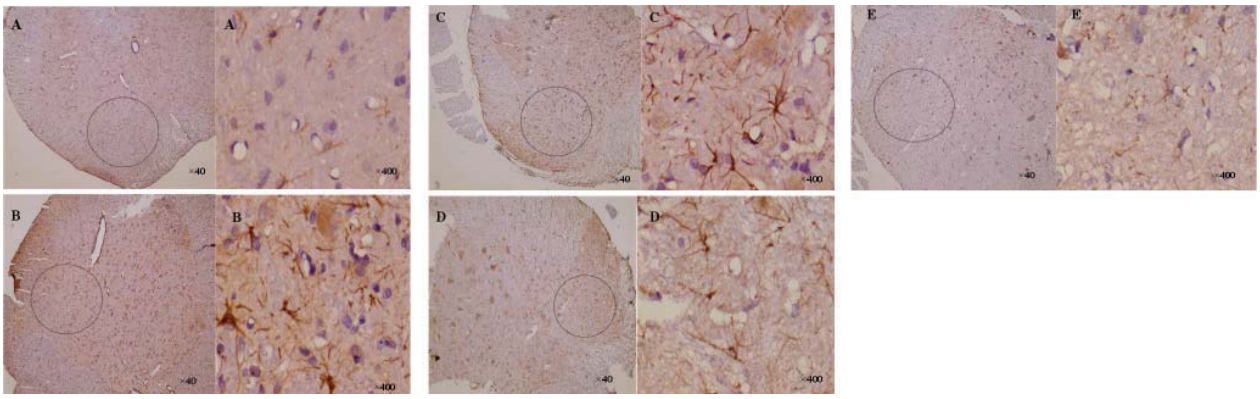


Figure 3: Effect of melatonin and morphine on GFAP expression with immunohistochemistry of dosal horn of lumbar spinal cord (diaminobenzidine stained, Figure 3). Compared with saline group, hypertrophic and proliferated astrocytes with enlarged cell body and number of GFAP-immunoreative cells increased (P<0.05) in morphine group (10mg/kg s.c. twice daily for 7 consecutive days) in the dorsal horn of the lumbar spinal cord in rats (Fig. B×400). Chronic melatonin administration (50, 100mg/kg, i.g.) reduced the number of GFAP-immunoreative astrocytes.(P<0.05 vs morphine group.(Fig. D×400, Fig. E×400)
A: Saline group, were sparse; B: GFAP+ cells were significantly increased and cell types showed intense GFAP immunoreactivity, multipolar and appeared hypertrophy after morphine s.c. 10mg/kg twice daily for 7 consecutive days. C: Melatonin 25mg/kg i.g. daily at 5:00pm and morphine s.c 10mg/kg twice daily for 7 consecutive days. D: Melatonin 50mg/kg i.g. daily at 5:00pm and morphine s.c 10mg/kg twice daily for 7 consecutive days. E: Melatonin 100mg/kg i.g. daily at 5:00pm and morphine s.c 10mg/kg twice daily for 7 consecutive days. (n = 3/group).

withdrawal, rats became even sensitive to thermal stimuli (P<0.05). Chronic treatment with melatonin (50, 100mg/kg, i.g. 5:00pm daily) along with morphine attenuated the development of tolerance and prevent hyperalgesia induced by morphine, while chronic treatment with melatonin alone (25, 50,100mg/kg) have no effect on baseline thermal nociceptive thresholds(Fig.1B).

Inhibition effect of chronic treatment of melatonin on spinal astrocytes activated by morphine in vitro and in vivo.

A common marker for glial reactivity is the well described increase in GFAP. The effects of morphine treatment (10mg/kg twice daily for 7 days) on spinal astrocytes were assessed by immunohistochemistry of GFAP. Lumbar spinal cord segments from rats treated, or not, with morphine and/or the melatonin(25,50, 100mg/kg, i.g.), were processed for GFAP. Hypertrophic and proliferated astrocytes with enlarged cell body and number of GFAP-immunoreative cells in morphine treated group compared with saline group. Chronic melatonin administration (50, 100mg/kg, i.g.) reduced the number of GFAP-immunoreative astrocytes.(P<0.05 vs morphine group, Figure 3).

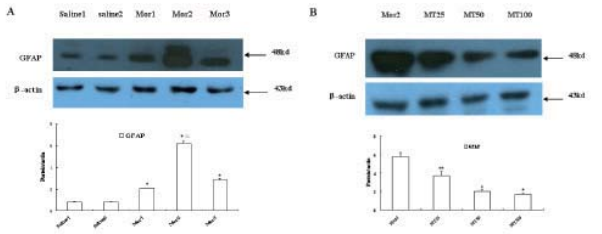


Figure 4: A: Long-term morphine treatment (10mg/kg s.c. twice daily for 7 consecutive days) significantly increased the total amount of GFAP protein in lumbar spinal cord (P<0.01). Saline1: The 7th day in saline group; Saline 2: 1th day after stopped saline treatment; Mor1: The 7th day in morphine group; Mor2: 1th day after termination of morphine; Mor3: 2th days after termination of morphin. (*P<0.01 vs saline1 and saline2, △P<0.01 vs Mor1 and Mor3)
B: Chronic melatonin treatment can dose dependently decreased the hyperexpression of GFAP induced by morphine. Mor2: 1th day after termination of morphine treatment; MT25: Melatonin 25mg/kg i.g. daily at 5:00pm and morphine (10mg/kg twice daily for 7 consecutive days); MT50: Melatonin 50mg/kg i.g. daily at 5:00pm and morphine (10mg/kg twice daily for 7 consecutive days); MT100: Melatonin 100mg/kg i.g. daily at 5:00pm and morphine (10mg/kg twice daily for 7 consecutive days). n=4/group (*P<0.01 vs Mor2, **P<0.05 vs Mor2).

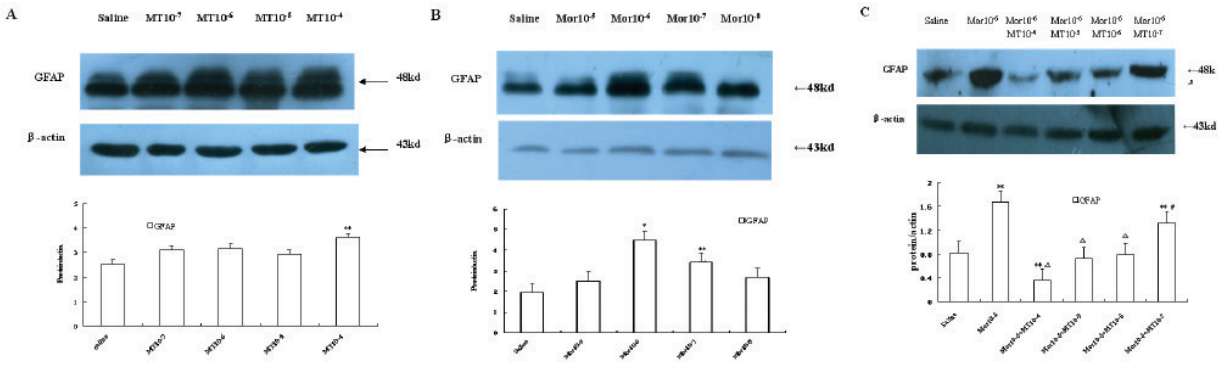


Figure 5: The effect of melatonin (10-7~10-4mol/L) and(or) morphine (10-8~10-5mol/L) on expression of GFAP in cultured spinal cord astrocytes. Only high concentration of melatonin (10-4mol/L for 4 days) statistically increased the GFAP expression in cultured spinal cord astrocytes. (P<0.05 vs saline, Fig. 5A) Morphine(10-7~10-6mol/L for 4 days) significantly increased GFAP in spinal cord astrocytes.(*P<0.01, **P<0.05 vs saline, Fig. 5B.) Melatonin (10-6~10-4mol/L for 4 days) significantly decreased overexpression of GFAP induced by morphine(10-6mol/L) in cultured spinal cord astrocytes.(**P<0.05 vs saline, △P<0.01 vs Mor10-6, #P<0.05 vs Mor10-6 , Fig. 5C).**

Western blot measurement of lumbar spinal cord GFAP levels after 7 days of morphine treatment showed significant increases compared with those in saline (Figure. 4A). The concurrent administration of melatonin attenuated the upregulation of GFAP in morphine treatment rats (Figure. 4B).

Several concentrations of melatonin were assayed to study its ability in GFAP expression in cultured primary spinal astrocytes. Only high concentration of melatonin (10-4mol/L for 4 days) statistically increased the GFAP expression in cultured spinal cord astrocytes.(Figure. 5A) Morphine(10-7~10-6mol/L for 4 days) significantly increased GFAP in spinal cord astrocytes.(Fig. 5B.) From the concentrations assayed, 10-4~10-7mol/L melatonin reduced over-expression of GFAP caused by morphine in cultured spinal astrocytes (Fig. 5C).

Effect of melatonin and morphine on PKC activity in spinal cords or cultured spinal astrocytes (Table3, Table4, Figure. 6).

Long-term morphine treatment (10mg/kg twice daily for 7 consecutive days) showed significantly enhanced (P<0.01) PKC activity in the lumbar spinal cord in rats while co-administrated with melatonin (25, 50, 100mg/kg) decreased (P<0.01) the over-expression of GFAP induced by morphine (Fig. 6A). In cultured spinal astrocytes, melatonin(10-6-10-4mol/L for 4 days) significantly (P<0.01) decreased PKC activity induced by morphine(10-6mol/L) in cultured spinal cord astrocytes (Fig. 6B).

Effect of morphine and melatonin on cAMP concentration in spinal cords and cultured spinal astrocytes (Table 3, Table 4, Figure. 7).

Long-term morphine treatment (10mg/kg s.c. twice

TABEL 3.Vivo effect of morphine and melatonin on cAMP concentration and PKC activity in spinal cords.

group (n=3)	PKC pmol/min.mg	cAMP pmol/g
NS	29±12	135±37
Mor	1273±265*	198±17*
MT_{25}	545±107*#	184±8
MT_{50}	185±31*#	177±14**
MT_{100}	89±12#	156±18△

* P<0.01, ** P<0.05 vs NS group; # P<0.01, △P<0.05 vs Mor group. Mor: morphine 10mg/kg subcutaneously twice daily for 7 days; MT25: Melatoin 25mg/kg, i.g. 5:00pm daily along with morphine; MT50: Melatoin 50mg/kg, i.g. 5:00pm daily along with morphine; MT100: Melatoin 100mg/kg, i.g. 5:00pm daily along with morphine.

TABEL 4.Vitro effect of morphine and melatonin on cAMP concentrationand PKC activity in cultured astrocytes.

group (n=3)	PKC pmol/min.mg	cAMP pmol/g
NS	10±3	1.12±0.18
Mor10-6mol/L	144±36*	1.72±0.06**
Mor10-6mol/L+MT10-7mol/L	151±25*	1.65±0.15**
Mor10-6mol/L+MT10-6mol/L	62±12*#	1.23±0.05
Mor10-6mol/L+MT10-5mol/L	35±14#	1.28±0.34
Mor10-6mol/L+MT10-4mol/L	9±2#	1.20±0.46△

* P<0.01, ** P<0.05 vs NS group; △P<0.05, # P<0.01 vs Mor10-6mol/L group. Melatonin 10-4mol/L~ 10-7mol/L for 4 days along with 10-6mol/L morphine in cultured spinal cord astrocytes.

daily for 7 consecutive days) in rats showed significantly increased cAMP level in the lumbar spinal cord (P<0.01) compared with control group. When Co-administrated with melatonin (100mg/kg i.g. daily at 5:00pm), the cAMP level significantly decreased (P<0.05) compared with that of morphine alone (Fig. 7A). Melatonin (10-4mol/L for 4 days) significantly decreased (P<0.05) cAMP level induced by morphine(10-6mol/L) in cultured spinal cord astrocytes(Fig. 7B).

Discussion

Chronic morphine treatment not only cause tolerance and withdrawal-induced hyperalgesia, but also led to glial activation in the spinal cord of rats[9]. The main findings of this study show that melatonin, by co-administrating with morphine, decreased the development of morphine tolerance, prevented the OIH, and reversed spinal glial reactivity. This enhanced glial activity induced by morphine, was also reversed by melatonin in primary cultured spinal astrocytes using vitro study.

Morphine is well known to coupled toμopioid receptor, activate Gαi protein, inhibit AC activity and reduce cAMP levels. When G protein activated, the effect is also accomplished by the dissociation of its subunit Gαi and Gβγ dimer. Long-term morphine exposure can cause up-regulation of AC activity by increasing concentration of Gβγ, resulting in high level of cAMP [30,31]. Increased cAMP level may stimulate the release of excitatory

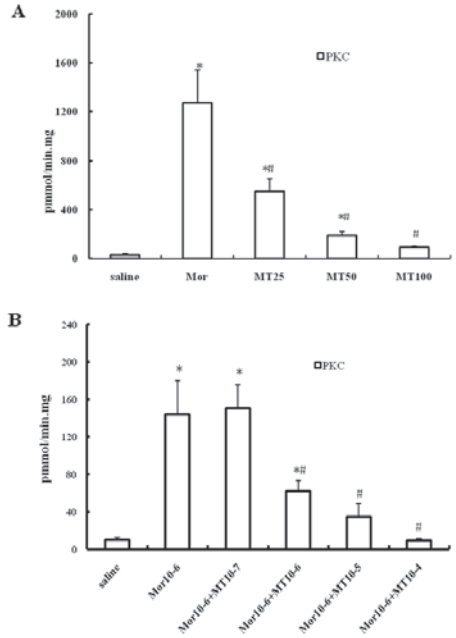


Figure 6: Vivo and vitro effect of morphine and melatonin on PKC activity in spinal cords (Fig. A) and cultured spinal cord astrocytes (Fig. B). Long-term morphine treatment (10mg/kg twice daily for 7 consecutive days) showed significantly enhanced PKC activity(P<0.01) in the lumbar spinal cord in rats while co-administrated with melatonin (25, 50, 100mg/kg i.g. daily at 5:00pm) decreased the hyperactivity of PKC induced by morphine (P<0.01, Fig. A). Melatonin(10-6~10-4mol/L for 4 days) significantly decreased the hyperactivity of PKC induced by morphine(10-6mol/L) in cultured spinal cord astrocytes (P<0.01, Fig. B). *P<0.01 vs saline,# P<0.01 vs Mor.

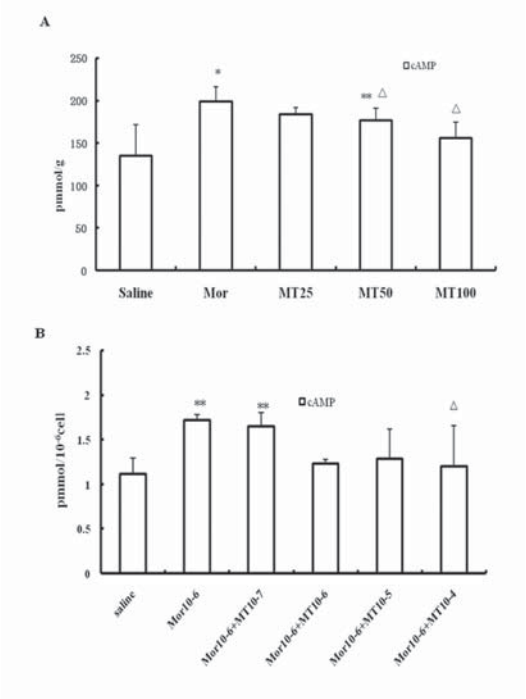


Figure 7: Vivo and vitro effect of morphine and melatonin on cAMP concentration in spinal cords and cultured spinal astrocytes. A: Long-term morphine treatment (10mg/kg s.c. twice daily for 7 consecutive days) showed significantly increased cAMP level in the lumbar spinal cord (P<0.01) in rats while coadministrated with melatonin (100mg/kg i.g. daily at 5:00pm) decreased the high level of cAMP induced by morphine (P<0.05). B: Melatonin (10-4mol/L for 4 days) significantly decreased high level of cAMP induced by morphine(10-6mol/L) in cultured spinal cord astrocytes (P<0.05). *P<0.01 vs saline, ** P<0.05 vs saline, △P<0.05 vs Mor or Mor10-6 mol/L.

neurotransmitters via presynaptic activation at a spinal level[32], thus cause central sensitization. Furthermore, Gβγ activities at least two phospholipase C (PLC) subtypes, PLCβ2 and PLCβ3, Activated PLC stimulates the production of diacylglycerol and IP3[33], which in turn leading to Ca2+ influx from the extracellular environment, thus enhancing membrane translocation of PKC[34]. PKC have a crucial role in the crosstalk between Gi-AC-cAMP pathway and other cellular process such as excitatory amino acids (EAA)-NMDA and glial hyper-reactivity[35].

The neuroprotective role of glia in the CNS is well known. Glial cells provide physical support and housekeeping for neuron, respond swiftly to even subtle physiological changes. Astrocytes constitute 40~50% of all glial cells and outnumber neurons. Astrocytes enwrap synapses, respond to neurotransmitters with changes in membrane potential and release many kinds of neurotransmitters, thus, actively regulate neuron-to-glia communication, modulate neuron-to-neuron synaptic transmission. Recent evidence suggests that glial cells might modulate opioid actions[6]. Chronic morphine treatment activates spinal astrocytes activity[9], and inhibition of this activation by glial inhibitors propentofylline partially reversed the development of morphine tolerance[8]. Activated glia release EAA, nitric oxide (NO), and proinflammatory cytokines[36]. Possibilities for chronic morphine-induced activation of glia could be the involvement of protein kinase C (PKC) pathway[35] or PKC dependent[13,37]. As GFAP is a specific marker of astrocytes, changes in GFAP level are normally considered to represent the astrocytes response in these cases.

Melatonin is lipophilic compound and when injected peripherally, it can freely cross hematoencephalic barrier, the concentrations in CNS is higher than those in the serum. MT exhibits its most effect through activation of G-protein coupled specific receptors. Melatonin's membrane-associated receptors are classified into MT1 and MT2 subtypes[38]. Like opioid receptors, they also belong to the seven transmembrane receptor family[39]. Autoradiography studies indicate that melatonin receptors are expressed in various neuronal areas[41] including the dorsal horn of the spinal cord, spinal trigeminal tract which involved in nociceptive transmission and pain control [41,42]. MT1 and MT2 receptors are in high density in superficial lamina of the spinal cord, which is vital region in pain modulation [43,44]. Previous works have also shown that the co-presence of specific opioids[45,46] and melatonin rceptors[47,48] on astrocytes.

Melatonin's antinociceptive and anti-inflammatory effects are mainly mediated through specific membrane-associated receptors coupled to inhibitory G protein (Gi), mediate suppression of intracellular cAMP levels[49]. Furthermore, melatonin has been suggested to block calmodulin (CaM) interactions with its target enzymes by increasing CaM phosphorylation[50,51], while CaM kinase plays an important role in leading to central sensitizationand maintaining opioid-induced hyperalgesia[52]. Melatonin has also been shown to enhancing survival of glial cells, reducing glial hyperactivity in various conditions both vivo and vitro study (as revealed by GFAP)[53,54]. Melatonin can inhibit proliferation of glioma cells by inactivate the pathway of PKC[55].

Considering the most commonly used medication method is orally routine, the intragastric route of melatonin was selected in current study rather than intraperitoneal way. Because the bioavailability of intragastric route is comparatively low[56], that's why the melatonin doses were high in this test. Melatonin could reverse morphine tolerance and dependence have been reported elsewhere[18]. The present data further highlight melatonin can not only alleviate the process of morphine induced tolerance, but also prevent morphine induced hyperalgesia after drug withdrawal. The present study also describes a marked glial response to chronic morphine treatment as characterized by increased immunoreactivity and expression of GFAP in lumbar spinal cord, the highest level of GFAP was at the 1st day after drug termination as revealed by western blot. Accordingly, significantly increased PKC activity in spinal cord was also detected. Morphine induced glial hypertrophy and PKC hyperactivity were attenuated by co-administrating with melatonin. High level of cAMP caused by long term morphine treatment has been proved [30,31], melatonin can coupled to its receptor and decreases the intracellular cAMP level through Gi-cAMP pathway. In the present study, the alterations of cAMP are not parallelled with the inhibition of PKC activity and GFAP output after melatonin treatment. The reason for this phenomenon might be related to the effect of melatonin on cAMP was

concealed by up regulation of cAMP after long term treatment of morphine, or inhibition the PKC activity may receptor independent or partially receptor independent. Interestingly, melatonin alone, in rather higher dose (10-4mol/L) could cause high level of GFAP in cultured spinal astrocytes, that might because that both melatonin's most powerful effect and the main function of astrocytes are free radical scavenger[57].

The major shortcoming of this study is that it didn't include the test of usage of PKC inhibitors to further verify the effect of melatonin on astrocytes.

Conclusions

This study demonstrated that melatonin, might prevent morphine induced hyperalgesia and glial reactivity both in vivo and vitro. This effect of melatonin may mediated by inhibition of PKC activity.

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Application of Blood Salvage in Neurosurgery

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Abstract

Intraoperative blood salvage (IBS) is a useful technique for intraoperative blood conservation. The indication, contraindication, clinical consideration and experiences of IBS used for neurosurgery were summarized in this article. IBS should be continuously applied in massive operation for cerebral vascular malformation, epilepsy, cranioplasty, closed head injury, and spinal surgery. The combinational use of IBS and other means of blood conservation (such as rational use of drugs promoting erythrocytopoiesis and hemostatic drugs, accurate hemostasis, or controlled hypotension) can reduce or even obviate the need for allogeneic blood transfusion. Further studies with larger sample size and longer-term follow-ups are necessary to indicate the safety of IBS for intracranial tumor patients.

Key words: Intraoperative blood salvage; Cell saver; Neurosurgery

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Intraoperative blood salvage (IBS) is not widely used in neurosurgery despite its extensive application in cardiovascular and orthopedic surgery [1]. Few in-depth studies are available regarding the use of IBS in neurosurgery, particularly those assessing the effect of neurosurgery on the quality of recovered blood during surgery [2-4]. The clinical consideration and experiences of IBS used for neurosurgery were summarized in this article.

A. Indications and contraindications of IBS for neurosurgery

Indications of IBS for neurosurgery include:

(1) cerebral vascular surgery in which intraoperative blood loss is expected to reach or exceed 500 ml;

(2) surgery for primary epilepsy;

(3) cranioplasty;

(4) surgery for closed head injury;

(5) pediatric neurosurgery in which even only a small amount of blood can be recovered.

Of them, operations for intracranial aneurysms and arteriovenous malformation are the neurosurgical procedures most suitable for IBS, since they usually involve considerable blood loss and a clean surgical field. In a previous study involving 326 patients who underwent surgery for intracranial aneurysms in Beijing Tiantan Hospital, the average blood loss was 538 ml (range 100 - 2500 ml) and IBS was applied to 160 of them. The average volume of erythrocyte suspension after salvage and washing was 342 ml (range 100 - 1150 ml). Meanwhile, the average blood loss was 1154 ml (100 -8500 ml) in another 102 patients who underwent resection of intracranial arteriovenous malformation during the same period at the same hospital, of whom 72 patients received IBS. The average volume of erythrocyte suspension after salvage and washing was 670 ml (range 125 -3750 ml). For patients who require emergency surgery due to closed head injuries, there is usually not enough time for blood preparation in such operations. In these cases, IBS serves as an important tool in increasing surgical safety and is thus of great practical value.

Previously, 170 patients aged between 7 months and 77 years underwent IBS during surgery for closed brain injuries such as cerebral contusion and laceration, depressed fracture of skull, epidural, subdural, and intracerebral hematoma in Beijing Tiantan Hospital. The intraoperative blood loss of these patients ranged from 130 ml to 5000 ml. The average volume of recovered blood was 623 ml (range 50 - 2750 ml). Intraoperative transfusion of allogeneic red blood cells was performed in only 19 patients. Besides, no adverse reactions or complications associated with blood salvage were noted. This study not only proves the remarkable efficacy of IBS in blood conservation, but also suggests that IBS provides a safe, prompt blood source for patients with massive bleeding because of cerebral trauma and increases the safety of emergency operations.

B. Contraindications of IBS to neurosurgery

Contraindications include:

(1) surgery for malignant tumors (glioma, ependymoma, chordoma, primary neuroectodermal

tumors, pineocytoma, germinoma, choroid plexus papillomas, malignant meningioma, metastatic carcinoma and osteosarcoma);

(2) surgery having polluted surgical field (trans-oral-nasal-sphenoidal approach, surgical removal of abscess and other infection foci in brain and spine, surgical removal of cysticerci, and surgery for craniocerebral trauma that involves open wounds).

Although the majority of meningiomas are benign, extracranial metastasis still occurs to less than one in a thousand, with the most common site of metastasis being the lungs, followed by the liver. Currently, it is generally believed in the medical community that hematogenous metastasis may be the major route responsible for metastasis of meningiomas, though there has been no report of IBS-caused extracranial metastasis of meningiomas. A total of 134 patients underwent meningioma resection in Beijing Tiantan Hospital during the period from January 1999 to December 2006. Of them, 89 received IBS (group I) and 45 did not (group II). The two groups of patients were followed up for at least 12 months after surgery, with a mean period of 25 months (range 12-58 months) and 30 months (range 12-82 months), respectively. Re-examinations using brain imaging, chest X-rays, and abdominal B-mode ultrasonography were performed to determine whether there was tumor recurrence or extracranial metastasis.

The results showed that intraoperative transfusion of allogeneic blood was conduced in 7 cases of group I (7.9%) and 11 cases of group II (24.4%) ($P<0.001$). During the follow-up period, of the patients who underwent Simpson Grade 1 resection in both groups, tumor recurrence appeared in 5 (7.6%, group I) and 4 (11.8%, group II). But no extracranial metastasis after surgery was found in both groups. There is no evidence yet that the use of IBS during meningioma resection is associated with increase in extracranial metastasis or recurrence of tumors. This study, however, included only a small number of cases and could not fully prove the safety of blood salvage in meningioma surgery. At present it is not recommended to employ IBS as a routine procedure during meningioma resection. In cases of massive bleeding which cannot be timely rescued with allogeneic blood transfusion or in cases where allogeneic blood transfusion is not suitable, once informed consent is obtained from patients and their families, the recovered blood can be filtered with some proper means such as a leukocyte depletion filter before being re-infused to the patients. Larger sample size and longer-term follow-ups are necessary to keep track of the long-term safety of IBS for such patients.

C. Issues to be taken into account when using IBS during neurosurgery

1. IBS should be rationally used according to the bleeding characteristics of neurosurgery. Bleeding in neurosurgery mainly occurs during occasions of opening and closing the skull, operations adjacent to large blood vessels or venous sinus, or resection of tumor tissue with abundant blood supply. Bleeding characteristics vary with the sites of bleeding. Bleeding due to venous sinus tear or bleeding of arteries and large veins are rapid and copious, and the small surgical fields are usually quickly filled with blood, thus making the surgeons difficult to stop bleeding in a fast and accurate way. When the skull is being opened or closed, fast, extensive blood oozing usually occurs because of the large wound involved and rich blood supply in the diploe.

For surgery that carries a risk of rapid, copious bleeding intraoperatively, two or three aspirators are required at one time to suction the blood. Besides, a large reservoir (3000 ml) is also needed in case of massive bleeding to avoid possible waste of spilled blood. When a massive bleeding does occur, the negative pressure of the aspirators can be elevated to a certain degree to accelerate suction and ensure suction effects.

2. Because of the small blood volume of pediatric patients, the absolute amount of blood loss in pediatric surgery is generally small. Sometimes, the salvaged blood cannot even fill up a small centrifuge bowl, and the efficiency of blood salvage decreases significantly. Moreover, the salvaged blood after washing has a relatively low hematocrit, thus increasing the volume load of children patients who receive such blood containing relatively few red blood cells. The use of continuous autotransfusion system (CATS), however, avoids the above concerns. The spiral washing chamber of CATS has a volume of only 30 ml. But its processing capacity for salvaged blood is basically not confined by the amount of salvaged blood, thanks to the incorporation of the continuous washing technique. Even if only 100 ml of blood is recovered from the surgical field, CATS blood salvage devices still have high efficiencies in blood processing, thus making them the most suitable

blood salvage apparatus for pediatric surgery. They are particularly useful in pediatric surgery for craniostenosis, cerebral vascular conditions, and craniocerebra trauma.

Although the use of IBS can decrease the need for allogeneic blood transfusion during pediatric surgery, IBS has a limited positive effect on blood conservation and the use of IBS alone cannot eliminate the need of allogeneic blood transfusion altogether. From March 2003 to February 2005, IBS was applied to 103 pediatric patients aged from 7 months to 12 years who underwent neurosurgery in Beijing Tiantan Hospital. The neurosurgical operations included surgery for intracranial aneurysms, arteriovenous malformations, and intracranial hematoma, and intraspinal surgery, as well as opening and closing of the skull for intracranial malignant tumors. The intraoperative blood loss ranged from 130 to 4200 ml, with a mean volume of salvaged blood being 289 ml (range 50-2000 ml). Of these patients, 36 (35.3%) still received allogeneic red blood cells. Only the combinational use of IBS and other means of blood conservation (such as rational use of drugs promoting erythrocytopoiesis and hemostatic drugs, accurate hemostasis, or moderate reduction of blood pressure) is possible to reduce or even obviate the need for allogeneic blood transfusion.

3. Efforts should be made to ensure adequate anticoagulation. As the brain tissue is rich in thromboplastin, this enzyme may be abundantly released during surgery into the shed blood, thereby remarkably promoting the activation of the coagulation system and expediting the formation of tiny clots in the blood. For this reason, when IBS is employed during neurosurgery, much attention is called for to timely adjust the drip rate of the anticoagulant solution according to the rate of intraoperative bleeding, and to shake gently the reservoir every so often to ensure uniform mixing of the anticoagulant and the salvaged blood. Compared with acid citrate dextrose preservation solution, heparin has a stronger anticoagulant effect and a wider dosage range (5-10U/ml is enough to achieve anticoagulation in vitro). Hence, slight increase in concentration or dosage of heparin will not greatly affect the quality of the salvaged blood.

4. Effective washing and filtering should be ensured. Two features of neurosurgical procedures may significantly affect the quality of the salvaged blood.

(1) Blood recovered intraoperatively has a high level of hemolysis. A neurosurgical operation, usually performed microscopically, has a confined surgical field and thus poses a high requirement for a clear surgical field. Even blood from minor bleeding is needed to be promptly aspirated from the surgical field. During this process, air or even solid impurities like bone or tissue debris may enter the salvaged blood, and cause notable turbulences in the suction pipes. Therefore, many red blood cells in the salvaged blood are damaged and the maximal rate of hemolysis of the blood salvaged intraoperatively can reach as high as 8% or more. Observations with scanning electron microscopy found that the recovered blood contained a lot of cellular debris and red blood cells with markedly changed shape including cells swelling into spine-shaped or mouth-shaped ones. This finding suggests that severe damage of red blood cells does occur in the blood recovered during craniocerebral operations. Sufficient washing is essential to ensure the quality of recovered blood. It is advisable to use washing solution at a volume 6 or 7 times that of the volume of centrifuge bowl to wash the salvaged blood (for example, 1500 ml of washing solution is recommended for centrifuge bowls of 225 or 250 ml). Alternatively, the automatic high quality washing programme pre-set by the blood salvage device can be used for such purposes.

The washing efficiency of the discontinuous-washing blood salvage device correlates closely with the amount of blood in the centrifuge bowl, pumping speed of the blood pump of the blood salvage device, centrifuge speed, and flow rate and amount of washing solution. Therefore, for neurosurgery in which the recovered blood has a high level of hemolysis, particular care should be taken to properly handle the blood salvage machine. Washing should initiate only after the centrifuge bowl has been filled up. In addition, the blood-pumping speed (speed of blood entry) and the washing speed of the blood salvage machine should not be elevated at will. Otherwise, the clearance rates of such harmful substances as free hemoglobin or inflammatory factors in the recovered blood may be reduced significantly. When emergency washing is indicated in case of massive bleeding, it is preferable to adopt Fresenius C.A.T.S. (Fresenius continuous autologous transfusion system, Fresenius AG, Bad homburg, Germany). Equipped with continuous washing technology, this blood salvage system enables simultaneous separation, washing, and empting of the salvaged blood. When used at the mode of fast processing (100 ml of red blood cell suspension is washed per minute), it can always ensure a hematocrit of

above 50% and a clearance rate of serum albumin higher than 90%. Additionally, its processing efficacy for the salvaged blood varies little with the change of processing programmes.

(2) Blood recovered during operation may be mixed with non-blood-derived impurities. When a surgical drill is used to drill the skull, small bone debris is often present in the surgical field. Moreover, as artificial surgical materials like bone wax, bone glue, gelatin sponge, hemostatic gauze or even titanium plates are often used, it is inevitable that tissue debris or the like may find their way in the salvaged blood. It is possible that impurity particles with a largest diameter less than the smallest pore diameter of the filter of the reservoir may still pass the filter during blood salvage, and that centrifugation alone cannot effectively remove impurity particles with a density close to or exceeding that of red blood cells. Although there has been no report of complications from non-gaseous embolization following re-administering the blood salvaged by blood salvage machines, yet a study found a great many black particles visible to the naked eye in the blood (Cell saver blood salvage system) salvaged from a patient who underwent total hip replacement surgery. Under electron microscopy, it was found that these particles were formed by aggregation of considerable minute tissue debris (diameter< 10 μm) and metal material used during surgery. Accordingly, when the blood salvaged from the surgical field consists of complex components (seriously damaged red blood cells, blood clots, and much debris from artificial materials and tissues), there is a likelihood of re-formation of large impurity particles with a diameter larger than the smallest pore diameter of the filter of the reservoir in the filtered blood. Theoretically, patients may therefore risk being re-infused impurity particles. Hence, when many impurities are present in the surgical field (surgical procedures involving much use of artificial materials, like the use of titanium plates and nails when repairing the skull, the use of bone wax to stop bleeding when opening and closing the skull, or the use of artificial biological gel), blood salvage should be suspended and microaggregates blood filters (diameter 40 μm) should be routinely used to re-infuse the salvaged blood, in an effort to increase the safety of blood salvage.

In addition, hydrogen peroxide solution is sometimes used during neurosurgery to facilitate hemostasis of wounds with extensive blood oozing. However, it can lead to hemolysis, and blood salvage, therefore, should be suspended.

5. Attention should be paid to changes in coagulation function and osmotic pressure when a large quantity of salvaged blood is re-infused. Excessive loss of the plasma, platelets, and coagulation factors during the recovery, washing, and re-administration of considerable amounts of blood can lead to hypoproteinemia and coagulation disorders. Therefore, supplement of these substances is required. In general, when the blood loss is below 50% of the blood volume, satisfactory blood salvage can be achieved, and supplement of plasma substitute alone would be sufficient. But neurosurgery, particularly craniotomy, presents a higher requirement for hemostasis. Once the blood loss exceeds 50% of the blood volume, surgeons can choose whether to supplement coagulation components depending on tests of coagulation function (coagulation profiles, viscoelastic test of bedside blood clots, platelet count, and surgeon's evaluation of coagulation in the surgical field), progress of surgery (whether or not major bleeding steps have ended), and clinical status of the patients (compensatory capacity).

In case of good coagulation in the surgical field, no presence of rapid, massive bleeding, but mildly abnormal parameters of viscoelastic tests of bedside blood clots, lyophilized human fibrinogen can be first supplemented. When there is considerable blood oozing in the surgical field and the blood loss or the re-infusion volume equals to the blood volume of the patient, fresh frozen plasma can be re-administered at a dose of 10-15 ml/kg. Since a lot of platelets are removed during blood salvage, platelet count should also be determined to ensure it not lower than 60×109/L when the blood loss equals or exceeds the blood volume of the patient.

Furthermore, for patients who underwent craniotomy and received large amounts of salvaged blood, particular care must be taken to avoid cerebral edema resulted from significantly decreased plasma colloid osmotic pressure. Plasma colloid osmotic pressure and plasma protein concentrations can be measured, if possible. Proteins should be supplemented when serum albumin levels drop below 20 g/L.

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摘要

摘要：在过去的10年中，数种新型间接喉镜在成年人临床实践中证实有用。但是，这些间接喉镜中仅有四种具有能够用于小儿的型号，包括一次性Airtraq光学喉镜、GlideScope视频喉镜、Storz DCI视频喉镜和Truview PCD婴儿喉镜。在此，我们评述此方面的相关文献，并介绍各种间接喉镜在小儿困难气道处理中的临床应用情况。

关键词：间接喉镜；气道管理；困难气道；气管插管；小儿

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新型间接喉镜在小儿困难气道处理中的应用

Use of New Indirect Laryngoscopes in Management of Difficult Pediatric Airway

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Abstract

During the last decade, several new indirect laryngoscopes have proven useful in clinical adult practice. Only four of them are currently available in sizes that may be used in children: the AIRTRAQ® Disposable Optical Laryngoscope, the GlideScope® Video Laryngoscope, the Storz DCI® Video Laryngoscope, and the Truview PCD® Infant. Here, we review the literature and describe the clinical use of new indirect laryngoscopes in management of difficult pediatric airway.

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对麻醉医师来讲，小儿困难气道处理总是一种挑战。然而幸运的是，意料之外的困难气道在小儿极为少见。小儿的病史或外貌特征常常能够提醒麻醉医师在麻醉诱导前对可能面对的困难气道做好充分的准备工作。多年来，光导纤维支气管镜引导气管插管一直是解决困难气管插管的金标准。在过去的10年中，数种不同的拐角视野（look around the corner）光学或视频间接喉镜已经在成年人临床实践中证实有用，但是仅有四种光学或视频间接喉镜具有小儿型号，包括：一次性Airtraq® 光学喉镜（Prodol Meditec,Vizcaya, Spain）、GlideScope® 视频喉镜（Verathon,Bothell, WA, USA）、Storz DCI®视频喉镜（Karl Storz,Tuttlingen, Germany）和Truview PCD™婴儿喉镜（Truphatek,Netanya, Israel）。本文阐述这四种间接喉镜及其在小儿困难气道处理中的应用，同时对这些设备的应用给出实用建议。

必须指出，这些间接喉镜均是基于两种不同的技术：Airtraq光学喉镜是在一侧设计有气管导管引导通道，而在应用其他三种设备时，气管导管则需装有韧性插管芯，插管芯可将气管导管塑型并引导其对向声门。

一、一次性使用的Airtraq光学喉镜

Airtraq光学喉镜是一次性使用喉镜，其灯光散射的热量是被作为防雾机制（anti-fogging mechanism）。虽然该喉镜可使用橡胶目镜进行观察，但是其亦可与重量极轻的摄像机相连，并通过无线监视器（Airtraq Wireless Monitor）应用摄像机。监视器采用11.5cm的屏幕，图像宽度是7cm[1]。

目前Airtraq光学喉镜有三种适用于小儿经口气管插管的型号，“婴儿型”（0号）可容纳2.5～3.5号的导管（图1A）；“小儿型”（1号）可容纳3.5～5.5号的气管导管（图1B）；“小号”可容纳6.0～7.5号的气管导管（2号）（图1C）。三种喉镜需要的张口度分别为10～11mm、12～13mm和15～18mm。另外，还有一个适用于小儿镜经鼻气管插管的Airtraq光学喉镜，除了无容纳气管导管的引导通道之外，其形状基本类似于“婴儿型”Airtraq光学喉镜（图1D）。

图1 小儿Airtraq光学喉镜的型号

在实施经口气管插管时，将气管导管插入Airtraq光学喉镜一侧的引导通道时，对其进行润滑可减小阻力。将Airtraq光学喉镜轻柔地插入口腔正中，同时注意避免将舌体压向喉部。为了显露声门，可将Airtraq光学喉镜前端放置在会厌谷。当声门被定位在取景器中央部位时，慢慢推送气管导管。如果气管导管不能沿着正确方向前进，则需重新定位Airtraq光学喉镜的位置。通常是上提Airtraq光学喉

镜，因为在大多数情况下气管导管是滑到了声门的后方[2]。

据报道，在一例体重4.8kg的Pierre Robin综合征小儿成功应用Airtraq光学喉镜实施气管插管[3]。由于该喉镜型号大小的问题，其在气道空间受限小儿的有效性受到了人们的质疑，并且已经有在小儿应用该喉镜实施气管插管失败的情况[4,5]。因此，有人建议将Airtraq光学喉镜与韧性插管芯一起使用以引导气管导管向更靠前的方向运动，或者是将其与可曲支气管镜联合使用以调节气管导管的方向[2]。

在直接喉镜气管插管失败的小儿，笔者已经成功应用Airtraq光学喉镜完成了气管插管[6]。虽然润滑气管导管非常重要，但是尽管如此操作者仍难判断推送气管导管的阻力是由引导通道所致，还是由气管导管角度不正确或气管导管管径过大所致[7]。根据我们的经验，只要口腔和喉部有足够的空间，Airtraq光学喉镜就可用于小儿。但是，如果张口受限或气道狭窄，则需选择其他技术。

二、GlideScope®视频喉镜

原始型号GlideScope视频喉镜有一个适用于小儿的镜片；目前的小儿型GlideScope视频喉镜是其第三代产品，即Cobalt型和Ranger型GlideScope视频喉镜，两者均包括可重复使用的视频杵和两个不同大小适用于小儿的一次性使用喉镜片（图2B和C）。Cobalt型和Ranger型GlideScope视频喉镜所配备的内置式视频记录元件可在显示器上产生清晰图像。与原始型号GlideScope视频喉镜应用的14.5mm喉镜片相比，Cobalt型和Ranger型GlideScope视频喉镜的最大改进是采用了10mm的喉镜片，而且采用了特殊的便携式、袖珍型、电池供电的改进型式。另外，与Cobalt型GlideScope视频喉镜相比，Ranger型GlideScope视频喉镜带有一个反式反射屏幕（trans-reflective screen），允许操作者在明亮的阳光下使用，其是专门为军事或院前急救应用而设计的[1]。

图2 适用于小儿的原始型号（A）、Cobalt型（B）和Ranger型（C）GlideScope视频喉镜

沿中线将GlideScope视频喉镜插入口腔内，并且无需移动舌的位置。由于其喉镜片的70°成角，所以仅能用于间接喉镜显露[8,9]。两项在正常气道小儿的研究发现，与直接喉镜相比，GlideScope视频喉镜可提供更好的喉部显露视野[10]。并且其中一项研究显示GlideScope视频喉镜需要更长的气管插管时间[11]。两项研究中插管芯形状的不同可能是导致气管插管时间差别的原因。目前已经有两个有关GlideScope视频喉镜在新生儿应用的小样本病例系列报道[12,13]。在这两个病例系列中，存在有两例应用GlideScope视频喉镜失败的小儿。第一个病例系列中应用的是带有14.5mm喉镜片的老式GlideScope视频喉镜[12]，而在第二个病例系列中作者将气管插管失败归因于使用经验不足[13]。

笔者已经在困难气道小儿成功应用了GlideScope视频喉镜。与其他设备相比，GlideScope视频喉镜可在较远的距离提供更好的声门视野，从而有助于定向和引导气管导管对向声门[8,9]。

三、Storz DCI®视频喉镜

Storz DCI®视频喉镜（SLV）配备有两个类似Miller喉镜片的细长喉镜片：0号和1号（图3）。SVL可在24cm宽的显示器（Tele pack, Karl Storz）上显示直径为14cm的清晰图像[1]。视频镜头和光源是安装在靠近喉镜片前端的位置，视角是80°。应用前，应在镜头使用防雾剂。

图3 带有0号喉镜片的Storz DCI视频喉镜，喉镜片厚度是5mm

由于是直型喉镜片，所以屏幕显示的图像类似于口腔直视看到的情况。SLV可被作为常规Miller喉镜应用，可用于直接喉镜培训[14]。由于喉镜片厚度仅为5mm，并且视频镜头是位于喉镜片前端，因此SVL能够用于张口十分受限的小婴儿。细长形状的喉镜片允许其从口腔一侧插入，就像“后磨牙”入路。Miller样喉镜片允许在气管插管时将其前端放置在会厌谷或者提起会厌。在4岁以下的正常气道小儿，SLV能够提供比直接喉镜稍微更好地喉显露[15]。在一项包括有7例困难气道婴儿的系列报道中，使用SLV时声门视野被提高到了Cormack-Lehane分级1～2级，并且全部婴儿成功实施了气管插管[16]。在一例体重2.1kg的肢体纤细型侏儒症早产儿[17]和一例体重9.3kg的Pierre Robin综合征婴儿[18]气管插管失败后，应用SVL亦成功完成了气管插管。另外，SVL也在42例体重低至500g的新生儿进行了试验，全部新生儿的气管插管均获成功[14]。作为该报道的一个有趣细节，在应用SVL实施气管插管时均未在气管导管内放置插管芯，而是将气管导管同轴性插入SVL喉镜片的凹槽向前推进，直到其进入显示器视野，然后继续向前推进气管导管进入气管。

四、Truview PCD™婴儿喉镜

Truview PCD™婴儿喉镜是一种最新的小型便携式喉镜，其目镜和光学装置在46°的前向折射角下能够提供宽大的放大喉部图像（图4）。带有磁性适配器的小型摄像机能够非常容易地被连接在目镜上，并在10cm的监视器屏幕上显示直径为7cm的图像（Truview PCD™显示器,Truphatek）。Truview

PCD™婴儿喉镜是采用充氧接头作为防雾机制，并可增加气管插管时气道内的氧浓度。Truview PCD™婴儿喉镜的喉镜片高度仅为8mm，这允许将其应用于新生儿。最近在60例正常气道新生儿和婴儿进行的一项研究显示，与标准Miller喉镜相比，该喉镜能够提供更好的喉部显露[19]。然而遗憾的是，至今尚无研究或病例报道证实该设备在困难气道婴儿的有效性。

四种喉镜特征和显露视野的比较见表1[20]。

表1 四种可用于小儿困难气道处理的间接喉镜的特征

	Airtraq	Cobalt型GlideScope	Storz VL	Truvies PCD
喉镜片厚度（mm）	12	10	5	8
喉镜处于最佳位置时的视野	声门及其周围结构	声门及其周围结构	仅显露声门	仅显露声门
便携性	+++（无视频装置时）	家用制氧仪（3～5L/min）	+（需要推车）	+++（无视频装置时）
防雾机制	有[a]	++(安装在移动支架上时)	无	有[b]
无插管芯情况下使用	能	有[a]	否（能）[c]	否
无摄像机或显示器时使用	能	否	否	能
一次性使用	是	否	否	否
优点	容易获得好的声门视野	一次性使用镜片	高质量的显示器图像；最小的张口要求	充氧延长脱氧饱和发生的时间
缺点	笨重、在狭窄气道内定位气管导管困难	视野大，所以将气管导管对准声门更容易	需防雾液；不符合人体工程学，使用中偶尔可发生解体	

a喉镜片上灯光的热量促进防雾；b氧气流促进防雾；c在无插管芯的情况下应用，沿喉镜片凹槽滑动气管导管

图4 带有磁性摄像头适配器的Truview PCD婴儿喉镜

五、间接喉镜显露

在常规直接喉镜显露时，虽然获得好的喉视野可能是困难的，但是只要能够看到声门，插入气管导管常常非常容易。相比之下，间接喉镜显露常常可获得好的声门显露，甚至在困难气道情况下亦是如此[20, 21]。但是困难之处在于引导气管导管对向不在视线上的声门，并将其插入两侧声带之间。如果看着屏幕或目镜“盲探”插入带有插管芯的气管导管，则有损伤气道的风险，并且甚至有发生腭弓穿孔的病例报道[22, 23]。

在使用大多数的间接喉镜时，均需要在气管导管内放置韧性插管芯对其进行塑型，并引导气管导管进入正确的位置。虽然一些厂商推荐将插管芯朔形成插管设备喉镜片的形状，但是许多麻醉医师喜欢将插管芯的最远端弯曲成60～80°的角，从口腔一侧插入[1, 8, 9]。这样较容易将气管导管定位在声门前。当气管导管前端位于声带之间时，将插管芯拔出。这有助于推送气管导管通过声门并进入气管。

为了减小间接喉镜显露和气管插管中发生气道损伤的危险，作者提出应用四步技术（表2）。在气道狭窄的情况下，将带有插管芯的气管导管对向声门非常困难或不可能。推送气管导管时，它常常是向喉的后方运动并进入食管。但是，如果将带有朔形成钩状插管芯的气管导管放置在声门前并将其指向正确方向，则常常可以解决该问题。在固定插管芯的情况下，推送气管导管脱离插管芯，然后沿相同方向推送气管导管通过声门并进入气管。在应用SVL喉镜实施气管插管时，应考虑使用早期描述的技术，即不在气管导管内放置插管芯的方法。

虽然无疑将来会有更多的相关资料发表，但是目前有关在困难气道小儿评价新型气道设备应用的研究和病例报道仍然非常有限，并且大多数发表的报道是有关SVL喉镜在小儿的应用。将来，更多新型的成年人气道设备也将有适合小儿气道管理的多个型号上市。

表2 间接喉镜显露的四个步骤

第一步	看口腔，将喉镜插入口腔内，并轻柔向前推进至舌根部
第二步	看屏幕，将喉镜定位在满意的位置
第三步	看口腔，将带有插管芯的气管导管轻柔地插入口腔内，并将其尽可能地放置在靠近喉镜片前端的位置
第四步	看屏幕，将气管导管对向声门并插入两侧声带之间

六、结论

在小儿，本文所介绍的四种新型喉镜通常有效，并能解决许多困难气道问题。但是，这些设备的大小及其所需的张口度决定了它们在小儿的有用性。尽管如此，仍有一些情况仅适合应用光导纤维支气管镜实施气管插管。虽然对这些新型设备的用法和应用时机的训练是必要的，但是必须坚持光导纤维引导气管插管技术的培训和教授，因为这种技术仍然是解决困难气管插管的金标准。

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于建设 综述

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摘要

围术期肠道屏障功能的变化对病人的术后转归有明显影响。术前病人状况、麻醉方法、麻醉用药、体外循环、手术种类等均对肠道屏障功能构成影响。硬膜外麻醉，特别是胸段硬膜外麻醉及止痛对肠道屏障功能有较明显的保护作用。异丙酚对肠道屏障也有一定的保护作用。而应激、休克、体外循环等对肠道有较严重的损害。

关键词：围术期肠道粘膜屏障功能

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围术期肠道屏障功能的影响因素

Effects of Perioperative Agents on Intestinal Mucosal Barrier Function

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Abstract

The changes of intestinal mucosal barrier function plays a role in outcome of postoperative patients. The pathophysiological basis of patient, anesthetic methods, anesthetic, cardiopulmonary bypass, types of surgery were all factors affecting intestinal barrier. There were significant protective effects on intestinal barrier in Epidural anesthesia, especially thoracic epidural anesthesia and analgesia. Propofol could also improve intestinal mucosal barrier function. But, the intestinal mucosal barrier function may be disrupted by stress, shock, cardiopulmonary bypass.

Key Words：perioperative agents , intestinal mucosal barrier function

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肠粘膜屏障功能是指正常肠道具有较为完善的功能隔离带，可将肠腔与机体内环境分隔开来，防止致病性抗原侵入。肠粘膜屏障主要包括机械屏障、生物屏障、免疫屏障和化学屏障。手术创伤与应激、各种原因引起的休克、感染等均可导致肠粘膜屏障功能受损，引发肠道细菌/内毒素移位，甚至发生全身炎症反应（SIRS）和多器官功能不全综合征（MODS）,因此，肠道是全身应激反应的靶器官，是SIRS和MODS的发动机，围术期如何调控手术创伤与休克、感染等应激反应对肠粘膜功能的损伤成为当前麻醉手术的一个重点和难点。

一、正常肠道屏障功能

正常肠道屏障功能主要包括机械屏障、生物屏障、免疫屏障和化学屏障[1]。机械屏障主要由粘液层、肠上皮层、紧密连接和粘膜下固有层构成，粘液层是一种由杯状细胞分泌的疏水粘蛋白，保护肠粘膜免受性化学和机械性损伤及减少有害菌对肠上皮细胞的粘附；肠上皮层的吸收细胞起到机械屏障作用，杯状细胞分泌粘蛋白，数量较少的潘氏细胞可吞噬细菌调节肠道菌群[2]；紧密连接层可阻止肠腔内细菌、毒素及炎性介质内移；粘膜下固有层的B细胞转化为浆细胞分泌IgA起到局部免疫作用，同时还可吞噬细菌。

生物屏障是由数量众多的各种细菌组成的微生态结构，主要分为膜菌群和腔菌群，膜菌群有抵抗腔菌群附着或定植于肠上皮的功能，称为定植抗性，构成了肠道生物屏障。

免疫屏障主要由肠相关淋巴样组织、派尔集合淋巴小结、肠上皮识别功能、M细胞、肠道免疫球蛋白和肝脏网状内皮系统组成。免疫屏障是肠道屏障最复杂和最重要的屏障，通过细胞免疫和体液免疫防止致病性抗原对机体的伤害。但肠道免疫屏障非常复杂，确切屏障机制尚不完全清楚。

化学屏障主要由各种消化液组成，包括胃酸、胆汁、消化酶、溶菌酶、粘多糖、糖蛋白等组成，可以起到杀灭细菌、抑制有害菌定植、阻止内毒素吸收等作用。

二、围术期影响肠道屏障功能的因素

1. 麻醉手术前

病人自身疾病所致的病理生理改变、治疗药物和麻醉手术前对病人所做的麻醉手术前准备

（1）病人状况

①癌：全身任何器官的恶性肿瘤都会对肠道屏障功能构成影响。不同癌症，及癌症发展的不同阶段，直接死亡原因都是不同的，而有一个与大多数癌症都有关系的基本的直接死亡原因，这个原因就是肠源性内毒素血症引发的多脏器功能衰竭。DNA复制是癌细胞生存、增殖的最主要环节。DNA复制所需要的原料，第一个重要物质是谷氨酰胺，在机体发生癌症以后，很快就会把储存的谷氨酰胺用完，使机体处于谷氨酰胺缺乏状态。谷氨酰胺是消化道修复的最重要的营养物质，因此癌症病人由于谷氨酰胺的耗竭使肠道修复功能丧失，屏障功能明显下降，此时若在进行手术发生肠源性内毒

素血症的几率将大大升高。

②肝硬化：肝硬化时肠道动力减弱，过度生长的细菌及其所分泌的毒素引起小肠上皮细胞病变而导致肠壁粘膜屏障功能损害。肝硬化后肠系膜动脉扩张、管壁通透性增加而发生内毒素血症，循环内毒素又可进一步损伤肠粘膜屏障，加重细菌及内毒素移位，彼此互为因果，形成恶性循环，加重肝损伤。

③胰腺炎：胰腺炎时特别是重症急性胰腺炎（severe acute pancreatitis SAP），呕吐所致的失水，胰腺水肿、渗出所致的体液丢失，大量体液进入第三间隙，造成机体血容量不足。为了保证心、脑等重要器官的血供，交感—肾上腺髓质系统兴奋，由受体支配的小肠血管发生强烈收缩，肠管血供急剧减少；再加上缺血再灌注所带来的氧自由基继发肠粘膜损伤；长期的禁食和TPN，不仅导致血流量减少，而且由于缺乏营养供应，特别是缺乏其主要的供能物质GLn（谷氨酰胺），导致肠粘膜萎缩，通透性增加，损害了肠粘膜的机械屏障[3]。

SAP时，肠粘膜血供减少，粘膜表面绒毛变短，杯状细胞脱落或功能下降，粘液分泌减少，肠粘膜的化学屏障因之受损。

④梗阻性黄疸：梗阻性黄疸时肠道机械屏障受损，导致肠道细菌移位，同时梗阻性黄疸时肝脏的单核吞噬细胞系统（MPS）的功能受抑制，清除细菌的能力下降，加剧肠道细菌移位。

⑤腹泻：对感染性腹泻的治疗临床上主要是使用抗生素，但广谱抗生素在杀死致病菌的同时也杀死了肠道有益菌群导致菌群失调，使肠道生物屏障受损[4]。

⑥肠易激综合征（IBS）：IBS是一种多因素的胃肠道症状，可能的病因包括胃肠动力、心理生理改变以及结肠发酵不良等[5]。IBS患者肠道微生物中的乳酸杆菌和双歧杆菌数量减少，而兼性厌氧的革兰阴性杆菌过度生长，这些细菌可产生细菌蛋白酶或毒素等代谢产物，破坏肠上皮细胞微绒毛膜蛋白并抑制蛋白质合成，通过改变肠道上皮细胞的生化反应，使肠上皮细胞机械屏障受损。

⑦创伤：严重创伤时，胃肠道与机体代谢和炎症反应密切相关。虽然对细菌和内毒素移位的潜在作用目前仍有争议，但许多证据支持肠道可能是脓毒血症和MODS发生的“枢纽”器官。创伤后，早期肠粘膜屏障损伤由以下因素所致：⑴肠道有效血循环量不足，处于缺血、缺氧状态，激活黄嘌呤氧化酶，产生过量氧自由基，损伤肠粘膜。⑵降低肠摄取、利用氧的能力，减少肠上皮细胞能量供给。另外，谷氨酰胺（Gln）作为上皮细胞的主要能量来源，创伤后其摄取、利用及Gln主要水解酶活性均明显下降，影响肠粘膜修复。⑶肠腔细菌过度繁殖，粘附到肠壁的细菌增多，定植机会增加，产生大量代谢产物和毒素，破坏肠粘膜结构。⑷肠道抗原递呈细胞激活，释放血小板活化因子（PAF）、肿瘤坏死因子（TNF）等细胞因子，引起肠粘膜屏障功能损伤[6]。

⑧应激：应激状态下肠粘膜病理生理过程的研究显示，应激通过一系列的神经、免疫、内分泌机制导致肠屏障功能下降[7]。

⑨休克：在休克时机体为维持重要脏器的血液供应通过神经内分泌调节使肠道的血供减少，同时肠道绒毛血管袢极度弯曲呈发夹样结构，动静脉之间存在着逆流交换机制。因此，绒毛顶端在严重低血容量时极易发生缺血性损伤，当缺血纠正后，又可产生再灌注损害，这一过程可激活中性粒细胞产生大量氧自由基和炎性介质包括TNF、PLA2、PAF等导致肠内细菌内毒素移位，进一步激活炎性介质，加重损伤形成恶性循环，最终引起全身组织器官出现失代偿高代谢和多脏器功能失常综合症（MODS）[8]

（2）药物

①非甾体类抗炎药(NSAIDs)：NSAIDs通过抑制环氧化酶（COX）对胃肠道产生损害，从消化不良到粘膜出血、穿孔。在应用NSAIDs的病人其胃肠道并发症发生率是未用NSAIDs病人的4-8倍，因此麻醉前应用NSAIDs会削弱胃肠道粘膜屏障(9)。

②阿司匹林：阿司匹林导致胃、十二指肠粘膜损害，主要是影响了粘膜的防御因子，包括：⑴通过抑制环氧合酶1（COX1））活性，减少胃肠粘膜中前列腺素合成；而前列腺素特别是PGE2具有扩张血管、增加胃肠粘膜血流、增加粘液分泌及碳酸氢钠分泌的作用，有助于上皮的修复和细胞的更新；⑵穿透胃粘膜上皮细胞膜，破坏粘膜屏障，产生直接损伤；⑶抑制血小板环氧化酶的合成，减少血栓素合成，降低血小板的聚集能力；⑷粘膜中性粒细胞浸润，生长因子减少，粘膜生成减少，粘膜上皮再生减少等[10]。

③激素：降低了胃粘膜腺体的分泌，改变了腺体分泌的成分，削弱胃粘膜屏保护作用，增加胃酸和胃蛋白酶的分泌，抑制了胃粘膜上皮细胞的再生。如长期大量服用强的松，即可引起胃炎和胃肠道溃疡，甚至穿孔。

（3）麻醉手术前准备

①禁食：在病人禁食时肠粘膜细胞萎缩。因为它们缺乏食物中所带来的谷氨酰胺的营养。因此，疾病期间试图用禁食让肠道自身修复和仅提供葡萄糖溶液支持就会发生相反的结果。不但不能修复，肠道还会损伤。

②灌肠：反复导泻和洗肠加上饮食的限制，不仅影响能量和营养物质的摄取，还会对肠道粘膜屏障造成直接损害，进而增加肠道细菌易位及肠源性感染的机会。

2. 麻醉手术中

（1）麻醉诱导：在一部分病人仅由于麻醉诱导的一个应激刺激就会导致肠粘膜屏障功能发生改变，使内毒素入血，影响器官功能。Bölke,P.M.等报道[11]，在心脏手术麻醉中，诱导气管插管后血浆内毒素浓度即开始升高，并随手术操作的进一步进行血浆内毒素逐渐上升。在体外循环结束后及手术后两小时达高峰，同时显示血浆内毒素较高的病人术后发生感染的机会明显增高。这证明麻醉诱导气管插管应激刺激就可导致肠道屏障功能受损，内毒素内移。

（2）麻醉维持方法：不同的麻醉维持方法对肠道粘膜的血流会有明显影响，硬膜外麻醉与全身麻醉相比，前者可

能更利于肠道血流的维持。Andreas W.Sielenka 等研究认为在低灌注压情况下胸段硬膜外麻醉（TEA）可以使结肠粘膜血流量增加，减少肠绒毛微循环血流的间断，对血压下降导致的肠道血流低灌注有保护作用[12]。全麻复合TEA可降低围术期患者血浆D乳酸、内毒素水平，降低术后SIRS发生率。TEA可能对上腹大手术患者肠粘膜屏障有一定的保护作用。Vagts等研究发现，尽管胸段硬膜外麻醉可引起全身性低血压，但小肠灌注和氧供可维持正常水平[13]。Kimiaki Ai等发现，硬膜外麻醉可减轻渐进性缺氧引起的小肠酸中毒和肝门静脉内毒素浓度[14]。Hendrik Freise,等报道在重症急性胰腺炎的家兔，胸段硬膜外镇痛通过增加胃肠黏膜血流而能减轻全身炎性反应改善生存状况[15]，同时TEA还能减轻急性坏死性胰腺炎的肝脏损害，保护SIRS中的肝功能[16]。Shizuko Kosugi,等报道硬膜外镇痛能减轻内毒素对结肠结构和功能的损害[17]。

从以上报道可以确定，硬膜外麻醉，特别是胸段硬膜外麻醉和止痛能够在低血压情况下维持肠粘膜血供，保护肠粘膜屏障功能，同时硬膜外麻醉和镇痛也能减轻内毒素对肠道屏障功能的损害。

（3）麻醉药：麻醉中使用不同的麻醉药对肠道屏障功能有不同的影响，这对于术前已有肠道损伤因素的病人非常重要。Necat Kaplan等报道与硫贲妥钠和维拉帕米相比，异丙酚能有效稳定缺血/再灌注损伤MDA的水平，降低肝和结肠的组织损伤程度抑制肿瘤坏死因子及白细胞介素6的增高。而维拉帕米与硫贲妥钠相比，有降低血浆细胞活素和肝MDA含量的作用[18]。国内李琳等报道异丙酚能抑制缺血再灌注时肠黏膜中TNF-α的表达，减轻病理损害,对肠黏膜具有保护作用异丙酚不但可以作为麻醉药,更可以作为一种抗氧化剂,具有减轻对缺血再灌注损伤的作用[19]。Hiltebrand,Luzius B.等报道在败血症的猪多巴胺、多巴酚丁胺、多培沙明在一定剂量分别能增加心脏指数18%、48%、35%，肠系膜上动脉血流量分别增加33%、13%、0%，但三种血管活性药对胃肠道微循环没有明显影响，这就是为什么在临床上血管活性药能改善全身的氧供，而不能提高危重病人的生存率。所以，现在人们普遍认为在危重和创伤病人胃肠道等内脏器官血液灌注的快速恢复是治疗成功的关键因素。胃肠道供血不足会引发肠道屏障功能障碍，导致细菌、内毒素移位发生MODS[20]。

（4）手术：不同种类手术对肠道屏障功能损害明显不同，创伤大、时间长、腹部肠道、消化道手术尤为明显。协和医院洪溪等报道通过测定肠道手术、骨科手术病人i-pH和血乳酸含量提示，肠道手术较骨科手术更易影响组织灌流及代谢[21]。南方医科大学张文斌等报道，腹部手术后机体对谷氨酰胺（Gln）的需求增加，损伤组织丢失谷氨酰胺增加，同时手术创伤应激反应时消耗增加，因此体内谷氨酰胺耗竭，而Gln的耗竭将导致肠粘膜通透性增高，细菌移位，导致术后感染[22]。Schwarte,Lothar A.等报道在腔镜手术中，随着气腹压力增高胃肠黏膜氧饱和度下降。所以，在对肠道屏障功能有明显影响的手术，在麻醉方法的选择、麻醉药物等选择上应仔细斟酌，尽量减少肠道损伤的进一步加剧，保护肠道屏障功能，避免SIRS和MODS[23]。

（5）体外循环：在心血管手术，体外循环会产生较明显的缺血再灌注损伤，对许多器官会导致损害，以往人们主要重视心肺脑及肾功能的保护，而忽视肠道屏障功能的维护，可是肠道在体外循环后其屏障功能会受到严重影响，导致术后一些并发症。Bölke, P.M.等报道，在心脏手术麻醉中，体外循环结束后及手术后两小时血浆内毒素水平达高峰，远高于其它手术，同时显示血浆内毒素较高的病人术后发生感染的机会明显增高。这证明体外循环后会对肠道屏障造成严重损害，肠内毒素大量内移，导致术后并发感染[11]。

三、结语

围术期肠道屏障功能对术后病人的并发症发生率、死亡率由明显的影响，而麻醉前对病人的评估、麻醉方法的选择、麻醉维持用药及术中血管活性药、手术种类等均对肠道屏障功能有影响，特别是对已有肠道功能受损的病人应格外慎重选择麻醉方式、麻醉用药，密切注意术中病人是否有大的创伤、休克、体外循环等严重影响肠道屏障功能的情况，尽可能保护肠道屏障功能。

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摘要

随着人们对术中维持适宜麻醉深度重要性及术中知晓危害性认识的增加。新型脑电监测系统麻醉／意识深度监测仪被越来越广泛地应用于临床和科研，大量研究结果证实了它的有效性。现就Narcotrend麻醉深度监测的临床应用及其研究进展作一综述。

关键词：Narcotrend；脑电图；麻醉深度；监测

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Narcotrend监测在临床麻醉中的应用及研究进展

Application and Development of Narcotrend Monitor in Anesthesia

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Abstract

As more attention is paid to the importance of maintenance of proper anesthetic depth and to the perniciousness of intra-operative awareness, the new type electroeneephalographic monitor, Narcotrend, is more and more extensively applied in clinic and research fields. Its efficacy has been confirmed by a large amount of studies, This review will focus on main advances in clinical application of the narcotrend monitor: evaluation on anesthetic depth; exploration on new field and research prospect.

Key Words: Narcotrend; Narcotrend index; Anesthetic depth; Electroeneephalogmm; Monitoring

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脑电监测是目前麻醉深度监测研究的重点，如听觉诱发电位和脑电双频指数等，尽管显现出一定的优势，但还存在不少的缺陷。新近研发的Narcotrend指数，在欧洲已被用于临床监测麻醉和催眠深度 ，并已取得较好的研究成果，现综述近年来Narcotrend指数(Nareotrend Index，NI) 临床应用研究进展。

一、NI概述

NI是一种测量EEG麻醉深度的新方法和基于定量脑电图模式识别的新指数，利用Ku—Gler[1]多参数统计和微机处理，将原始的脑电图时间点分为从A(清醒)到F(渐增的对等电位的爆发抑制)6个阶段14个级别的量化指标，即A、B0～2、C0～2、D0～2、E0～1、F0～1，重新形成从0(清醒)到100(等电位)的指数，并同时显示波的功率谱变化情况和趋势。阶段A表示清醒状态；B镇静状态(0级、1级、2级)；C浅麻醉状态(0级、1级、2级)；D适宜麻醉状态(0级、1级、2级)；E深度麻醉状态(0级、1级、2级)；F脑电活动消失(出现逐渐增多的爆发性抑制到脑电静止)。)。Narcotrend分级监测是由德国Hannover大学医学院一个研究组开发的脑电监测系统。Narcotrend能将麻醉下脑电图进行自动分析并分级，显示麻醉深度，其最新软件4．0版包括dimen—sionless指数(类似BIS指数)，范围从100(苏醒)至0。

NARCOTREND COMPACT麻醉深度监护仪的特点：①对静脉和吸人麻醉脑电波(ECG)自动分类，通过脑电波指标对比分析显示病人麻醉深度；②优化赝像的识别；③触摸屏操作，简单易用；④连续电极测试确保持续高质量脑电信号；⑤多种电极定位(标准的心电电极，针式电极和杯式电极都可用)；⑥可接外部监护仪和文档管理系统的接口；⑦脑电记录文档报告功能。有两种配置：一通道版本，用于一般麻醉脑电监护；二通道版本，用于两个大脑半球手术麻醉监测。Avidan等[2]估计美国如果常规使用脑电双频指数监测全麻患者麻醉深度，其一次性电极的年费用将会超过3.6亿美元，相对于BIS专用电极价格高昂，而NT对标准或普通的心电电极、杯式电极、针式电极等均可应用，从而使成本大大降低，并且有单通道和双通道两种模式，方便了对两个大脑半球进行分别的监测。目前，已经有大量的研究结果证实了NT的可行性和实用性。

二、临床应用

1. 麻醉深度评价

有关这方面的研究最多，其中以比较性研究尤甚，常用的临床观察和比较指标有预测概率(Pk值)、NI、经典脑电图

(classical electroencephalogram，cEEG)参数(30脑电波总功率P、脑电波90a13的相对功率、脑电图中间频率median frequency、95%边缘频率spectral edge frequency 95%，SEF95%)和血流动力学参数(如心率、平均动脉压)等，其中预测概率应用最为广泛，Pk值是Smith等提出并用于评价某项指标预测麻醉深度的准确性，其取值范围为0～1，Pk值为1时说明监测指标预测的正确率为100%，Pk值为0.5时表示其正确预测机率为50%，仅仅是一种随机猜测而没有预测作用。Schmidt等比较了异丙酚复合瑞米芬太尼麻醉时Narcotrend、BlS、传统脑电波和血流动力学参数。应用预测概率预测麻醉深度(清醒、稳态麻醉、麻醉苏醒时首次出现反应和拔除气管导管)，结果显示仅Narcohnd的预测概率大于0.9；与其他传统脑电参数比较，Narcotrend可作为临床评估麻醉深度更可靠的方法。

2. 与BIS的关系

Kreue等[3]经比较发现NT的A级或B级与BIS值100～85相当，NT的D级或E级与BIS值64～40相当。在此基础上，Kreuer等[4]收集到18例根治性前列腺切除术患者38 629个没有受干扰的数据对，用于建立数学模型描述BIS值与NI之间的相互转换关系。研究发现：当50≤BIS≤100时，第一个S型曲线的表达NI=52.8+26.8/(1+exp(-(BIS-78.3)/4.8))0.4，r=0.52；当BIS<50时，第二个S型曲线的表达式为NI=6.6+45.3/(1+exp(-(BIS-29.8)/2.4))0.6，r=0.83；另外，NI与脑电图爆发抑制比例(burstsuppression ratio. BSR)的S型曲线关系式为：NI=265(1+epx((-BSR+108)/-49))，r=-0.73。

根据NT的设计及计算原理，NT更能有效去除各种干扰成分(如肌电活动、心电活动等)造成的脑电图伪差。Panousis[5]等观察了33例在全麻联合胸段硬膜外镇痛下行泌尿系统手术的患者，麻醉深度分别控制在40～50(BIS)及D2-D0(NT)，结果显示在肌电活动>35dB时BIS值间歇波动于70～80，但NI及患者临床体征在BIS值升高时并不改变，证实BIS值与肌电图活动显著相关(P<0.01)，而NI则否。但Ellerkmann等[6]发现无论包含NT监测到的有伪差脑电图的数据对与否，BIS预测异丙酚效应室浓度的Pk值不变(Pk=0.86±0.05 vs Pk=0.85±0.04)。表明当存在NT判别为脑电伪差而拒绝计算的信号时，BIS仍能得到数据。

3. 静脉麻醉药

在对异丙酚用量和复苏时间的影响方面，Kreuer[7]的研究表明，NT和BIS用于指导异丙酚瑞芬太尼复合麻醉，均能显著降低异丙酚用量和复苏时间。

在区分异丙酚各种麻醉状态方面，Schmidt等[8]现只有NI可以有效区分清醒与稳定麻醉状态、稳定麻醉状态与复苏第一反应或拔管，并且它们的Pk值均大于0. 9。Bauerle等[9]用异丙酚靶控输注为23名眼科和泌尿外科患者实施全麻，其靶控浓度值有0.5、1.0、2.0、3.0、4.0mg/L等5个点，同时分别记录NI及改良的警觉镇静评分(Modified Observer's Assessment of Alertness/Sedation，OAMS)，发现NT对不同镇静水平的Pk值为0. 92，对异丙酚不同靶控浓度的Pk值为0. 91，再次证实了NT能有效监测异丙酚的各种镇静程度。

而最近也有对氯胺酮的研究，施冲等9研究表明在七氟烷维持麻醉时，0.2mg/kg的氯胺酮对NI无影响，0.5mg/kg时NI增加，但不影响Narcotrend分级. 而1.0mg/kg的氯胺酮明显增加NI，并改变Narcotrend分级，可能导致麻醉深度的误判，致使麻醉药物过量。

4. 吸入麻醉药

武晓文等[10]研究了34例ASA Ⅰ/Ⅱ，在异氟醚吸入全麻下行腹部手术的患者，发现NTS、NI与患者苏醒期意识水平的变化显著相关(P<0.01)。NTS、NI预测患者睁眼的Pk值分别为0.693和0.692，预测患者恢复定向力的的Pk值分别为0.837和0.824，均显著高于0.5(P<0.01)，也高于MAP和HR对应的Pk值(P<0.01)。表明NT能够及时有效反映异氟醚吸入全麻苏醒期意识水平的变化。

5. 年龄与性别的关系和影响

Wallenborn等[11]研究表明，对于监测5岁以下儿童的麻醉深度，目前的研究结果显示，NT与BIS相比没有明显的优势。Schuhz等[12]研究发现在异丙酚诱导阶段，年龄大于70岁的患者，其NI显著低于小于70岁的患者，且达到最深麻醉状态的时间较长，需要更长时间才能恢复到浅麻醉状态；Weber等[13]观察30例不同年龄组的地氟烷麻醉病人眼科手术，非稳态呼气末地氟烷浓度(Des)，NI，传统脑电参数(classical EEG parameters，cEEG)，心率(heart rate，HR)和平均动脉压(mean arterial pressure，MAP)是否存在药代动力学的年龄相关性。应用预测概率评估意识与无意识间NI的差异。结果显示，不同年龄组呼末(Des)与NI间的药代动力学和年龄相关；与青年和成年人比较，儿童EC(50)显著增高；与cEEG，MAP和HR比较，无意识向有意识转化 这一过程中，NI值似乎有较大的差异。Wilhelm等[14]对60例男性和60例女性整形手术病人，应用脑电监测(NI或BIS)或传统方法控制麻醉，研究异丙酚复合瑞米芬太尼麻醉时，药物用量和恢复时间的性别差异。结果显示，传统组：异丙酚用量男女间无差异，而男性恢复时间显著延长；2种脑电监测组：异丙酚用量男性减少，恢复时间轻度延长。在达到相同的NI和BIS靶控目标时，女性异丙酚靶控浓度比男性更高。异丙酚复合瑞米芬太尼麻醉，性别对恢复时间和异丙芬用量有影响。如果增加异丙酚用量，男性清醒较慢，应用BIS或NI监测可使男性异丙酚用量减少。

三、在其他领域的应用

Munte等[15]用Narcotrend监测仪研究了Narcotrend与隐性记忆，证实浅到中度麻醉存在隐性记忆，深度麻醉时不存在隐性记忆；提示浅麻醉时，隐性记忆可能保护病人免受听觉信息对术后恢复产生负面影响。Raymondos等[16]证实脑电波监测适合于实时监测皮层抑制水平。Schultz等[17]提示Narcotrend自动分级计算能可靠评估催眠深度。还能用于ICU病人脑功能监测[18]。Schultz等[19]用Narcotrend脑电波监测，发现一例无癫痫病史的62岁女性病人，在七氟烷呼气

末浓度5.9%时出现癫痫样脑电活动。薛庆生等发现熵指数和血流动力学指标均能及时反映气管插管刺激，而NT对气管插管刺激不敏感，可能原因是插管反应主要为皮层下兴奋反应。

四、目前还存在的问题

NI监测同样存在不能正确评估阿片类药物的镇痛水平，也很少有研究米达唑仑的镇静水平。

目前，对于复合麻醉的麻醉深度监测的研究还很少，尚需进一步研究。麻醉深度监测单靠某一个指标是不全面的，应采取全方位多指标的综合监测，才能准确、真实地反映麻醉深度。

五、结语

现在研究多趋向于将NT与其他麻醉深度监测指标比较，以判断其准确性，一般只应用于泌尿外科、骨科、妇产科、内镜检查等较简单手术中的监测，目前还没有应用于肝肾移植及心脏等复杂大手术的临床观察。总之，由于NT性价比高等优点，其在临床及科研上的应用必将日益受到重视，但仍需在临床应用反馈中不断修正与完善。

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第二次全国中医药防治疼痛学术年会

由中华中医药学会、黑龙江省中医药管理局共同主办，中华中医药学会疼痛学分会、黑龙江省中医药学会共同承办，世界疼痛医师协会中国分会、北京中医药大学第一临床医学院、黑龙江省中医医院共同协办的第二次全国中医药防治疼痛学术年会将于2011年7月25-27日在黑龙江省哈尔滨市举行,特邀请疼痛临床工作者及科研人员参加。

征文范围及要求：

一、征文范围：

1、急慢性疼痛的中医治疗及机理研究；2、疼痛治疗的风险及误诊教训；3、神经性疼痛的药效学研究：4、疼痛评估记录的临床应用研究等。

二、征文内容：

1、疼痛相关的基础研究；2、中西医结合治疗疼痛机理的探讨及经验总结;3、中西医药内服、外用镇痛机理的研究成果；4、中西医微创介入镇痛机理的研究成果；5、神经病理性疼痛的研究进展；6、慢性疼痛诊疗；7、急性疼痛治疗；8、疼痛治疗并发症及处理；9、疼痛治疗中的风险及误诊教训；10、抑郁与慢性疼痛相关的神经生物学共同机制研究进展；11、疼痛心理学研究的最新进展；12、神经性疼痛的药效学研究；13、神经病理性疼痛分子生物学研究进展；14、慢性疼痛与器质性疼痛心理学特征的差异；15、功能基因组学技术在慢性疼痛研究中的应用；16、疼痛评估记录的临床应用研究；17、疼痛科的建设和发展。

三、征文要求：

1、内容：所投稿件内容应真实，具有科学性、先进性和实用性。稿件一律采用英文或中文摘要形式；2、文题：反映出文章的主题，力求简明、醒目，一般不超过50个汉字；3、正文字数限制为1000～3000字符。包括目的、方法、结果（应给出主要数据）、结论四个部分，各部分冠以相应的标题。作者单位及邮编列于作者姓名的下一行；4、文责自负，请自留底稿；5、截稿日期：2011年6月20日。

A Comparison between Volume Responsiveness Predicted by Changes in Pulse Pressure and by Changes in Stroke Volume Induced by Passive Leg Raising

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Abstract

Background: Monitoring hemodynamic impact induced by passive leg raising (PLR) can predict volume responsiveness. However, special equipments and skills of measuring stroke volume (SV) or cardiac output (CO) restrict its general application. Arterial pulse pressure (PP) is easy to record at the bedside. However, the role of PLR-induced changes in pulse pressure to predict volume responsiveness is controversial in limited researches. The aim of this study was to compare the ability of PLR-induced changes in pulse pressure (△PP) and that in stroke volume (△SV) to predict volume responsiveness, thus rendering them interchangeable.

Methods: 42 severe sepsis and septic shock patients in ICU were prospectively observed. Pulse pressure and stroke volume were measured in the supine position, during PLR and after volume expansion (VE). Responders were defined by an increase in SV induced by VE of more than 15%.

Results: Twenty-two (52.4%) patients were considered to be responders to VE. The increases in SV induced by PLR and by VE were well correlated (r=0.811, P=0.000). The increase in PP induced by PLR was correlated with the increase in SV induced by VE (r=0.329, P=0.033). A △SV of >12% predicted volume responsiveness with a sensitivity of 86.4%, specificity of 90%, positive predictive value of 90.5%, and a negative predictive value of 85.7%. A △PP of >8.89% predicted volume responsiveness with a sensitivity of 72.7%, specificity of 80%, positive predictive value of 80%, and a negative predictive value of 72.7%. The area under the receiver operation characteristic curve (AUC) for △PP was 0.741±0.077 and was significantly lower than the AUC for △SV (AUC=0.928±0.042) (P=0.0233).

Conclusions: PLR-induced changes in pulse pressure can be an index to predict volume responsiveness, but its value is lower than PLR-induced changes in stroke volume in severe sepsis and septic shock patients.

Key words: Passive leg raising; Volume responsiveness; Pulse pressure; Stroke volume; Sepsis;

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Passive leg raising (PLR) is a reversible " self-volume challenge "[1]. Recent studies [2-4]demonstrated that PLR-induced changes in stroke volume (△SV) or cardiac output (CO) can reliably predict volume responsiveness. However, special equipments (such as echocardiography, pulse indicator continuous cardiac output) and skills of measuring SV restrict its general application. Arterial pulse pressure (PP), taken as a surrogate for SV, is attractive because it is easy to record at the bedside. However, the role of PLR-induced changes in pulse pressure (△PP) to predict volume responsiveness was controversial in limited researches[5-7]. The aim of this study was to test whether △PP and △SV are equally accurate at predicting volume responsiveness in severe sepsis and septic shock patients, thus rendering them interchangeable.

Materials and Methods

Patients

This study was approved by the local ethics committee. Patients were informed before participation in the study. We studied severe sepsis and septic shock patients hospitalized in the intensive care unit of Peking University Shenzhen Hospital from July 2009 to May 2010.

Inclusion criteria were: ①age >18y, ②severe sepsis and septic shock was diagnosed according to the criteria proposed by SCCM/ESICM/ACCP/ATS in 2001[8], ③presence of at least one clinical sign of inadequate tissue perfusion defined as (a) systolic blood pressure below 90 mmHg (1mmHg = 0.133Kpa) (or a decrease > 40 mmHg in previously hypertensive patients) or the need for vasopressive drugs, (b) urine output < 0.5 $ml \cdot kg^{-1} \cdot h^{-1}$ for ≥ 2 hours, (c) heart rate > 100 beats/min, (d) presence of skin mottling, (e) persistent hyperlactacidemia.

Exclusive criteria were: ①increase in intracerebral pressure, ②PaO_2/FiO_2 < 100 mmHg, ③left ventricular ejection fraction < 40%, ④pulmonary hypertension,

⑤increase in intra-abdominal pressure, ⑥obvious hypovolemia, ⑦elastic compression stocking or deep venous thrombosis, ⑧aortic or mitral valve disease, ⑨ascending aortic aneurysm.

At last, 42 patients (25 males and 17 females) with a mean age of 51.4±20.1yrs (18～87yrs) were included in the study because of pulmonary infections (n=21), gastrointestinal infections (n=9), biliary tract infections (n=3), urine tract infection (n=3), catheter-related infections (n=2), soft-tissue infections (n=2), and unknown origin infection (n=2). Patients with an increase in SV ≥15% and < 15%[2,3] after volume expansion (VE) were separated into responders (n=22) and non-responders (n=20), respectively.

Methods

This study was a prospective observational study.

Hemodynamic measurements

①Hemodynamic data were measured non-invasively by Ultrasonic Cardiac Output Monitor (USCOM; Pty Ltd, Coffs Harbour, NSW, Australia) which was a new continuous-wave Doppler ultrasound monitor[9,10]. All measurements were performed by a single experienced investigator. The intraobserver variability was below 4.0%. The ultrasound probe (3.3 MHz) was placed in the patient's suprasternal notch to acquire an optimal flow profile at the aortic valve, presented as a time-velocity spectral display. CO was calculated automatically from the equation: CO = heart rate×SV, where SV is the product of the velocity time integral and the cross-sectional area of the aortic valve, determined by the USCOM internal algorithm based on height and gender. ②Invasive arterial blood pressure was measured by radial artery catheter. Arterial PP was calculated as the systolic blood pressure (SBP) minus the diastolic blood pressure (DBP). Mean arterial pressure (MAP) was maintained above 65 mmHg by intravenous infusion of dopamine or norepinephrine when necessary. ③Central venous pressure measurement: Patient's right internal jugular vein or subclavian vein was cannulated by a dual-channel catheter for monitoring central venous pressure (CVP). CVP was determined at end-expiratory by traditional manual ruler. The reading was taken from the midaxillary line at the level of the fourth intercostals space with the patient supine.

Study protocol

We measured hemodynamic parameters during three sequential steps. A first set of measurements was obtained in the supine position (designated 'baseline'). Then, With an automatic bed elevation technique, the lower limbs were raised to a 45°angle for 3 minutes while the patient's trunk was still horizontal. A second set of measurements (designated 'during PLR') was obtained during leg elevation, at the moment when SV reached its highest value. The body posture was then returned to the baseline position for 5 mins. Finally, measurements were obtained after a 30-min infusion of 250～500 ml of 6% hydroxyethyl starch (Voluven; Fresenius Kabi, Sevres, France) (designated 'after VE'). Vasopressor doses, sedative doses and ventilator settings were not changed throughout the study period.

Statistical analysis

All numerical variables were normally distributed except for the " SOFA score ". Numerical data were given as mean±SD except when otherwise indicated. The comparison between responder and non-responder values was performed using an independent-sample Student's t test except for the " SOFA score ", which was compared using the Mann-Whitney U test. Comparisons before and after PLR, and before and after VE were performed using a paired-sample Student's t test. For categorical variables, chisquared or Fisher's exact tests were used to test for differences between groups. Linear correlations were tested using the Pearson test. Receiver operating characteristic (ROC) curves were generated for PLR-induced changes in PP and SV by varying the discriminating threshold of each parameter. The area under the ROC curves (AUC)

TABEL 1.Patients characteristics in two groups

	N	Age (years)	Male/female	APACHEII score	SOFA score
Non-responders	20	49.2±21.7	13/7	19.7±6.8	6(2-15)
Responders	22	52.9±19.0	12/10	17.3±8.1	4(2-12)
Test statistic		0.520	0.475	1.002	1.255
P values		0.606	0.491	0.322	0.210

	N	Mechanical ventilator (n, %)	Vasopressors (n, %)	Cardiac arrhythmias (n, %)
Non-responders	20	15（75%）	11(55%)	2(10%)
Responders	22	14(63.6%)	6(27.3%)	3(13.6%)
Test statistic		0.633	3.343	
P values		0.426	0.067	1.000

was expressed as the area±SE, and was compared using the Hanley-McNeil test. All tests were two-tailed, and a P value of less than 0.05 was considered statistically significant. Statistical analysis was performed using SPSS 17.0 software (SPSS, Chicago, IL, USA) for all tests except the Hanley-McNeil test, which was performed with the MedCalc 13.3.8.0 software (Mariakerke, Belgium).

Results

Patient characteristics

The patient characteristics are summarized in Table 1. Twenty-two (52.4%) patients were considered to be responders to VE. The general characteristics of the two groups were similar (P>0.05).

Baseline hemodynamic variables

The baseline hemodynamic measurements are summarized in Table 2. The responders had a significantly lower initial SV (60.6±19.4 ml vs. 75.3±18.5 ml, P=0.016) and CO (6.4±2.0 L/min vs. 7.7±1.7 L/min, P=0.027) compared with the non-responders, although the heart rate,

TABEL 2.Hemodynamic variables in two groups at baseline, during PLR and after VE

	Baseline	During PLR	t_1 values	P_1 values	After VE	t_2 values	P_2 values
Heart rate (bpm)							
Non-responders（n=20）	103.8±15.1	104.7±14.0	0.318	0.754	102.7±14.4	0.391	0.700
Responders（n=22）	107.5±16.0	106.7±15.3	1.533	0.140	108.1±16.0	0.323	0.750
t_3 values	0.792	0.439			1.141		
P_3 values	0.433	0.663			0.261		
SBP(mmHg)							
Non-responders（n=20）	103.7±18.8	106.6±14.8	1.462	0.160	108.2±17.3	1.242	0.229
Responders（n=22）	111.0±19.3	115.1±20.9	3.763	0.001	117.5±18.9	2.719	0.013
t_3 values	1.233	1.492			1.668		
P_3 values	0.225	0.144			0.103		
DBP(mmHg)							
Non-responders（n=20）	61.1±16.2	62.9±12.6	1.031	0.315	63.7±16.9	0.839	0.412
Responders（n=22）	62.5±12.0	61.5±10.9	0.907	0.375	62.5±12.2	0.001	0.999
t_3 values	0.331	0.390			0.266		
P_3 values	0.743	0.698			0.791		
MAP(mmHg)							
Non-responders（n=20）	75.3±15.6	77.5±12.0	1.278	0.231	78.6±16.0	1.013	0.324
Responders（n=22）	78.7±12.7	79.4±12.6	0.631	0.535	80.9±12.0	0.887	0.385
t_3 values	0.783	0.492			0.535		
P_3 values	0.438	0.625			0.596		
PP(mmHg)							
Non-responders（n=20）	42.6±15.4	43.7±12.5	1.230	0.234	44.4±12.5	1.477	0.156
Responders（n=22）	48.4±15.8	53.6±17.3	8.045	0.000	55.0±18.2	7.269	0.000
t_3 values	1.204	2.091			2.164		
P_3 values	0.236	0.043			0.037		
CVP(cmH_2O)							
Non-responders（n=20）	11.3±6.1	12.3±6.7	2.901	0.009	14.8±7.2	6.588	0.000
Responders（n=22）	9.7±5.1	11.0±5.5	5.530	0.000	12.3±6.4	5.046	0.000
t_3 values	0.944	0.640			0.876		
P_3 values	0.351	0.526			0.240		
SV(ml)							
Non-responders（n=20）	75.3±18.5	78.8±20.1	2.614	0.017	77.3±18.7	1.197	0.246
Responders（n=22）	60.6±19.4	71.2±22.4	10.603	0.000	75.0±23.3	11.617	0.000
t_3 values	2.514	1.151			0.356		
P_3 values	0.016	0.257			0.724		
CO(L/min)							
Non-responders（n=20）	7.7±1.7	8.2±2.3	1.905	0.072	7.9±2.0	0.671	0.510
Responders（n=22）	6.4±2.0	7.5±2.3	10.191	0.000	8.0±2.5	10.208	0.000
t_3 values	2.291	1.069			0.241		
P_3 values	0.027	0.292			0.811		
SVR($dyne.s.cm^{-5}$)							
Non-responders（n=20）	745.0±507.8	720.7±428.3	0.769	0.452	747.7±553.2	0.070	0.945
Responders（n=22）	944.6±357.8	795.6±299.0	7.162	0.000	757.4±309.6	5.079	0.000
t_3 values	1.459	0.662			0.071		
P_3 values	0.154	0.512			0.944		

PLR = passive leg raising, VE = volume expansion, SBP = systolic blood pressure, DBP = diastolic blood pressure, MAP = mean arterial pressure, PP = pulse pressure, CVP = central venous pressure, SV = stroke volume, CO = cardiac output, SVR = systemic vascular resistance. t1/P1 = during PLR versus baseline, t2/P2 = after VE versus baseline, t3/P3 = non-responders versus responders.

arterial pressure, CVP, and systemic vascular resistance were not different between the groups (P>0.05).

Effects of PLR and volume expansion on SV

For the responders, during PLR and after VE, SV increased significantly in comparison with baseline (P<0.05; Table 2). For the non-responders, PLR also induced a significant increase in SV (P<0.05; Table 2), but the △SV were significantly greater in responders than in non-responders (18.0±7.2% vs. 4.5±8.2%, P=0.000; Figure1).

For the group as a whole, the increase in SV induced by PLR was correlated well with that induced by VE (r=0.811, P=0.000; Figure2).

Effects of PLR and volume expansion on PP

During PLR and after VE, PP increased significantly in comparison with baseline in responders (P<0.05), but not in non-responders (P>0.05; Table 2). The △PP were significantly higher in responders than in non-responders (11.0±6.3% vs. 4.7±8.7%, P=0.009; Figure 1).

For the group as a whole, the increase in PP induced by PLR was correlated with the increase in SV induced by VE (r=0.329, P=0.033; Figure 3).

Prediction of volume responsiveness

A △SV of >12% predicted volume responsiveness with a sensitivity of 86.4%, specificity of 90%, positive predictive value of 90.5%, and a negative predictive value of 85.7%. A △PP of >8.89% predicted volume responsiveness with a sensitivity of 72.7%, specificity of 80%, positive predictive value of 80%, and a negative predictive value of 72.7%.

The AUC for △SV and for △PP were 0.928±0.042 (P=0.000) and 0.741±0.077 (P=0.0016), respectively (Figure 4). The difference between them was significant (0.187±0.0827, P=0.0233). The AUC for baseline CVP and for PLR-induced changes in CVP (△CVP) were 0.595±0.090 (P=0.290) and 0.632±0.088 (P=0.144), respectively.

Discussion

Our prospective study demonstrates that △PP can predict volume responsiveness in severe sepsis and septic shock patients, but △SV is more accurate at predicting volume responsiveness than △PP. The AUC for △PP was 0.741, whereas the AUC for △SV was 0.928.

This study showed that nearly half of critically ill patients with hemodynamic instability were not responsive to volume expansion, underscoring the need for predicting volume responsiveness routinely in order to avoid ineffective or even detrimental fluid therapy. Our study showed that the AUC for baseline CVP and △CVP were 0.595 and 0.632, respectively. These data further suggest that traditional static hemodynamic parameters are no longer considered reliable tools to predict volume responsiveness[11-13]. Therefore, the search for more reliable methods became a major axis during the last decade.

PLR is a dynamic parameter for predicting volume responsiveness. Lifting the legs passively to a 45°angle

Figure 1: Effect of PLR on changes in SV and PP in two groups.

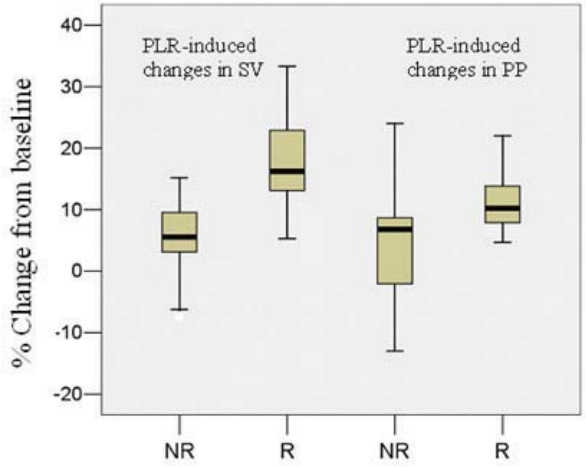
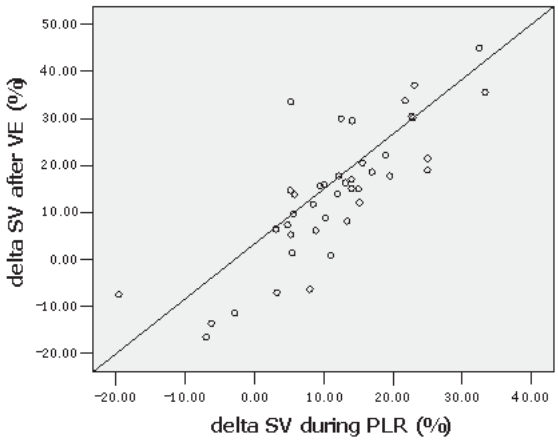


Figure 2: The correlation between PLR-induced changes in SV and VE-induced changes in SV.



for 1 min induces a gravitational transfer of 150～300 ml blood from the legs toward the central circulatory compartment[1,14,15]. Hemodynamic impact induced by PLR rapidly reversed when the legs are returned to a horizontal position[1]. So, PLR is a reversible " self-volume challenge " with good safety.

Our research confirmed previous studies[2-4] by showing that △SV is a reliable predictive index of volume responsiveness. Its AUC was 0.928. More interestingly, PLR can be used in patients with spontaneous breathing activity and arrhythmias[2,4,5], whereas other dynamic parameters such as stroke volume variation and pulse pressure variation lost their values in cases of spontaneous breathing or arrhythmias or low tidal volume ventilation[5,16,17]. However, SV/CO measurement may be cumbersome, its feasibility is variable and depends on patient echogenicity, hospital equipment, and physicians' skills in echocardiography.

PP measurement only requires ordinary critical care equipment and expertise so that it is easy to perform at the bedside. Boulain and his colleagues[18] presented that △PP were significantly correlated to rapid fluid loading-induced changes in SV (r=0.84). Therefore, they suggested that volume responsiveness could be predicted by simply measuring △PP. However, Monnet et al.[7] demonstrated that the predictive value of △PP was little, only having an AUC of 0.68. So, the aim of this study was to specially compare the performance of △PP and △SV for predicting volume responsiveness.

This study showed that △PP was a predictive index to detect preload responsiveness. The AUC for △PP was 0.741 (P<0.05). PLR mimics volume expansion will lead to an increase in cardiac preload and then in left ventricular SV, if the patient's ventricles work on the ascending portion of Frank-Starling curve. Therefore, PP being SV surrogate is increased. On the contrary, if the right and/or the left ventricle work on the platform of Frank-Starling curve, no increases in left ventricular SV and in PP are expected. Thus △PP can detect volume responsiveness. Our data showed a △PP threshold value of 8.89% predicted volume responsiveness with a sensitivity of 72.7% and a specificity of 80%.

More importantly, we compared the AUC for △PP and △SV using the Hanley-McNeil test, and demonstrated that △PP was a worse predictor than △SV (P<0.05). This is probably because PP is not a direct measure of SV and depends on complex properties of the systemic arterial tree, such as compliance, wave propagation, and wave reflexion[19,20]. These parameters can vary with patient's hemodynamic conditions and can be directly altered by PLR[7]. Moreover, PP may also vary with the site of measurement[14]. So, △SV rather than △PP was more robust parameter of preload responsiveness. This finding was consistent with results from Monnet[5] and Lakhal[21]. However, Preau et al.[6] did not find any difference between the accuracy of △PP and △SV at predicting fluid responsiveness in nonintubated patients with severe sepsis or acute pancreatitis. The AUC for △PP was 0.86. They claimed △PP and △SV were interchangeable indices. The difference

Figure 3: The correlation between PLR-induced changes in PP and VE-induced changes in SV.

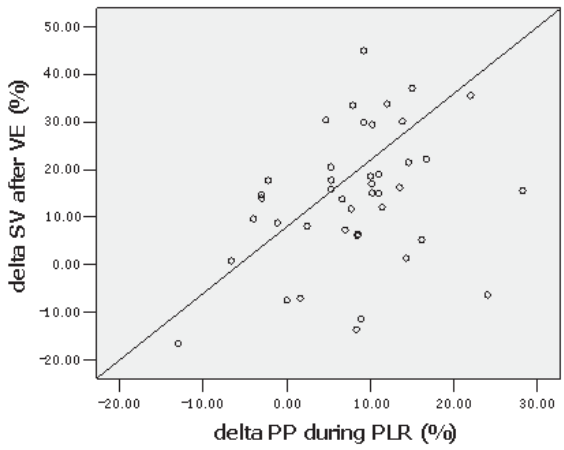
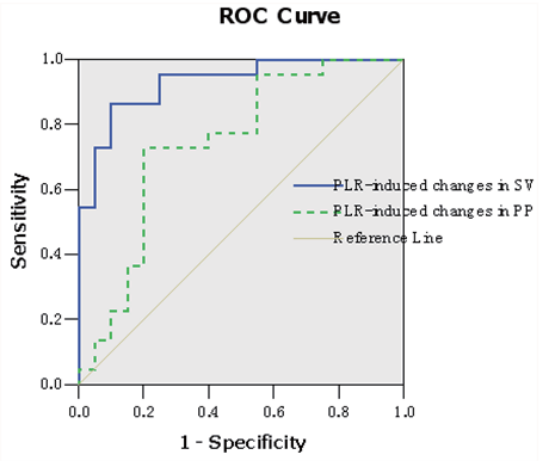


Figure 4: ROC curves for predicting response to volume expansion.



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Effects of "Phone Consultation" to Mental Status and Quality of Life of Patients with Cancer-related Pain and Physicians' Work and Life

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Abstract

We told all patients or their family my mobile phone number when they came to my clinic first time, and informed that they could call me to consult if necessary, and we wrote down their consulting times and duration of each call of every patient, the content of patient's complaint, mental status and quality of life of each patient, and recorded the effects of "phone consultation" to physicians' work and life. All patients and their family accepted my mobile phone number and agreed that they would call me in demand. 753 times of phone consultation from patients or their family had been shown on " incoming call " of my mobile phone during 2 years (730 days), 1.03 times per day on an average. "Phone consultation" had given patients with cancer-related pain the sense of safety, comfort for mental status, and improved their quality of life. And "phone consultation" had not affected physician's work and life too much.

It's reported that 60% cancer patients live with cancer-related pain[1], cancer pain patients in depression have higher incidence of death[2], the reasons that some patients were not wiling to stay in hospital, or difficult in walking, or even more that there were not enough wards to accept so many of these patients in hospital, they received palliative care in home usually. In my pain clinic, although all patients were devised a detailed pain relieve plan, which contained regular evaluation to pain, the scheme of administration and the management of side effects of medications, treatment of breakthrough pain, and many of other palliative care measures, occasionally they had questions and problems to my management scheme and that they were not convenient to see me, at the same time, because my clinic is open only every Tuesday afternoon, patients can not consult me in other time, they were nervous and anxious to pain and in depression, namely that half of the day was not far more enough to patients. So we told all my patients and their family my mobile phone number and let them call me if necessary. Then we wrote down the content of their consultation and observe all patients' mental status, quality of life, and even effects of "phone consultation" to physicians' work and life.

Materials and methods

From Aug. 1 2006 to Jul. 31 2008, we had received 161 patients with cancer-related pain (716 man-times) in my clinic, their general data are shown in table 1. We told all patients or their family my mobile phone number when they came to my clinic first time, and informed that they could call me to consult if necessary, and we wrote down their consulting times and duration of each call of every patient, the content of patient's complaint, mental status and quality of life of each patient, and recorded the effects of "phone consultation" to physicians' work and life.

Results

1, All patients and their family accepted my mobile phone number and agreed that they would call me in demand.

2, 753 times of phone consultation from patients or

TABEL 1.general data of patients in cancer pain clinic

ladder	Male (age)	Female (age)	total
ladder 1	3（14-78yrs）	7（45-58yrs）	10
ladder 2	15（31-75yrs）	21（24-80yrs）	36
ladder 3, especially	66（17-82yrs）	49（34-76yrs）	115
neuropathic pain			

TABEL 2.total times and per capita times of telephone call from patients or their family

	Ladder 1	Ladder 2	Ladder 3, especially neuropathic pain
Having consulted patients	6/10	30/36	115/115
per capita times	2.4	2.5	8.0

their family had been shown on " incoming call " of my mobile phone during 2 years (730 days), 1.03 times per day on an average (table 2) .

3, Questions and problems from patients or their family are shown on table 3.

4, "Phone consultation" had given patients with cancer-related pain the sense of safety, comfort for mental status, and improved their quality of life to some extent (table 4).

5, Effects of "phone consultation" to physicians' work and life Times of phone consulting of after work was slightly more than that of on-time according to "the incoming call" of my mobile phone, and I had only been awakened 5 times during 2 years, consulting phone from patients and their family was only 1.03 times per day on an average, the proportion of times of phone that had prolonged less than 3 min occupying whole incoming phone was 98.59%(table 5).

Discussion

Why patients with cancer-related pain see physicians of pain clinic are made out the plan of relieve pain, prescribed medications every week, evaluated the effects of treatment, and so on. Usually, patients or their family must go to pain clinic when medications were consumed over, but many of circumstances can be reflected to physicians merely through phone consulting. Patients and their family need not go to hospital through "phone consulting" in many circumstances except being prescribed medications. All patients and their family accepted "phone consulting" suggested that they approved the ways of communication between doctors and patients. We can see from table 1 that 753 times of "phone consultation" from patients or their family had been shown on " incoming call " of my mobile phone during 2 years (730 days), 1.03 times per day on an average, patients on ladder 1 and 2 and their family had not called me too many times, some of them had never called me, but all patients on ladder 3 or their family had called me, 8 times incoming call on an average, this may state that the communicating way was necessary for patients on ladder 3. And the content of consulting show that patients on ladder 1 or their family called doctor because they were not very clear to the usage of medications, such as time, dosage, ways and means and needed further consulting, patients on ladder 2 consulted doctor because the effects of medications decreased and needed to be improved the dosage, to be managed for side effects of narcotics used for the first time such as drowsiness, nausea and vomitting, dizziness, constipation, etc., patients on ladder 3 and their family called doctors because of bursting of severe pain or breakthrough pain, needing to be further evaluated to the results of relieve pain(table 3).

It was reported that the incidence of depression in cancer patients is up to 20%-50%[3] and anxiety and depression have positive correlation with the extent of pain[4]. Table 4 show that all patients and their family understood that "I can call doctor if having pain or any other uneasiness", "feel very safe, doctor is accompanying me". Patients on ladder 1 had no psychological problem, the scores of most of patients on ladder 2 and 3 was less than 3, their sleep quality was fine, incidences of psychological

TABEL 3.complains of telephone call from patients or their family

Content of phone	Ladder 1	Ladder 2	Ladder 3 ,especially neuropathic pain
A	0	151	305
B	0	0	180
C	0	112	23
D	3	25	3
E	0	1	0

A decreasing of analgesia effects, dosage of narcotics must be increased

B breakthrough pain

C side effects such as drowsiness, nausea and vomitting, dizziness, constipation, etc.

D patients or their family were not very clear to the usage of medications, such as time, dosage, ways and means, and needed to further consult

E needed to be emergently treated for coma and shock because of administrating over dose of narcotics

TABEL 4.mental status and quality of life of all patients

mental status and quality of life	ladder 1 (proportion)	ladder 2 (proportion)	ladder 3 and (proportion)
A	10（100%）	36（100%）	115（100%）
B	0（0%）	2（5.55%）	3（2.60%）
C	0（0%）	0（0%）	15（13.04%）
D	10（100%）	35（97.22%）	101（87.82%）
E	0（0%）	0（%）	2（0.6%）

A knowing that "I can call doctor if I have any problems and questions", "feel very safe, doctor is accompanying me"

B being nervous and anxious, and worry about that they cannot see doctor when bursting of severe pain

C having the symptoms of depression for the reason of pain

D the score of pain according to NRS was less than 3 and the quality of sleep was high

E having the intent of commit suicide

symptoms such as anxiety and depression were low[3], and only 2 cases of neuropathic pain had trended to commit suicide (0.6%). That times of calling from patients and their family on-time of work were more than that of after work indicated that patients needed physicians' care also when they were after work. In the 2 years, although it was unpleasant that I(Pro. Chen Zhiyang) had been awakened up from sleeping 5 times, the frequency was not very high, and "phone consulting" had provided many conveniences for patients. 1.03 times of telephone call per day on an average were not too frequent to bother doctors' work and life too much in their after work time.

TABEL 5.effects of "phone consultation" to work and life of physicians

	Times of calling on-time	Times of calling after work	Times of being awaked up	Consulting time <3min	Consulting time >3min
Times of phone consultation	325/753	428/753	5/753	741/753	12/753
Proportion of occupying whole incoming phone	43.16%	56.84%	0.66%	98.59%	1.61%

Conclusions

This retrospective study show that "phone consultation" can decrease the times of seeing doctor, which can give patients and their family convenience, in other words, can improve curative effects. For the patients who stay in home to be relieved pain or are difficult to go to see doctor, it can bring them the sense of safety and the psychological comfort once they have pain or have any other problems and questions, may promote their quality of life. And as you can see, "phone consultation" had not affected physician's work and life too much, doctor's hearty care, although sometimes is not very much, can give patients much more help and convenience.

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may be due to the variance of patients who were studied.

Our study has some limitations. First, we measured hemodynamic data by using USCOM which is a novel noninvasive cardiac output monitor. Though multiple studies[9,10,22] demonstrated it is a reliable and accurate method for monitoring of CO/SV. There are still limited researches of applying USCOM to PLR. However, Thiel et al.[23] demonstrated that USCOM can be used in conjunction with PLR to predict volume responsiveness. Second, we defined volume responsiveness as an increase in SV of ≥15% with fluid infusion. This cutoff value seems clinically relevant, because it was chosen in reference to previous studies[2,3].

Conclusion

Though PLR-induced changes in pulse pressure has a significantly lower predictive value than PLR-induced changes in stroke volume, considering the simplicity of monitoring pulse pressure, volume responsiveness can be predicted by the simple observation of changes in pulse pressure during PLR in severe sepsis and septic shock patients if necessary.

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摘要

目的：探讨预注射氟比洛芬酯用于妇科腹腔镜手术超前镇痛的作用。方法：ASAI—II级择期妇科腹腔镜手术60例，随机分为治疗组和对照组各30例，对照组缝皮前不用任何镇痛药，治疗组缝皮前10—15min静脉注射氟比洛芬酯50mg，分别于术后1h(T1)，4h(T2)，8h(T3)对切口疼痛采用BCS评分标准，分为5分，当评分0分时给予哌替啶100mg肌肉内注射镇痛，记录两组术后使用哌替啶的时间，例数及次数，咽喉疼痛发生率等不良反应。结果：治疗组术后1，4，8小时疼痛评分均低于对照组(P＜0.01)，术后使用哌替啶的时间，例数及次数均低于对照组(P＜0.01)，治疗组和对照组咽喉疼痛发生率分别为15%和60%(P＞0.05)，两组的不良反应除恶心呕吐外差异无显著性(P＞0.05)。结论：氟比洛芬酯超前镇痛用于妇科腹腔镜手术，能有效缓解术后切口疼痛，减轻炎症反应，减少术后镇痛药的使用和不良反应，且术后苏醒迅速安全。

关键词：氟比洛芬酯，超前镇痛，妇科腹腔镜手术

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氟比洛芬酯超前镇痛在妇科腹腔镜手术中的应用

Flurbiprofen Ester Preemptive Analgesia in Gynecologic Laparoscopic Surgery

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Abstract

Objective: To study the preemptive analgesia of flurbiprofen ester in gynecological laparoscopic surgery.

Methods: 60 patients (ASAI-II) under elective gynecologic laparoscopic surgery were randomly divided into treatment group and control group (n=30). Control group without any pre-analgesic treatment; Treatment group: intravenous injection of flurbiprofen ester 50mg 10-15min before sewing leather. Score the pain level after 1h (T1), 4 h(T2), 8 h(T3) using the standard BCS, once patients at 0 score, intramuscular injection 100mg pethidine, recorded the time and frequency of each group, as well as the incidences of throat pain and other adverse reactions.

results: Pain scores of treatment group at 1,4,8 hours were lower than the control group(P＜0.01). The number and frequency of pethidine injection were lower in treatment group than control group(P＜0.01). The incidence of sore throat were 15%(treatment group) and 60% (control group) (P＞0.05). There were no significant difference of other adverse events between two groups except nausea and vomiting (P＞0.05).

Conclusion: Flurbiprofen ester pre-emptive treatment in gynecologic laparoscopic surgery can effectively relieve postoperative incisional pain, reducing inflammation reaction

Key Words: esters of flurbiprofen, preemptive analgesia, gynecologic laparoscopic surgery

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氟比洛芬酯(商品名凯纷，北京泰德制药有限公司生产)是静脉注射的非甾体类抗炎药(NSAIDS)，具有起效快，镇痛效果明显，持久，无呼吸抑制，胃肠道不良反应轻等优点。2009年6-12月通过预注射氟比洛芬酯用于妇科腹腔镜手术超前镇痛60例，观察其对术后切口痛的影响及不良反应，探讨其疗效及安全性。

一、资料与方法

1. 临床资料

ASAI-II级择期妇科腹腔镜手术60例，年龄25-54岁，体重45-68kg，卵巢囊肿剥离术12例，陈旧性宫外孕(病灶清除术)10例，粘膜下子宫肌瘤18例，子宫全切20例，随机分为治疗组和对照组各30例。排除支气管哮喘史，消化道溃疡史，严重的肝，肾及血液系统疾病。

2. 麻醉方法

麻醉诱导前静脉注射阿托品0.3-0.5mg，静吸复合麻醉，入室后开放外周静脉，诱导前输注8-10ml/kg复方乳酸钠林格液，常规监测生命体征。麻醉诱导用药咪达唑伦0.02-0.03mg/kg，芬太尼20-30ug/kg，丙泊酚1.5-2mg/kg，阿曲库铵0.3-0.4mg/kg诱导快速气管内插管，麻醉维持以1-1.5%异氟醚吸入，瑞芬太尼，丙泊酚持续微量泵泵入，必要时追加阿曲库铵5-10mg。术毕前30min停用异氟醚，缝皮前10-15min停止瑞芬太尼，丙泊酚，停药后随即予以治疗组静脉缓慢注射氟比洛芬酯50mg，对照组则不用任何镇痛药，手术结束5-10min后患者呼吸恢复，清醒后拔管。

3. 观察指标

术中常规监测血压(BP)，心率(HR)，心电图(ECG)，血氧饱和度(SPO_2)和呼气末二氧化碳分压($PetCO_2$)，术毕拔管送回病房观察。分别于术后1h(T_1)，4h(T_2)，8h(T_3)对切口疼痛采用BCS(Bruggmann Comfort Scole)评分标准，分为5分，当评分0分时给予哌替啶100mg肌肉内注射镇痛，记录两组患者术后使用哌替啶的时间，例数及次数，咽喉疼痛发生率等。并于术后第二天复查血常规，肝肾功能，凝血功能等指标。观察术后不良反应如恶心，呕吐，呼吸抑制，异常出血等。

4. 统计学方法

所有数据以均数±标准差(x±s)表示,采用SPSS11.0统计软件进行检验和检验,P<0.05为差异有显著性。

二、结果

治疗组术后1,4,8小时疼痛评分明显低于对照组,术后初次使用哌替啶的时间,例数及次数均低于对照组(P<0.01),不良反应:咽喉疼痛,治疗组4例(15%),对照组11例(60%)(P<0.05),恶心呕吐发生情况:治疗组2例(6%),对照组15例(50%)(P<0.05),头昏呼吸抑制的发生率对照组虽然增加趋势,但两组差异无显著性(P>0.05),治疗组术后第二天血常规,凝血功能,肝肾功能等各项指标均在正常值范围内与术前相比差异无显著性。

表1 一般资料(x±s)

组别	例数	年龄(岁)	体重(kg)	卵巢肿瘤	子宫肌瘤	宫外孕	子宫全切
治疗组	30	36.70±0.08	54.6±5.9	8	7	4	11
对照组	30	37.25±0.00	53.7±5.0	4	11	6	9

*P>0.05

表2 术后各时点BCS评分及镇痛药应用情况(x±s)

		手术后各时点BCS评分			手术后应用哌替啶情况		
组别	例数	T1	T2	T3	初次使用时间	例数	次数
治疗组	30	3.61±0.08	3.75±0.09	3.77±0.10	14.3±2.8	4	7
对照组	30	1.48±0.05*	1.66±0.07*	2.01±0.09*	4.2±0.7*	13*	21*

*P<0.05

表3 术后咽喉疼痛及不良反应发生率(x±s)

		咽喉疼痛	恶心呕吐	头晕嗜睡	呼吸抑制	出血量
组别	例数	例	例	例	例	ml
治疗组	30	4(13.3%)	2(6.67%)	1(3.33%)	0(0.0%)	52.0±4.5
对照组	30	1(36.7%)*	15(50.0%)*	3(10.0%)	3(10.0%)	48.0±5.5

*与对照组比较,P<0.05

三、讨论

妇科腹腔镜手术因其创伤小,术后恢复快而被临床广泛应用,二氧化碳气腹导致患者术后出现的肩部酸痛和膈下,腹部胀痛以及腹腔创伤后引起的局部炎症反应痛等全身性疼痛(腹腔镜术后疼痛综合症),虽属中等度疼痛,仍是影响患者住院时间及手术恢复程度的重要因素。近年来疼痛治疗中提出了超前镇痛这一概念,即在伤害性刺激作用于身体之前采取一定措施防止中枢神经系统敏感化,从而消除或减轻术后疼痛。

阿片类,非甾体类,局麻药等都是超前镇痛的常用药物,但所有的阿片类镇痛药均存在呼吸抑制作用,还可能导致过度镇静,恶心呕吐,肠蠕动减少,增加胆道内压等不良反应而限制其应用。而传统非甾体类镇痛药大多为口服剂,易引起胃肠功能紊乱,出血等不良反应,而且在治疗术后疼痛时多数无法口服药物。与之相比,经过脂微球这一新型的药物载体系统包裹的氟比洛芬酯静脉注射液有以下4个方面的优势,1)靶向性:脂微球可在体内特异性分布,靶向聚集在手术切口及炎症部位,提高药物局部有效浓度,直接抑制前列腺素合成,产生强力速效的镇痛作用。2)抢先性:通过升高痛阈,降低神经末梢痛觉传导,减轻中枢敏化,延长和扩散术后疼痛达到超前镇痛的目的。3)缓释性:氟比洛芬酯通过脂微球的包裹和保护作用,避免了在体内被迅速代谢而达到长效,减少用药次数,改变药物峰谷现象。4)舒适性:不会引起恶心呕吐,呼吸抑制,依赖性等不良反应,较传统胃肠道的安全性提高,对血小板影响轻微,不影响出凝血时间。

本研究结果提示,缝皮前10-15分钟静脉注入氟比洛芬酯50mg能明显减轻腹腔镜术后的切口性疼痛,术后使用哌替啶的例数,次数明显减少(P<0.01),患者能更早下床活动,增加了对手术的满意度,未见胃肠道紊乱及出血倾向,提高术后镇痛质量,降低术后麻醉性镇痛药用量的50%,并降低全麻术后躁动的发生率。说明预注氟比洛芬酯超前镇痛能有效延长和减少术后阿片类药物的使用,避免了相关不良反应。

本研究显示氟比洛芬酯超前镇痛用于妇科腹腔镜手术,能有效缓解术后切口疼痛,减轻炎症反应,减少术后镇痛药的使用和不良反应,且术后苏醒迅速安全,值得临床推广。

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2011年天坛·国际神经外科麻醉论坛（TiNAS2011）

由首都医科大学附属北京天坛医院、首都医科大学麻醉学系和北京医学会麻醉学分会主办的“2011年天坛·国际神经外科麻醉论坛（TiNAS2011）”将于2011年6月3-5日在北京隆重举行！

2011年，我们以“探索，合作，进步”为主题，以更新的视角、更丰富的内容、更高质量的学术研究和创新的组织形式，全面展示神经外科麻醉其崭新的学术理念与高新技术。届时，我们将围绕脑外伤与麻醉、脑血管病与麻醉、术中神经功能监测与麻醉、唤醒麻醉技术以及神经外科麻醉恢复期管理等专题的进行交流与探讨。为促进与国际接轨，大会特邀欧洲专家亲临现场，与国内知名专家零距离对话，共同聚焦国际热点话题。

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摘要

目的：妇产科腔镜手术对麻醉要求较特殊，要求血流动力学稳定，术后苏醒迅速平稳，为此麻醉药物的选择非常重要。本文对全麻下行妇产科腹腔镜手术患者，术中血流动力学的变化进行了临床观察。方法：选择妇产科腔镜手术100例，随机分为两组，A组采用调节异丙酚和瑞芬太尼的用量维持麻醉深度，B组采用在异丙酚恒速输注的基础上调节异氟醚浓度维持麻醉深度。结果：两组术前及诱导后MAP，HR，RR，SpO_2比较差异无统计学意义（P＞0.05）。BP，MAP，HR在气腹后10min，20min，30min较气腹前升高，两组比较有显著性差异（P＜0.05）。气腹后1小时BP，MAP，HR接近气腹前水平，并趋于平稳至术毕，术中未出现心律失常。血气变化显示，两组气腹后20—30分钟的pH值，$PaCO_2$与气腹前比较均无显著性差异（P＞0.05）。结论：A组用于妇产科腔镜手术较B组更容易维持术中血流动力学稳定，而且术后拔管时间更短。

关键词：麻醉方式，腹腔镜，血流动力学，妇产科

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妇科腔镜手术中不同麻醉维持用药对血流动力学的影响

Effects of Varied Anesthetic Maintainence on Hemodynamics in Obstetrics and Gynecology Laparoscopic Surgery Patients

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Abstract

Objective: The laparoscopic surgeries of obstetrics and gynecology require stable hemodynamics,the rapid and smooth postoperative recovery are also necessity for the success of the operation. So the choice of anesthetic is very important. In this paper, the authors compare the effects of different anesthetic agents for Obstetrics and Gynecology laparoscopic surgery under general anesthesia. Analysis the change of MAP, HR, RR, SPO_2, PO_2, PCO_2 and pH during and after operation.

Methods: 100 patients under laparoscopic surgery were randomly divided into two groups. Group A, Propofol and remifentanil were given to maintain the proper level of anesthesia. Group B, propofol infusion at constant speed and adjust the concentration of isofluran to maintain the proper level of anesthesia.

results: There were no difference of MAP,HR,RR,SpO_2 between two groups before and after intubation. In both groups the BP, MAP and HR of patients all increase after pneumoperitoneum 10min, 20min and 30min respectively (P<0.05). 1 hour after pneumoperitoneum, the BP,MAP,HR decreased back to the basal level, and kept until the end of surgery. No intraoperative arrhythmia. Blood-gas analysis:There were no significant changes of pH, PCO_2 show before and after 20 to 30minnuts pneumoprtonoum in both groups.

Conclusion: Group A shows a better stability of hymodynamics than Group B. The patients of Group A also experience shorter time of recovery and extubatoin.

Key Words: different anesthesia,gynecology and obstetrics,celioscope, hemodynamic

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腹腔镜手术麻醉的特殊性在于CO_2气腹对呼吸循环的影响较大。文献上对硬膜外麻醉和全麻下妇产科腹腔镜手术CO_2气腹对呼吸循环影响的报道较多，关于全麻下妇产科腹腔镜手术不同麻醉维持方法的对比研究并不多。由于这类手术对麻醉要求较特殊，要求血流动力学稳定，术后苏醒迅速平稳，对麻醉药物的选择就显得非常重要。本文就妇产科腔镜手术麻醉过程中采用不同麻醉维持用药，观察血流动力学的变化，以选择最佳麻醉方案，现报道如下：

一、临床资料

1. 研究对象

选择妇产科腔镜手术100例，其中子宫加附件全切术23例，卵巢包块切除31例，宫外孕手术40例，输卵管结扎9例，无心肺合并症。

2. 麻醉方法

入室后开放外周静脉，静脉注射阿托品0.3mg，以10ml/kg/h输注乳酸钠林格注射液。常规进行无创动脉压，心电图，指脉搏氧饱和度监测。随机分为两组，每组50例，采用咪达唑仑0.04mg/kg，异丙酚1.5mg/kg，芬太尼4μg/kg，万可松0.1mg/kg静脉诱导气管插管，以维持用药不同分为A组全凭静脉麻醉组，异丙酚60μg/kg/min，瑞芬太尼0.1-0.2μg/kg/min恒速输注，调节异丙酚和瑞芬太尼的用量维持麻醉深度，B组为静吸复合麻醉组，采用异丙酚60μg/kg/min恒速输注基础上调节异氟醚浓度1-2%维持麻醉深度。Drager麻醉机控制呼吸（Vt8-10ml/kg，f12-14次/min）。患取头低臀高约15度的Trendelenburg体位，WOLF牌定压气腹机以1L/min的速度制造

CO_2气腹,腹内压设定在12mmHg,容量共2-3L,气腹时间30-100分钟。

3. 观察指标

记录两组术中各时点围术期平均动脉压(MAP),心率(HR),呼吸频率(RR),脉搏氧饱和度(SpO_2),拔管时间并分别于气腹前及气腹后20-30min采取动脉血作血气分析。

4. 统计学处理

采用SPSS13.0软件包进行统计学分析,计量资料以均数±标准差($\bar{x}\pm s$)表示,计数资料采用配对χ2检验,组间分析采用配对t检验,P<0.05有统计学意义。

二、结果

两组术前及诱导后MAP,HR,RR,SpO_2比较差异无统计学意义(P>0.05),见表1。BP,MAP,HR气腹后10min,气腹后20min,气腹后30min较气腹前升高,两组比较有显著性差异(P<0.05),气腹后1小时BP,MAP,HR接近气腹前水平,并趋于平稳至术毕,术中未出现心律失常。

血气变化:两组气腹后20-30分钟pH值、$PaCO_2$与气腹前比较,均无显著性差异(P>0.05),见附表。A组在术后15min内顺利拔除气管导管,B组在术后30min内顺利拔除气管导管,未见麻醉及外科并发症。

表1 二组MAP, HR, RR, SpO_2比较($\bar{x}\pm s$)

项目	组别	麻醉前	诱导后	气腹后10min	气腹后20min	气腹后30min	气腹后1h	术毕0.5h
MAP	A组	85.4±12.3	80.4±11.3	84.2±11.3	78.5±12.3	79.2±11.5	80.4±11.2	82.2±10.3
(mmHg)	B组	87.3±15.0	81.2±10.0	91.3±13.2*	89.8±15.1*	87.2±15.4*	88.5±11.2*	84.6±12.4
HR	A组	82.3±14.8	76.3±11.8	80.9±13.7	76.3±10.3	75.8±12.6	76.2±10.8	80.5±10.3
(次/min)	B组	81.7±14.7	73.7±12.5	91.7±13.8*	88.4±12.5*	85.7±13.2*	82.5±14.7*	81.2±10.2
SpO_2	A组	99.0±1.3	99.4±1.2	99.6±0.8	99.8±1.2	99.2±1.5	99.0±1.3	99.2±1.2
(%)	B组	98.9±1.5	99.6±0.9	99.6±0.5	99.7±1.0	99.2±2.5	98.9±1.5	98.6±0.6

*P<0.05为有显著性差异

附表 两组动脉血气变化比较

	气腹前	气腹后20-30分钟
A组		
PO_2(mmHg)	414.3±99.1	432.9±90.9
PCO_2(mmHg)	31.7±4.6	35.1±4.9
pH	7.475±0.054	7.436±0.037
B组		
PO_2(mmHg)	413.2±24.8	447.0±33.0
PCO_2(mmHg)	37.6±5.6	38.3±3.3
pH	7.380±0.028	7.337±0.023

注:与术前比较:P>0.05

三、讨论

妇产科腔镜手术由于二氧化碳气腹使得膈肌抬高,头低臀高体位,肠管自动推移到上腹部,致使肺顺应性降低,肺容量下降和通气血流比(V/Q)降低。二氧化碳经腹膜和内脏的吸收,血液中浓度逐渐升高,刺激颈动脉体和主动脉体的化学感受器,使外周血管阻力明显增加,收缩压和舒张压升高,亦可产生不同程度的高碳酸血症。另因麻醉抑制交感神经系统和气腹压力在腹腔内压迫大血管等高危因素作用下,常会导致血流动力学发生变化如心脏指数(CI)减少,MAP升高,回心血量减少及循环阻力(SVR)明显增加加重心肌缺血以及内分泌紊乱,高碳酸血症又会严重影响循环系统功能。本文采用不同的麻醉维持用药,观察到在整个手术过程中A组较B血流动力学更稳定。

气腹造成高碳酸血症的主要因素,是CO_2充入腹腔的速度和容量,腹内压的高低及通气量是否足够。在CO_2气腹充气过程中,呼吸随腹内压的改变而发生明显变化,腹内压的变化主要受CO_2充气流速影响,故减慢CO_2充气速度,有助于减轻气腹对呼吸的显著影响。

体位在腹腔镜手术中对机体血流动力学的影响虽然远远不及CO_2气腹的影响大。但对心功能不全者仍需引起足够的重视,妇产科腔镜术中应尽量避免长时间的头高较低体位。应选择恰当的低腹内压,低充气速度和低容量,在满足腹腔镜手术要求的同时,尽量减轻气腹对呼吸循环的影响。妇产科腔镜手术通常采用全身麻醉,由于机械通气,可以调整呼吸参数,易于纠正高碳酸血症和酸中毒。气腹后由于CO_2的刺激呼吸作用,有过度通气的表现,f,Vt增加,可代偿性排出潴留的CO_2。本资料证实患者行机械控制呼吸,气腹前有过度通气的表现,气腹后代偿性排出CO_2,故气腹前后$PaCO_2$和pH值均保持在正常范围内,无显著性变化。

在妇产科腹腔镜手术麻醉维持中采用异丙酚和瑞芬太尼复合具有血流动力学更稳定,术后苏醒更迅速等优越性。

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书讯

复旦大学附属肿瘤医院麻醉科陈志扬著的《临床麻醉难点解析》一书，已由人民卫生出版社出版，书中阐述了临床麻醉医生经常遇到的难点，如困难气管插管、硬膜外阻滞进展、双腔管原则、麻醉禁忌症（停手术）、麻醉与催眠术、心肺复苏失败的原因、把植物人唤醒、手术后猝死、癌痛治疗等。30元/本，汇款至200032，上海市徐汇区东安路270号复旦大学肿瘤医院麻醉科 陈志扬收

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摘要

目的：回顾重症严重急性呼吸综合征（SARS）患者接受抗病毒治疗的情况。方法：在广东省SARS数据库中筛选出资料较完整的确诊重症患者127例。根据接受抗病毒治疗的情况分成四组：用了抗病毒药组、有用达菲组、单用达菲组、早期单用达菲组；观察以上四种情况下对发热天数、总病程时间、急性肺损伤（ALI）发展为急性呼吸窘迫综合征（ARDS）的可能性、以及死亡率等影响；结果：所观察的重症SARS患者78.7%应用了抗病毒治疗，在1月份期间，有7例患者应用了达菲治疗，占本月患者数25%；2月份期间，有22例患者应用了达菲，占本月患者数30.6%；3月份期间，有14例患者应用了达菲，占本月患者数73.7%；ALI发展为ARDS的可能性、死亡率在不同月份间无显著差异（P>0.05）；纳入分析的13家医院患者ARDS的发生率、以及应用达菲的情况均有显著差异（P<0.05），但死亡率在医院间无显著差异（P>0.05）；发病后9.4±6.9天开始应用达菲，剂量为150mg/天，持续治疗时间为8.1±3.7天，早期单用达菲的比率为11.8%，其中73.3%是在3月份应用的；用了抗病毒药、有用达菲、单用达菲、早期单用达菲四种情况下对发热天数、总病程时间、ALI发展为ARDS的可能性、以及死亡率等均无显著差异（P>0.05）；结论：所观察的重症SARS患者普遍应用了抗病毒治疗，但开始应用达菲时间较晚，虽然不同医院患者的严重程度、达菲的使用率、以及死亡率有显著差异，但影响因素众多；应用抗病毒治疗总体来说对重症SARS总的病程时间、症状缓解以及死亡率等均无影响。

关键词：严重急性呼吸综合征；急性肺损伤；急性呼吸窘迫综合征；奥司他韦

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达菲在严重急性呼吸综合征的回顾分析

A Retrospective Analysis Report——The Impact of Tamiflu on Severe Acute Respiratory Syndrome (SARS)

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Abstract

Purpose: Analyzing the Tamiflu anti-virus therapy effect of Severe Acute Respiratory Syndrome (SARS) patients retrospectively.

Methods: We screened 127 SARS-diagnosed patients from Guangdong SARS database, which were divided into 4 groups: Anti-virus Group, Tamiflu used Group, Tamiflu only Group and Tamiflu only in early stage group. We compared fever days, total disease period, the probability from Acute Lung Injury(ALI) to Acute Respiratory Distress Syndroms(ARDS) and Death Rate to conclude the impact of Tamiflu on SARS patients.

Result: There are 78.7% of the patients had received anti-virus therapy: 7 cases(25% in January) prescribed with Tamiflu; 22 cases(30.6% in February) prescribed with Tamiflu; 14 cases (73.7% in March) prescribed with Tamiflu. In these 3 months, there is not significant difference(p>0.05) in probability from ALI to ARDS and Death Rate. There is significant difference of ARDS incidence and the Tamiflu used ratio in these 13 hospital where the patients were chosen from(p<0.05), while not in DR (p>0.05). The average Tamiflu used time was 9.4±6.9 days post-pathogenesis with dosage 150mg/day; the average therapeutic time was 8.1±3.7 days. The ratio of Tamiflu used in early stage was 11.8% in which 73.3% was used in March. There are not significant difference in these 4 groups in fever days, total disease period, the probability from Acute Lung Injury(ALI) to Acute Respiratory Distress Syndroms (ARDS) and Death Rate.

Conclusion: Basically speaking, the patients were received Anti-virus therapy but mostly in later stage. Although There are not significant difference in these 4 groups in fever days, total disease period, the probability from Acute Lung Injury(ALI) to Acute Respiratory Distress Syndroms (ARDS) and Death Rate, yet there are a lot of impact factors. There is not significant impact of anti-virus therapy on SARS period time, symptoms relief and DR.

Keywords: SARS, ALI, ARDS, Tamiflu (Oseltamivir)

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广东省SARS疫情流行初期的患者主要两大特点：迅速发展的临床表现和较强的传染性，当时主要按社区获得性肺炎对症处理，直到2003年3月份WHO发现其病原体为变异的冠状病毒，开始针对病因相对规范应用抗病毒的治疗，本文回顾这段时期抗病毒治疗特别是达菲应用的情况。

一、对象和方法

基于广东省SARS临床资料数据库，筛选出资料较完整的重症患者127例，发现应用的抗病毒药种类参差不齐，通常有利巴韦林、单磷酸阿糖腺苷、达菲、无环鸟苷、干扰素等。且抗病毒药相互间联用、序贯等情况均有，因此根据接受抗病毒治疗的情况分成四组：用了抗病毒药组、有用达菲组、单用达菲组、早期单用达菲组，所谓早期单用达菲组指发病一周内开始应用达菲治疗；观察以上四种情况下对发热天数、总病程时间、急性肺损伤（ALI）发展为急性呼吸窘迫综合征（ARDS）的可能性、以及死亡率等影响。

二、统计学处理

应用SPSS 17.0对资料进行统计分析，计量资料采用$\bar{x}\pm s$表示，计数资料采用频数（%）表示。分别采用单因素方差分析（ANOVA）和交叉表卡方分析，P<0.05为差异有统计学意义。

三、结果

1. 基本情况

这组ALI/ARDS患者共127例，其中男59例，女68例；年龄（40.5±15.6）岁；符合ALI的患者50例，符合ARDS患者77例。一般情况见表1。

表1 筛选患者的一般情况（$\bar{x}\pm s$）

病情严重分组	例数	年龄（岁）	APACHE II评分	APACHE III评分	Murray评分	MODS评分	胸片渗出象限	起病时间（d）
ALI	50	34.8±12.8	8.6±3.7	44.7±8.3	1.0±1.1	5.8±0.7	7.5±4.2	10.2±4.7
ARDS	77	44.3±16.3	11.2±5.1	57.6±14.9	1.9±0.7	6.9±1.2	11.9±3.6	12.2±5.1

2. 抗病毒治疗的一般情况

以不同月份为界限，分为2002年12月31号前、2003年1-2月、2003年2-3月、2003年3-4月、2003年4月1号之后，了解抗病毒治疗的变化趋势（表2）。

表2 以不同月份为界限应用抗病毒治疗的情况

组别	以不同月份为界限									
	2002年12月		2003年1-2月		2003年2-3月		2003年3-4月		2003年4月后	
用了抗病毒药组	0	0%	20	71.4%	58	80.6%	17	89.5%	5	71.4%
有用达菲组	0	0%	7	25%	22	30.6%	14	73.7%*	1	14.3%
单用达菲组	0	0%	6	21.4%	7	9.7%	12	63.2%*	0	0%
早期单用达菲组	0	0%	2	7.1%	2	2.8%	11	57.9%*	0	0%

所观察的重症SARS患者78.7%应用了抗病毒治疗，2003年1月之前，各地已经有散发的报道，病因不明，按照“非典型肺炎”处理，所以没有应用抗病毒治疗，特别是重症患者；在1月份期间，有7例患者应用了达菲治疗，占本月患者数25%；2月份期间，有22例患者应用了达菲，占本月患者数30.6%；3月份期间，有14例患者应用了达菲，占本月患者数73.7%，成显著上升趋势，组间有显著差异（P<0.01），单用达菲组和早期单用达菲组趋势类似，提示病因明确后，更多患者选用达菲抗病毒治疗；用了抗病毒药组指凡是应用过抗病毒治疗的患者，从1月份疫情开始至4月份后疫情结束，应用率均在70%以上，组间没有显著差异（P>0.05），提示病因明确后抗病毒药物的构成从病毒唑、单磷酸阿糖腺苷、干扰素等为主转变成以达菲为主。

发病后9.4±6.9天开始应用达菲，剂量为150mg/天，持续治疗时间为8.1±3.7天，早期单用达菲的比率为11.8%，其中73.3%是在3月份应用的；进一步提示病因明确后选择抗病毒药物的变化趋势。

3. 应用抗病毒治疗对重症SARS预后是否有影响

以有否影响持续发热天数了解抗病毒药对症状缓解的作用；以总病程时间、ALI发展为ARDS的可能性、死亡率等情况了解抗病毒药物对重症SARS预后是否有影响（表3）。

表3 抗病毒治疗对重症SARS预后的影响

组别	对症状的缓解		对预后的影响					
	持续发热天数（天）	显著性	总病程时间（天）	显著性	ALI发展为ARDS（似然比）	显著性	死亡率（似然比）	显著性
用了抗病毒药组	12.8±2.7	P>0.05	31.4±15.8	P>0.05	0.252	P>0.05	0.907	P>0.05
有用达菲组	12.6±2.8		32.3±15.2		0.005		0.086	
单用达菲组	12.6±3.2		32.9±15.4		0.024		0.030	
早期单用达菲组	11.7±2.2		30.4±11.2		0.052		0.702	

用了抗病毒药、有用达菲、单用达菲、早期单用达菲四种情况下对症状缓解的指标“持续发热天数”均无显著差异（P>0.05），对重症SARS预后的影响如总病程时间、ALI发展为ARDS的可能性、以及死亡率等均无显著差异（P>0.05），虽然纳入分析的13家医院患者ARDS的发生率、以及应用达菲的情况均有显著差异（P<0.05），但死亡率在医院间无显著差异（P>0.05），考虑主要跟重症患者在不同医院间分布不同有关。

三、讨论

2002年底，面对这一全新的疾病，当时医务人员认识到其传染性和临床特点，但不清楚其病原学。其临床特点主要是：（1）传染性；（2）急性起病，通常以发热为首发症状，体温一般>38℃，常伴有肌肉刺痛，乏力等症状，严重者出现急性肺损伤和急性呼吸窘迫综合征的表现[1]；由于对抗菌药物治疗无效，以及患者的外周血WBC一般正常或降低，疫情开始就普遍应用了抗病毒治疗，当时在不清楚病原体的前提下，没有可以借鉴的诊疗指引，导致临床治疗方法上存在多样性，比如抗病毒治疗有利巴韦林、单磷酸阿糖腺苷、达菲、无环鸟苷、干扰素等，甚至包括中药，还有开始用药的时机以及联合用药等。

历时4个多月以后，WHO在日内瓦宣布一种新的冠状病毒是SARS的病原[2]，对于SARS病毒感染，可以选择的治疗包括有：抗病毒药物、免疫调节剂、特异性抗体等。因疫情没有再发，到目前为止，尚没有证实有效的特异性治疗，本文从广东省SARS数据库中筛选出资料较完整的确诊重症患者127例，着重回顾重症SARS患者接受抗病毒治疗特别是应用达菲的情况。

神经氨酸酶抑制剂奥司他韦（达菲）是继离子通道阻滞剂（金刚烷胺、金刚乙胺）后的一类全新作用机制的抗流感的药物[3]。神经氨酸酶抑制剂可选择性地抑制神经氨酸酶的活性，阻止子代的病毒颗粒在宿主细胞的复制和释放，从而有效地预防流感和缓解症状。神经氨酸酶抑制剂在治疗流感样症状患者患者，多主张在出现流感症状24-48小时内使用，更能发挥抗病毒作用，能有效缓解症状、明显缩短病程、进一步减少并发症的发生和抗菌药物的使用，且对重症流感患者剂量加倍（300mg/天）[4, 5]。

根据接受抗病毒治疗的情况分成四组：用了抗病毒药组、有用达菲组、单用达菲组、早期单用达菲组；分别观察以上四种情况下对发热天数、总病程时间、急性肺损伤（ALI）发展为急性呼吸窘迫综合征（ARDS）的可能性、以及死亡率等影响；所观察的重症SARS患者普遍应用了抗病毒治疗，从1月份疫情开始至4月份后疫情结束，应用率均在70%以上，在1月份期间，有7例患者应用了达菲治疗，占本月患者数25%；2月份期间，有22例患者应用了达菲，占本月患者数30.6%；3月份期间，有14例患者应用了达菲，占本月患者数73.7%，成显著上升趋势，单用达菲组和早期单用达菲组趋势类似，提示病因明确后，更多患者选用达菲抗病毒治疗；进一步整理数据发现开始应用达菲是在发病后9.4±6.9天，剂量为150mg/天，持续治疗时间为8.1±3.7天，提示开始应用达菲时间较晚，对重症患者应用剂量相对不足。

虽然不同医院患者的严重程度、达菲的使用率有显著差异，但死亡率在医院间无显著差异，考虑影响因素众多，主要跟重症患者在不同医院间分布不同有关。经回顾分析，应用抗病毒治疗总体来说对重症SARS总的病程时间、症状缓解以及死亡率等均无影响。

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Extra-cellular Signal-Regulated Kinase (ERK) is Down-Regulated with Hippocampal ARC Protein Expression in Sevoflurane induced Bidirectional Regulation of Memory

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Background: Low dose sevoflurane is demonstrated to have neuronal excitatory effect in CNS. Activity-regulated cytoskeleton protein (Arc) can be fastly expressed in hippocampus for the modulation of synaptic plasticity. Extracellular signal-regulated kinase (ERK) pathway also involves in learning and memory by mediating signals and modifications. This study aims at exploring the mechanism of sevoflurane on memory by connecting ERK pathway, Arc and IA behavioral training.

Methods: SD rats were randomly assigned to three groups (sham, 0.11% SEV and 0.3% SEV). Anesthesia was given by target dose of sevoflurane for 45min and IA (0.4mA, 2s) was followed to every subject immediately after inhalation. The memory retention latency was observed 24hs after. Another serial of rats were killed for hippocampal tissue examination after first IA by western-blot and PCR.

Results: 24h IA performance was compared among groups. 0.11% SEV displayed an elevation of memory retention while 0.3% SEV descended, both showed statistical difference with sham (air) group. PCR analysis of Arc mRNA levels showed that subanesthetic doses of sevoflurane did not change Arc transcription level between groups. However, 0.11% sevoflurane significantly increased Arc protein in the hippocampus, while 0.3% sevoflurane reversed this (* $P < 0.05$, compared with the sham group). There was no difference in total ERK between groups. Expression of phosphorylated ERK was significantly increased according to the increased concentration of sevoflurane.

Conclusion: ERK is down-regulated with hippocampal ARC expression in sevoflurane induced bidirectional regulation of memory, and potentially in a translational level of modification.

In Vivo and Ex Vivo Effects of Propofol on Myocardial Performance in Rats with Obstructive Jaundice

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Background: The responsiveness of "jaundiced heart" to propofol has not been fully elucidated. The purpose of this study aims to evaluate the effect of propofol on myocardial performance in rats with obstructive jaundice.

Methods: Male Sprague-Dawley rats (n=40) were randomly allocated into two groups. Twenty received bile

duct ligation (BDL) whilst same number of rats underwent sham operation. Seven days after the surgery, three concentrations of propofol were administered in vivo and ex vivo (Langendorff) preparations. Heart rate (HR), left ventricular end-systolic pressure (LVESP), left ventricular end-diastolic pressure (LVEDP), maximal rate for left ventricular pressure rising and declining (±dP/dtmax) were measured. Performance of the rat hearts toward propofol was examined using above indexes of cardiac function.

Results: Impaired basal cardiac function was observed in the BDL isolated hearts, whereas indexes of basal cardiac function, LVESP and ±dP/dt, in vivo were significantly higher than those receiving sham operations. With low or intermediate concentrations of propofol, these indexes of cardiac function in both groups were within the normal physiological range and the responsiveness to propofol was unaffected by bile duct ligation. While propofol of the highest concentration was administered, significant decline in cardiac function was found in BDL group.

Conclusions: The basal cardiac performance was better in vivo but worse in ex vivo in the BDL group than in the sham controls. Propofol of low and intermediate concentration appears not to have significant negative effect in cardiac function of rats with obstructive jaundice.

OMEGA-3 Polyunsaturated Fatty Acids Protect against Ischemic Damage Via Formation of Phosphatidylerine and Activation of the Akt Signaling Pathway

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Abstract: Recent studies have demonstrated that dietary supplementation or pharmacological administration of omega-3 polyunsaturated fatty acids (n-3 PUFA) confers remarkable neuroprotection in models of cerebral ischemia or neonatal hypoxic/ischemic brain injury. While it is likely that n-3 PUFA treatment attenuates ischemic brain injury by directly protecting neurons and by ameliorating cerebral pro-inflammatory reactions, the precise mechanism underlying the neuroprotective effect of n-3 PUFA is poorly understood. The present study was aimed to investigate the role of the Akt pro-survival signaling pathway in mediating neuroprotection conferred by n-3 PUFA in both in vitro and in vivo models of hypoxic/ischemic neuronal injury. Dietary supplementation of n-3 PUFA began at day 2 of pregnancy in the dams. Hypoxic/ischemic (H/I) brain injury was induced in 7-day-old newborn rats by means of ipsilateral common carotid artery occlusion followed by hypoxia (8% oxygen for 2.5 hrs). Brains were assessed for cell death and PI3-K/Akt activation at 0-24 hrs after H/I, and for cerebral tissue loss at 7 days after H/I. Neurological performance was analyzed in additional animals using gait testing and righting reflex up to 2 weeks after H/I. Oxygen-glucose deprivation (OGD) was induced in primary cortical-neuron cultures to study the direct neuroprotective effect of n-3 PUFA, where DHA or EPA (0-40 μM) was applied to cultures 24 hr prior to OGD. Supplementation of n-3 PUFA protected against H/I in neonatal rats, resulting in significantly reduced brain tissue loss and neuronal

apoptosis, and improved neurological performance after H/I. Activation of the PI3-K/Akt pathway was diminished in H/I brains, whereas n-3 PUFA treatment promoted this survival pathway. To further support an essential role of PI3-K/Akt in mediating neuroprotection, intracerebral administration of the PI3-K inhibitor LY294002 significantly ablated the neuroprotective effect of n-3 PUFA in H/I animals. In primary neuron cultures, DHA and EPA protected against OGD-induced mitochondrial damage and cell death, which was also dependent on the PI3-K/Akt activity. In conclusion, n-3 PUFA protects against hypoxic/ischemic neuronal injury in neonatal rats and in cultured neurons. The direct neuroprotective effect of n-3 PUFA is mediated, at least in part, by facilitating the activation of Akt.

Sevoflurane Preconditioning Alters Expression of MiR-15b following Transient Focal Ischemic Injury in Rats

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Objective: Neuroprotection afforded by sevoflurane preconditioning has been demonstrated in different labs, yet the underlying mechanism is poorly understood. As playing important roles in gene regulation, microRNAs (miRNAs) are believed as indispensable involvers in the pathogenesis of cerebral ischemia that causes significant morbidity and mortality. However, it has not been described whether sevoflurane preconditioning alters miRNA expression. In this study, we reveal the miRNA expression profile following transient cerebral ischemia in rats and related roles of sevoflurane preconditioning.

Methods: Male Sprague-Dawley rats were exposed for 30 min/day on 4 consecutive days to ambient air or to 2.4% sevoflurane. Then rats were subjected to filament occlusion of the middle cerebral artery (MCAO) for 120 min, and euthanized 3 days after MCAO. The microarray technology was applied to determine the global miRNA expression change following transient cerebral ischemia in rats (n=3/ group). The differentially expressed miRNAs were verified by real time PCR. Furthermore, we identified the expression of markedly changed miRNAs in rats of sevoflurane preconditioning.

Results: There were 4 up-regulated miRNAs (>2 fold) and 9 down- regulated miRNAs (< 0.5 fold) exhibiting differential expression between MCAO group and sham group on the microarray chips. MiRNA profiling experiments have shown that miR-15b is expressed at hight levels in stroke rats, but sevoflurane preconditioning decreased the boosted level of miR-15b. miR-15b has been shown to play very important roles in regulating cell apoptosis by targeting the antiapoptotic Bcl-2 gene. Thus, sevoflurane preconditioning may protect brain against ischemic injury by reducing the elevated expression of miR-15b.

Conclusion: Our results demonstrated that sevoflurane preconditioning markedly depressed ischemia-induced up-regulation of miR-15b, and this may account for its neuroprotective effects at 72 h after ischemic injury in rats.

基底外侧杏仁核去甲肾上腺素能系统参与七氟醚遗忘效应的实验研究

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目的：探究七氟醚经由基底外侧杏仁核（basolateral amygdala,BLA）介导遗忘效应的机制。

方法：健康成年雄性Sprague-Dawley大鼠双侧BLA脑区埋管后随机分为9组。依据分组，于连续被动回避实验（continuous multiple-trail inhibition avoidance, CMIA）训练后即刻向大鼠双侧BLA注射去甲肾上腺素（norepinephrine, NE0.3,1.0或3.0μg/0.5μl）或等体积的生理盐水。随即大鼠吸入空氧混合气（30%O2+70%N2）或七氟醚（Sevoflurane, Sev2.0%）2小时。未进行脑区埋管的大鼠作为对照组，于CMIA训练后吸入空气。24小时后行 IA记忆（潜伏期）检测。另一批大鼠在相同处理结束后即刻处死，用于检测活性调节的细胞骨架蛋白（activity-regulated cytoskeletal protein,Arc）在海马的表达水平。结果 去甲肾上腺素能够以剂量依赖性的方式增强记忆巩固，且最大剂量的去甲肾上腺素（3.0μg/0.5μl）不但能够逆转七氟醚导致的大鼠CMIA记忆巩固损害作用，而且能够逆转其海马Arc蛋白表达的降低。

结论：七氟醚的遗忘效应部分源自其对双侧BLA去甲肾上腺素受体的抑制，后者损害记忆在海马的巩固。

高渗氯化钠羟乙基淀粉40注射液对产妇仰卧低压综合征的临床观察

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目的：观察预输注高渗氯化钠羟乙基淀粉40注射液（霍姆）对产妇仰卧低压综合征的防治效果。

方法：选择行剖宫产产妇180例，随机分为3组，每组60例。NS组输注生理盐水250ml；WW组输注6%羟乙基淀粉130/0.4氯化钠注射液（万汶）250ml；HM组输注霍姆250ml。均于硬膜外麻醉穿刺成功后经上肢静脉输入，30min内输完。于输液前、输液后30min、术后1d抽产妇对侧上肢静脉血及脐动脉血测电解质，记录术中尿量、术后第一个24h尿量。记录各组仰卧低压综合征的发生情况和新生儿1分钟Apgar评分。

结果：三组患者各时点电解质均在临床正常范围。三组术中尿量无显著性差异，但术后第一个24h尿量HM组明显多于NS组和WW组（$P<0.05$）。仰卧低压发生率HM组为6.7%，WW组为8.3%，均显著低于NS组18.3%。三组胎儿脐动脉血PH值、电解质及新生儿Apgar评分均在正常范围。

结论：高渗氯化钠羟乙基淀粉40注射液预扩容能有效防治产妇仰卧低压综合征，且对胎儿无不良影响，可安全用于剖宫产患者。

警惕椎管内麻醉所面临的风险

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目的：总结研究我院脊柱外科收治的脊柱疾病患者，以探讨麻醉椎管内麻醉所面临的风险。

方法：回顾我院近3年来脊柱外科收治的有症状和无症状的脊柱椎管各类疾病患者大约2000例，并在术中观察脊柱和硬膜外腔等椎管内结构的改变，结合术前CT与核磁共振结果探讨此类患者对于临床椎管内麻醉的启示和意义。

结果：椎间盘突出、腰椎退行性病变发病率最高，占收治患者的80%左右，此类患者大多表现为腰痛，行走障碍，临床症状较明确，易于临床诊断；脊柱肿瘤患者比例大约10%左右，此类患者主要表现为持续的疼痛，即使夜间也不易缓解，易于与退行性腰椎病变混淆误诊，且误行椎管内麻醉极易酿成严重后果；椎体栓系，硬膜外脂肪垫形成等疾病占近年来收治的比例低于5%，此类脊柱疾病无明显症状，在没有影像学诊断情况下很难做出诊断甚至引

起麻醉医师警惕，行椎管内麻醉时风险最大，不易进行临床诊断，但此类患者国内外文献均有报道误行椎管内麻醉后造成严重并发症；近年来我院大约收治了3例外院行椎管内麻醉引起脊柱神经严重并发症的病例（小于收治患者1%），主要是由于操作失误导管断裂硬膜外腔（2例）和一例硬膜外操作损伤神经根引起，并由于随后处置失误引起的神经并发症。

结论：椎管内麻醉作为一个盲探性操作本身具有很大风险性，麻醉医师在操作前应仔细询问相关病史，并进行相应的检查，当怀疑有脊柱相应疾病时应进行影像学检查或者放弃椎管内麻醉以避免引起相应的并发症或严重后果。

小儿嗜铬细胞瘤手术的麻醉和管理

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目的：提高小儿嗜铬细胞瘤手术的安全性。方法：回顾性分析2007年6月至2009年11月我院收治的4例嗜铬细胞瘤小儿的临床资料、术前准备、手术的麻醉和管理。

结果：3例诊断嗜铬细胞瘤患儿术前积极降压扩容，术中输液泵输注硝普钠行控制性降压，肿瘤切除后快速输血输液扩容并用输液泵输注去甲肾上腺素。对于1例术中诊断嗜铬细胞瘤患儿及时给予控制性降压和输血输液扩容。4例患儿均成功被切除肿瘤，3例肾上腺嗜铬细胞瘤，1例肾上腺外纵膈嗜铬细胞瘤。

结论：小儿嗜铬细胞瘤手术术前、术中控制性降压及扩充血容量最重要，而对术前误诊的嗜铬细胞瘤,术中及时判断和麻醉正确处理是减少并发症的关键。

脓毒症大鼠膈肌对不同类型肌肉松驰药阻滞效能的改变和机制

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目的：观察脓毒症大鼠膈肌对顺式阿曲库铵和罗库溴铵的IC50值改变和脓毒症对大鼠膈肌乙酰胆碱受体亚基配比变化的影响。

方法：健康雄性SD大鼠48只，周龄8周，体重220-250g，随机分为四组，每组12只：对照组Con；假手术组Sham；盲肠结扎穿孔后9小时组CLP9；盲肠结扎穿孔后18小时组 CLP18。通过盲肠结扎穿孔（Cecal Ligation and puncture ,CLP）建立脓毒症大鼠模型，取带有膈神经的10mm宽膈肌肌条，通过直接恒压电刺激刺激膈神经，分别检测不同组膈肌对顺式阿曲库铵和罗库溴铵的IC50值。通过Western Blot 和Real-time PCR分别检测不同组大鼠膈肌内乙酰胆碱受体亚基和亚基蛋白水平和mRNA水平的变化。

结果：和sham组相比，CLP18组对罗库溴铵的IC50值明显增加（P<0.01），CLP9组对罗库溴铵的IC50值也增加（P<0.05），然而，CLP18和CLP9组对顺式阿曲库铵IC50值无明显变化（P>0.05）。Western Blot和Real-timePCR结果显示：Con组和Sham组两组亚基和亚基蛋白水平和mRNA水平的无明显变化（P>0.05）。和Sham组相比，CLP18组亚基在蛋白水平和mRNA水平均明显增加（P<0.01），CLP9组亚基表达增加（P<0.05）；然而亚基变化与之相反。

结论：脓毒症大鼠膈肌对罗库溴铵的反应性下降，对顺式阿曲溴铵反应性无变化。此现象的发生机制可能是脓毒症对大鼠膈肌乙酰胆碱受体亚基和亚基不同影响。

硬膜外预充生理盐水对剖宫产产妇硬膜外置管并发症和脊麻效果的影响

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目的：腰硬联合麻醉（CSEA）越来越多的应用于产科择期剖宫产的麻醉，其能提供更快、更充分的麻醉效果，硬膜外置管可以对阻滞效果不全的脊麻进行补救，还可以实施镇痛。但是在置入硬膜外导管的过程中，可能会发生不适或对硬膜外血管造成损伤。国外已有许多关于硬膜外预充生理盐水对单纯硬膜外麻醉时硬膜外置管相关并发症的研究报道，目前，尚无对在腰硬联合麻醉下硬膜外预充生理盐水剖宫产产妇硬膜外置管并发症和脊麻效果影响的相关报道。因此，本研究拟评价硬膜外预充生理盐水对剖宫产产妇硬膜外置管并发症和脊麻效果的影响。

方法：拟在针内针法腰硬联合麻醉下行子宫下段剖宫产术的足月妊娠产妇266例，ASA分级Ⅰ或Ⅱ级，年龄21～45岁，体重60～90kg。随机分为2组，Ⅰ组对照组（n=143），行脊麻穿刺，回抽见无色透亮脑脊液流出即注入等比重布比卡因9mg，随后头向置入硬膜外导管3cm；Ⅱ组实验组（n=123），行脊麻后在硬膜外置管前通过硬膜外针注射0.9%的生理盐水5ml，注射完毕后保持注射器压缩针栓20s，随后头向置入硬膜外导管3cm。记录置入硬膜外导管时感觉异常（下肢或背部不适、酸胀、麻木、疼痛）的发生情况，硬膜外导管对血管损伤（回抽见淡红色液体和硬膜外导管置入血管）的发生率，感觉阻滞平面和运动阻滞程度（改良的Bromage分级：0级为双下肢完全可以运动；1级为下肢无力抬起但能屈膝；2级为无力屈膝能屈踝关节；3级为双下肢完全不能运动）。

结果：与Ⅰ组比较，Ⅱ组硬膜外导管对血管的损伤的发生率明显降低（P<0.05），分别是22.7%和9.1%；Ⅱ组置入硬膜外导管时感觉异常的发生率没有差异（P>0.05），分别是38.3%和35.5%；Ⅱ组感觉阻滞平面高（P<0.05），10min时阻滞平面达到T6的比率分别是75.7%和94.2%；运动阻滞程度强（P<0.05）。

结论：剖宫产产妇在脊麻后硬膜外置管前硬膜外腔预充0.9%生理盐水5ml可以有效预防硬膜外置管对硬膜外血管的损伤和降低硬膜外导管置入血管的发生率，增强脊麻的效果，增加了产妇的满意度，但不能降低硬膜外置管时感觉异常的发生。

喉罩在乳腺手术中的应用（4579例临床分析）

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目的：总结我院2006-2010年间全麻喉罩通气实施乳腺手术的病例，为临床安全有效的使用喉罩提供参考。方法 4579例择期实施乳腺手术的病人，ASAⅠ～Ⅲ级，男3例，女4576例，年龄16～89.岁，体重35～110kg，其中乳腺癌根治和改良根治术3132例，双侧乳腺癌改良根治术9例，乳房单切215例，乳腺病、小叶增生、良性肿瘤行单或双侧乳腺象限切除1223例。分为HZY组1987例病人使用HZY型一代喉罩，LMA组2592例病人使用LMA型三代喉罩，全部病人术前30min肌注苯巴比妥钠100mg，东莨菪碱0.3mg，入室后开放外周静脉或颈内静脉，常规监测NIBP，HR，SpO2,麻醉诱导依次静脉注射咪唑安定0.04mg/kg，芬太尼3～4ug/kg（或舒芬太尼0.3-0.4ug/kg），丙泊酚1.5～2.0mg/kg，维库溴铵0.15mg/kg（或罗库溴铵0.6-1mg/kg或顺式阿曲库胺0.2mg/kg），待下颌松弛后插入喉罩，体重<50kg选用3#喉罩，>50kg选用4#喉罩，手控加压气道压力25～30cmH2O无漏气为对位良好。听诊双侧颈部和双肺呼吸音对称清晰（连续插三次对位不良则放弃插喉罩改气管插管），接呼吸机间歇正压通气（IPPV），监测并维持呼气潮气量（VTE）8ml/kg，呼吸频率（RR）10-12次/min，呼吸末二氧化碳（ETCO2）33～35mmHg,气道峰压（PEAK）<20 cmH2O，气道阻力（RaW）<20cmH2O，麻醉维持持续吸入1.0%～3.0%异氟醚或七氟醚，微泵持续静注丙泊酚2～3mg/kg/h，间断注射芬太尼1ug/kg/h（舒芬太尼0.2ug/kg/h）， 维库溴铵0.06～0.08mg/kg/h（罗库溴铵0.5mg/kg/h或顺式阿曲库胺0.15 mg/kg/h）维持，

至缝合切口时停用全麻药，术中如喉罩移位气道阻力超过25cmH2O，经调整喉罩位置气道阻力无降低则改插气管导管。

结果：4579例病人，麻醉时间1.5～9小时，喉罩插入一次成功率HZY组87.5%，LMA组97%，喉罩充气量10～20ml，最大30ml；术中改插气管导管HZY组3例，LMA组无，两组均无反流误吸病例，胃胀气8例均为HZY组病人，术后咽痛HZY组76（76/1987）例，LMA组43（43/3132）例，两组血流动力学指标平稳。

结论：喉罩完全适用乳腺手术全麻通气管理，使用三代喉罩并发症少，安全性更高。

右美托咪啶预处理对诱导时舒芬太尼所致呛咳反应的影响

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目的：探讨右美托咪啶预处理对麻醉诱导时舒芬太尼诱发的呛咳反应的影响。

方法：240例ASAⅠ～Ⅱ级成年女性，年龄18-60岁，拟在全麻下行妇科手术。随机分为4组，每组60例。Ⅰ组（对照组）诱导前输注生理盐水2min，Ⅱ组、Ⅲ组、Ⅳ组诱导前分别以0.05μg/kg.min的速率输注右美托咪啶2min、5min、10min。麻醉诱导舒芬太尼0.5ug/kg 经前臂静脉给药，注射时间3S。记录舒芬太尼注射后1 min内的呛咳反应，根据呛咳次数进行严重程度分级。

结果：Ⅰ组（对照组）舒芬太尼诱发的呛咳反应发生率25%，Ⅱ组、Ⅲ组、Ⅳ组呛咳反应的发生率分别为6.6%、6.6%、5%，诱导前以0.05μg/kg.min的速率输注右美托咪啶2min、5min、10min，可以明显降低呛咳反应的发生率（P<0.01）。Ⅰ组（对照组）有5例患者出现重度咳嗽，Ⅱ组、Ⅲ组、Ⅳ组分别为1例、2例、1例，诱导前给予右美托咪啶不改变呛咳反应的严重程度（P>0.05）。Ⅲ组、Ⅳ组T1、T2、T3时心率明显减慢（P<0.05）。

结论：在我国的女性患者中，右美托咪啶诱导前以0.05μg/kg.min的速率输注2分钟可在不影响心率的前提下有效减少呛咳的发生率，但不改变呛咳反应的严重程度。

瑞米芬太尼对肺癌根治术患者术中房颤的影响

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目的：研究瑞米芬太尼对肺癌根治术患者术中房颤的影响。方法 通过电子麻醉信息系统收集2008年1月～2011年3月记录完整的肺癌根治术患者的麻醉记录单。分为瑞芬组和非瑞芬组。瑞芬组和非瑞芬组又分为男性组和女性组，以及老年组（≥65岁）和非老年组（＜65岁）。统计各组和各亚组房颤的发生率。采用卡方检验（Fisher’s exact test）配对组间房颤发生率的统计学差异。结果 两组患者麻醉诱导用药和剂量无显著差异，瑞芬组患者麻醉诱导后开始使用瑞芬太尼，剂量范围0.1～0.2ug/mg/kg。非瑞芬太尼组手术开始前追加芬太尼0.1mg～0.25mg，术中根据需要追加芬太尼0.05mg。瑞芬组和非瑞芬组中，男性患者术中房颤发生率均明显高于女性（瑞芬组：4.49%vs2.88%，P＜0.05；非瑞芬组：6.68%vs2.67%，P<0.01；男女性总体：6.32%vs2.4%，P<0.01）；老年患者房颤发生率明显高于年轻患者（男性：7.51%vs5.42%，P＜0.05；女性：4.21%vs2.13%，P＜0.01；总体：6.61%vs4.43%，P＜0.01）。与非瑞芬组比较，瑞芬组患者术中房颤发生率均有降低趋势，总体房颤发生率下降1%左右（5.25%vs4.24%）：其中男性患者中降低幅度为2.2%左右（6.68%vs4.49%）；老年患者中降低幅度为2.1%（7.11%vs4.95%）;老年男性患者中降低幅度为2%左右（7.98%vs6.02%）；老年女性患者中降低幅度为3.1%（4.8%vs1.78%）；年轻患者中也有轻微降低趋势。但房颤发生率的降低幅度均无统计学意义。

结论：老年和男性患者是肺癌根治术中房颤发生的重

表1 肺癌根治术男性和女性房颤发生率的比较

	瑞芬组		非瑞芬组		合计	
	病例数	Af例数(%)	病例数	Af例数(%)	病例数	Af例数(%)
男性	556	25(4.49)	1540	103(6.68)	2096	128(6.32)
女性	104	3(2.88)△	858	23(2.67)#	962	26(2.4)#
合计	660	28(4.24)	2398	126(5.25)	3058	154(4.96)

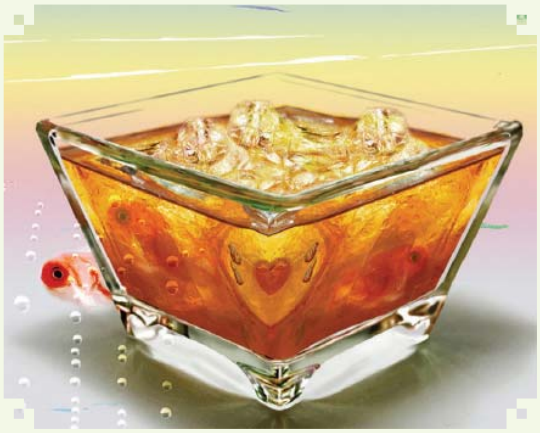
与男性比较，△P＜0.05，#P<0.01

表2 两组患者中不同年龄和性别肺癌根治术中房颤发生率比较

		男性		女性		合计	
		病例数	Af例数（%）	病例数	Af例数（%）	病例数	Af例数（%）
≥65岁	瑞芬组	166	10（6.02）	56	1（1.78）	222	11（4.95）
	非瑞芬组	526	42（7.98）	205	10（4.8）	731	52（7.11）
	合计	692	52（7.51）*	261	11（4.21）☆	953	63（6.61）#
＜65岁	瑞分组	290	15（5.17）	148	2（1.35）	438	17（3.88）
	非瑞芬组	1112	61（5.48）	555	13（2.34）	1667	74（4.43）
	合计	1402	76（5.42）	703	15（2.13）☆	2105	91（4.32）
总计		2096	128（6.32）	962	26（2.4）☆	3058	154（5.03）

与＜65岁组比较，*P＜0.05，#P＜0.01；与男性比较，☆P＜0.01

要患者因素，可针对这些患者给予必要的预防措施。瑞米芬太尼有降低肺癌根治术中房颤发生率的趋势，其中在男性患者和老年患者中更明显。但可能样本量不足，这些房颤发生率的降低在本研究中并未见统计学差异。今后可进一步增加样本量和采用随机对照方式进行更深入的研究。主要数据见下表1和表2.



老年患者下肢手术罗哌卡因腰麻剂量的选择

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目的：探讨罗哌卡因腰麻用于65岁以上老年患者下肢骨科手术的剂量选择。

方法：选择ASA分级为Ⅱ～Ⅳ 级65岁以上老年患者60例，采用DIXON序贯法，按照设定的剂量梯度和方案给药，观察患者的麻醉效能并记录术中、术后不良反应及血管活性药物的应用。结果：老年患者下肢手术采用罗哌卡因腰麻时的最低有效剂量为12.07mg（95%可信区间为10.93-13.29mg）；95%的老年患者有效的局麻药剂量（ED95）为16.77mg；99%的老年患者有效的局麻药剂量（ED99）为18.71mg。

结论：罗哌卡因腰麻在老年患者下肢手术中的应用是安全的，选择接近18mg的剂量可满足绝大多数老年患者下肢手术的麻醉需要。

急性高容量血液稀释对神经外科手术患者颅内压、脑氧供需平衡和心血管功能的影响

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目的：观察急性高容量血液稀释对神经外科开颅手术患者颅内压、脑氧供需平衡以及心血管功能的影响。方法 80例择期行神经外科开颅手术的患者，ASA I或II级，年龄18～60岁，BMI 15～30，随机分为血液稀释组（H组）以及对照组（C组），每组40人。全麻诱导后H组以24ml·Kg^{-1}·h^{-1}的速度输入羟乙基淀粉130/0.4氯化钠注射液，C组以6ml·Kg^{-1}·h^{-1}输入复方电解质注射液。分别于监测操作完成全麻诱导前（T_{Base}）、机械通气稳定5min后（T_0）、输液30min（T_{30}）以及输液60min（T_{60}）记录心率（HR）、平均动脉压（MAP）、中心静脉压（CVP）、心输出量指数（CI）、每搏量指数（SVI）、每搏输出量变异（SVV）、脑脊液压力（CSFP）、颈静脉球血氧饱和度（$SjvO_2$）以及动脉血气分析和血电解质，并计算氧输送（DO_2I）、外周血管阻力指数（SVRI）以及脑氧摄取率（$CERO_2$），比较尿量以及血管活性药物使用次数。结果 中心静脉压（CVP）在H组升高明显（P<0.001），在T_{30}以及T_{60}均高于C组（P<0.001），但仍在正常范围内。血液稀释后SVRI较T_0降低（P<0.001），且在$T_{30}T_{60}$均低于C组（P<0.001）。两组SVV在T_0时无明显差异（P=0.91），H组在$T_{30}T_{60}$均分别较前一时点有明显降低（P<0.001），且显著低于C组（P<0.001）。血液稀释30min时CI以及SVI较T_0增加（P<0.01），且高于C组（P<0.001），然而与T_{30}相比，两组在T_{60}时点的CI或SVI均无明显增加（P>0.05）。两组CSFP在$T_{30}T_{60}$均高于前一时点（P<0.001），且H组CSFP与C

组相比有显著差异（P<0.001）。$SjvO_2$与$CERO_2$在两组间以及不同时点间均无显著差异（P>0.05）。两组60min后尿量没有差别（P=0.67），H组血管活性药物使用量明显小于C组（P=0.002）。

结论：神经外科开颅手术术前高容量血液稀释虽然会引起CVP以及CSFP增加，然而都在正常生理范围内，且不会影响脑氧供需平衡，患者心排量以及每搏量指数增加，循环状态更稳定。

HS014对CCI大鼠中脑导水管周围灰质星形胶质细胞激活及细胞因子表达的影响

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目的：研究表明，脊髓4型黑皮质素受体（MC4R）参与外周神经损伤引起的中枢敏化和慢性疼痛状态的调节。中脑导水管周围灰质（PAG）是下行疼痛易化系统的核心结构，其参与脊髓伤害性信息的调控。PAG下行易化体系的激活可引起慢性疼痛状态，且其在热觉痛敏和触觉痛敏的维持中起重要作用。研究表明，多种神经递质和神经调质均参与了下行易化系统的紧张性活动。在PAG脑区，既有POMC和AgRP神经元投射，又有MC4R的表达，所以我们推测此处的MC4R可能参与了下行易化通路的活性调节。本研究选取中脑导水管周围灰质（PAG），观察选择性MC4R拮抗剂（HS014）对神经病理性疼痛大鼠的镇痛作用及PAG中星形胶质细胞表面标记物GFAP和炎性因子（α-TNF，IL-1β）表达的影响。方法 健康雄性Wistar大鼠75只， 随机分为A组(假手术组,n=25)，B组(CCI对照组，n=25)，C组 (CCI治疗组，n=25)，B组和C组大鼠在坐骨神经结扎损伤手术前12个小时，PAG分别注射NS（0.5ul）或HS014（5ug/0.5ul），每24h注射一次，连续注射到CCI术后14天为止。各组大鼠分别于术前(以第0d表示) 以及术后第1d、3d、7d、14d测定损伤侧后肢热刺激缩足阈值，然后相应分别取每组大鼠PAG。采用免疫组化染色方法测定PAG星形胶质细胞胶质原纤维酸性蛋白(GFAP)及炎性因子（α-TNF，IL-1β）的表达。

结果：A组大鼠各观察时点热刺激缩足阈值以及GFAP免疫反应阳性细胞的平均光密度值，α-TNF，IL-1β的阳性细胞数组内比较均无统计学意义（P均>0.05）；与术前比较，B组和C组大鼠CCI术后各时间点热刺激缩足阈值均有不同程度的降低(P<0.05)，术后各时间点α-TNF，IL-1β的阳性细胞数则有不同程度的增加(P<0.05)，GFAP免疫反应阳性细胞平均光密度值则从术后3d开始出现增加，后持续增加至术后14d ； 尤以B组大鼠在CCI术后14d损伤侧热刺激缩足阈值显著降低(P<0.05)，且α-TNF，IL-1β的阳性细胞数，GFAP免疫反应阳性平均光密度值均显著增加(P<0.05)。其中C组与B组大鼠术后各观测时点分别比较，热刺激缩足阈值均明显升高(P<0.05)，α-TNF、IL-1β的阳性细胞计数以及GFAP免疫反应阳性细胞的平均光密度值均明显减少(P<0.05)。

结论：CCI可致PAG中星形胶质细胞激活和炎性因子的表达增加，且其增加程度与慢性神经病理性疼痛维持过程中热刺激缩足阈值的降低程度平行。HS04能明显降低PAG中星形胶质细胞的激活和炎性因子的增加，从而更为有效减轻CCI大鼠的痛觉过敏。

孕早期母体接受丙泊酚全身麻醉对SD大鼠子代学习记忆功能的影响

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目的：研究孕早期母体接受丙泊酚全身麻醉对SD大鼠子代学习记忆功能的影响。

方法：将20只孕7天SD母鼠随机分丙泊酚组(P组)和对照组（C组），每组十只。P组母鼠经尾缘静脉注射丙泊酚20mg/kg行麻醉诱导，继之以20mg/(kg·h)速度静脉泵注丙泊酚维持麻醉2h，C组母鼠用等体积的生理盐水代替丙泊酚，余同P组。待其自然分娩，将各只母鼠所产子鼠

随机均分入30日、60日、90日三个观察时间点，用Morris水迷宫实验评估子鼠学习记忆功能，取各观察时间点子鼠海马组织行病理学观察及透视电镜行超微结构分析，使用PT-PCR技术测定子鼠海马即早基因c-fos、c-jun mRNA的表达水平。

结果：P组子鼠在各观察时间点逃避潜伏期、第二象限活动时间、穿越平台次数与C组相比无统计学差异(P>0.05)；两组子鼠海马组织病理学及超微结构相比无明显差异；两组子鼠c-fos、c-jun mRNA表达水平无明显差异(P>0.05)。

结论：在本实验条件下，孕早期母体接受丙泊酚全身麻醉对SD大鼠子代的学习记忆能力无明显影响。

上胸段硬膜外阻滞并尼莫地平在兔蛛网膜下腔出血后脑血管痉挛中的作用

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目的：探讨上胸段硬膜外阻滞并尼莫地平对兔蛛网膜下腔出血（SAH）后脑血管痉挛的保护作用。

方法：用切开置管法制备HTEB 模型的新西兰兔50只，随机分为5组(n=10)：假手术组（S组）、对照组（Con组）、HTEB治疗组（HS组）、尼莫地平治疗组（NS）和HTEB+尼莫地平治疗组（HNS组）；采用“枕大池二次注血法”(0.5ml/kg) 制成兔SAH模型，经颅多普勒检测兔基底动脉平均血流速度(Vm)；光镜下观察基底动脉形态学变化；TUNEL法检测基底动脉内皮细胞凋亡情况，免疫组化测定内皮细胞Bcl-2、Caspase-3表达情况。

结果：与S组比较，其余各组基底动脉Vm均明显升高，管壁增厚、管腔变窄，Bcl-2表达下调，Caspase-3表达上调（P<0.01）；与Con组、HS组和NS组比较，HNS组基底动脉Vm明显减慢，管壁增厚减轻、管腔增宽，Bcl-2表达上调，Caspase-3表达下调（P<0.05）。

结论：上胸段硬膜外阻滞并尼莫地平显著改善蛛网膜下腔出血后脑血管痉挛，且优于上胸段硬膜外阻滞或尼莫地平的单独使用，提示上胸段硬膜外阻滞和尼莫地平改善脑血管痉挛可能存在协同作用；使基底动脉内皮细胞上调Bcl-2的表达水平，下调Caspase-3表达水平，减少内皮细胞的凋亡，进一步证实其作用机制可能涉及细胞凋亡,与细胞凋亡途径中线粒体途径有关。

δ阿片受体激动剂抗全脑缺血过程中星形胶质细胞反应的研究

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目的：既往对于缺血脑损伤的研究主要集中在神经元上，对星形胶质细胞关注较少。近年来发现星形胶质细胞不仅对神经元有营养支持的作用，还参与内环境调节以及与神经元之间的信号传递，从而影响神经元或神经行为功能的恢复。δ阿片受体对低氧/缺血损伤后的神经元存活非常重要。但是，目前关于缺血后δ阿片受体活化对星形胶质细胞的影响还不清楚。因此，本实验拟研究全脑缺血及δ阿片受体活化后海马星形胶质细胞的反应以及相关蛋白的表达定位。

方法：采用侧脑室埋管和四血管阻塞的方法建立动物模型，大鼠分为四组（n=8/组）：正常组、假手术组、缺血组以及DADLE后处理组。运用组织学染色和免疫组化技术观察缺血后72小时海马神经元存活和星形胶质细胞形态学变化，运用免疫组化双标的方法分析p-Akt和active caspase-3表达的变化及其细胞定位特点。

结果：假手术组和正常组各指标没有显著差异。与假手术组相比，缺血组海马CA1区神经元显著丢失，星形胶质细胞数量增多，形态受损。DADLE后处理组较缺血组存活神经元明显增加，同时星形胶质细胞活化明显，表现为胞体肥大，突起粗长，但数量增加较缺血组少。P-Akt表

达集中于海马的椎体细胞层和颗粒细胞层，缺血后3天荧光强烈，主要表达在神经元上；而DADLE处理组p-Akt分布除神经元集中部分外有部分散在分布，免疫双标后证明p-Akt除表达在神经元上外，也表达于星形胶质细胞。缺血后伴随细胞凋亡，DADLE后处理在减少CA1区神经元丢失的同时也诱导active caspase-3阳性细胞数量增加，经免疫双标证实其细胞定位主要在星形胶质细胞上。

结论：缺血后给予DADLE后处理促进了星形胶质细胞的活化，可能于促进神经元存活有关；同时DADLE后处理又抑制了星形胶质细胞的过度增殖，诱导星形胶质细胞凋亡，后者可能与减轻其有害作用有关。

选择性阻断cGMP依赖性蛋白激酶对内毒素孵育的大鼠血管环收缩功能的影响

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目的：观察选择性阻断cGMP依赖性蛋白激酶（PKG）对恢复内毒素（LPS）孵育的大鼠血管环收缩功能的影响。方法　取SD大鼠胸主动脉血管环，随机分为正常对照组、LPS组、LNAME（N-硝基精氨酸甲酯）组以及DT2（DT-2三氟醋酸盐）组。在体外测定LPS孵育2、3、4 h后各组血管环在苯肾上腺素（PE）作用下收缩的浓度效应曲线、最大收缩力（Emax）和产生最大收缩力的半数有效浓度（EC50）。

结果：LPS孵育后各时间点血管环的收缩浓度效应曲线与对照组比较明显降低（P<0.05）。LNAME可以提高LPS孵育2、3、4 h时血管环的收缩功能，Emax和EC50较LPS组差异有统计学意义（P<0.05）。DT2可以显著提高LPS孵育3 h时血管环的收缩功能（P<0.01），Emax和EC_{50}的差异具有统计学意义（P<0.01），但在2和4h时，DT2组与LPS组血管环收缩的浓度效应曲线比较差异无统计学意义。

结论：选择性阻断cGMP依赖性蛋白激酶可以部分恢复LPS孵育的大鼠胸主动脉血管环的收缩功能。

七氟醚预处理对成年大鼠局灶性脑缺血再灌注损伤早期血脑屏障的神经保护作用

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目的：围术期脑缺血再灌注损伤可导致患者术后不可逆的神经功能损害。目前仍缺乏有效的治疗手段和干预措施。血脑屏障（BBB）破坏已被证实是加重继发性脑实质炎症反应的关键因素。因此，有效阻断BBB破坏可能是治疗脑缺血再灌注损伤的潜在靶点。吸入麻醉药能减轻大鼠脑缺血再灌注损伤，但有关其对脑缺血后BBB影响的研究很少。现有研究发现，脑缺血可引起细胞粘附分子（CAMs）和基质金属蛋白酶（MMPs）的表达增加，前者介导白细胞浸润和迁移至受损脑组织，后者水解基底膜和紧密连接（TJs）蛋白等神经血管周围基质，破坏BBB，加重脑缺血损伤。因此，我们提出假设：七氟醚预处理能有效减轻局灶性脑缺血再灌注损伤，这种保护作用与其抑制CAMs和MMPs的表达，减轻BBB破坏有关。

方法：采用大脑中动脉栓塞模型（MCAO）模拟局灶性脑缺血再灌注损伤。成年SD雄性大鼠在MCAO手术前连续4天给予1.2%七氟醚吸入治疗（预处理），每天30分钟。第五天行MCAO手术，缺血时程为60分钟。在MCAO术后第一天至第三天对大鼠进行神经功能缺陷评分。于术后第二天行透射电镜和Evans blue含量检测，以评估BBB的完整性。采用western blot、明胶酶谱技术和免疫荧光技术等分析脑损伤后6小时至72小时CAMs、MMPs和TJs的表达，同时观察小胶质细胞和星形胶质细胞的活化情况。

结果：七氟醚预处理显著减轻了脑缺血再灌注损伤后BBB的破坏程度，并改善了脑损伤后的神经功能。七氟醚预处理抑制了脑缺血后细胞间粘附分子-1（ICAM-1）、血管细胞粘附分子-1（VCAM-1）、MMP-2、MMP-9和金属蛋白酶组织抑制因子-1（TIMP-1）的上调和occludin的缺失，同时抑制了脑损伤侧皮层、纹状体和胼胝体脑区的星形胶质细胞和小胶质细胞的活化。结论：七氟醚预处理对脑缺血再灌注损伤早期的BBB具有保护作用，其保护机制可能包括：抑制脑缺血后CAMs和MMPs的上调，减少TJs的缺失，以及抑制小胶质细胞和星形胶质细胞的激活。

GSK-3磷酸化对老年大鼠肝缺血再灌注损伤的保护机制研究

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背景：肝缺血再灌注（I/R）损伤是接受肝外科手术，尤其是肝移植手术患者术后恢复的重大障碍。线粒体膜通透性转换孔（mPTP）开放被认为是I/R损伤的关键。糖原合成酶激酶-3（GSK-3）能磷酸化调控mPTP的开放，在I/R时提供心肌保护。但其在肝脏和老年动物中的作用都并不清楚。本课题通过缺血前对GSK-3位点行磷酸化预处理观察其在老年肝脏I/R中的保护作用及机制，对于临床老龄患者围手术期肝保护具有重要的理论和实际意义。目的：研究GSK-3在老龄大鼠肝I/R中的保护作用机制，以期为再灌注后肝损伤的防治提供新思路。

方法：本研究采用18月龄SD大鼠70%肝热缺血再灌注模型。通过血清酶学指标评价肝损伤；H-E和TUNEL染色检测肝坏死和凋亡；分离再灌注后线粒体，使用荧光分子探针检测线粒体钙容纳力（CRC）以评价mPTP的敏感性；使用免疫印迹法研究GSK-3位点的磷酸化对COX-2和PCNA的表达影响。

结果：（1）单纯预处理使GSK-3位点磷酸化并不能减轻老年大鼠再灌注24h时肝细胞的坏死和凋亡。然而，当合并给予外源性能量物质--D-葡萄糖时却能起到明显的肝保护作用。而单纯给予D-葡萄糖不磷酸化GSK-3位点却无类似保护效果。（2）再灌注早期GSK-3位点的磷酸化能一定程度上抑制MPTP开放，但随着再灌注时间延长，该作用并不持久。但是，GSK-3位点磷酸化的同时给予D-葡萄糖能有效抑制mPTP的开放。在老年动物中，葡萄糖能延长GSK-3磷酸化对mPTP的抑制效果。（3）再灌注时，GSK-3位点的磷酸化并不能改善COX-2介导的炎症反应。但是，在外源性葡萄糖参与时，其却能显著刺激老年肝脏I/R时肝细胞的再生活性，该作用可能是再灌注后期mPTP受抑制的因素之一。

结论：肝脏I/R时，GSK-3位点的磷酸化能抑制mPTP的开放，但是，在老龄动物中，该作用并不持久。导致其对老龄肝脏并无直接保护效果。D-葡萄糖能延长磷酸化的GSK-3对mPTP的抑制作用，并提供有效的肝保护。机制可能与其刺激老年肝脏I/R时肝细胞的再生活性有关。

远端肢体缺血预处理对大鼠大脑低灌注后认知功能的保护

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目的：评估远端肢体缺血预处理对大鼠大脑低灌注后认知功能损害的保护效应。

方法：SD大鼠18只随机分为三组，对照组，双血管阻断组和远端缺血预处理组，每组6只。3%戊巴比妥钠腹腔注射麻醉（30mg/kg），麻醉成功后分组进行手术。对照组大鼠仅暴露右下肢股动脉和双侧颈总动脉。双血管阻断组大鼠暴露右下肢股动脉后不行预处理，暴露后30min行双侧颈动脉阻断60min。预处理组大鼠暴露右下肢股动脉后行缺血预处理阻断10min后开放，共三个循环，三个循环后立即对双侧颈总动脉阻断，60min后开放颈总动脉。每组手术时间90min，术后缝合切开皮肤。术后第5日，三

组实验大鼠行Morris水迷宫训练，连续5日，分别记录术后第5日-术后第8日寻台潜伏期，术后第9日穿台率。术后第9日Morris水迷宫结束后，三组大鼠即行麻醉后去头取脑。一侧鼠脑4%福尔马林固定后石蜡包埋后，行HE染色检测。另一侧鼠脑在肉眼下，行海马区域取材，进行Bcl-2 ELISA检测。神经行为学检测数据及ELISA数据均行单尾方差分析检测，p<0.05为统计学意义上差异显著。

结果：对照组、双血管阻断组和远端缺血预处理组术后第5日寻台潜伏期分别为：83.1±33.3，63.9±48.3，69.2±50.0；术后第6日分别为：39.2±5.9，34.0±17.8，17.0±5.4；术后第7日分别为：26.5±4.1，37.8±26.0，13.2±8.1；术后第8日分别为13.5±11.2，29.0±22.1，13.2±3.5。远端缺血预处理组在术后第7日，第8日均较双血管阻断组明显缩短（p<0.05）。术后第9日穿台率对照组、双血管阻断组和远端缺血预处理组分别为2.5±1.2,1.6±1.3,2.6±1.2，双血管阻断组较其它两组明显降低（p<0.05）。HE染色各组均未发现明显异常。鼠脑海马Bcl-2 ELISA检测对照组、双血管阻断组和远端缺血预处理组分别为：3.2±0.7ng/mg，2.5±0.5ng/mg，4.1±0.6ng/mg，远端缺血预处理组明显高于其它两组（p<0.05）。

结论：远端肢体缺血预处理可减轻大鼠大脑双血管阻断低灌注认知功能损害，海马Bcl-2表达增加减少相应区域神经元凋亡可能是其保护机制之一。

诱生型一氧化氮合酶在肺移植大鼠肺血管功能改变中的作用

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目的：观察肺移植大鼠再灌注早期肺血管功能的改变，探讨诱生型一氧化氮合成酶在肺移植大鼠肺血管功能改变中的作用。

方法：雄性SD大鼠40只，体重300g～400g，先取15只作为移植供体鼠，余下大鼠分为2组：对照组（n=10），仅做左侧开关胸处理；移植组（n=15），即肺移植受体组，采用改良三袖套法建立大鼠左肺原位移植模型，肺移植完成，再灌注2h后处死大鼠，取左肺组织检测毛细血管通透性指标肺湿干比(W/D)、肺内伊文思兰含量；测试氧化应激指标丙二醛(MDA)和髓过氧化物酶(MPO)含量；同时检测诱生型一氧化氮合酶(iNOS)、内皮源性一氧化氮合酶(eNOS)含量的变化。另外取大鼠肺动脉，制备离体肺动脉环，再细分为内皮完整组和去内皮化组，采用乙酰胆碱的累积舒张反应曲线法测试血管环舒张功能改变，采用去氧肾上腺素的累积收缩反应曲线法测试收血管环缩功能的改变；并采用非选择性NOS抑制剂(L-NAME，300μM)和选择性 iNOS抑制剂（L-NIL，10μM）孵育血管20min，比较其对离体肺动脉血管环收缩和舒张功能的影响。

结果：移植组的W/D和肺内伊文思兰含量高于对照组(P<0.05)；MDA、MPO增高；肺内iNOS活性高于于对照组(P<0.05)，eNOS活性低于对照组(P<0.05)；移植组离体肺动脉舒张功能下降（P<0.05），而L-NIL（10μM）预处理后血管舒张效应恢复到对照组水平；移植组离体肺动脉的收缩功能下降（P<0.05），去内皮化对移植组肺动脉收缩功能无显著影响，采用L-NAME或L-NIL预处理后移植组血管收缩功能明显恢复（P<0.05）。

结论：移植肺再灌注早期一方面氧化应激损伤加重，肺毛细血管通透性增加，另一方面肺动脉的收缩和舒张功能都有不同程度的损害，其中舒张功能的损害可能与内皮功能相关，而收缩功能的损害主要与平滑肌功能相关，移植肺再灌注早期的这两方面改变其机制可能与肺内iNOS活性的异常增加以及eNOS活性的降低有关。

腹腔内出血致腹内高压引起气管插管时心跳骤停一例的报道

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摘要：本文介绍一例肝叶部分切除术后的患者因腹腔内出血在急诊剖腹探查术行气管插管时发生心动过缓并最终引起心跳骤停的报道，可能与腹腔内高压、平卧位以及静脉麻醉药有关。因此我们建议腹腔内高压患者急诊手术全麻诱导时采取半卧位联合清醒状态下纤支镜气管插管以防止心跳聚停的发生。

简介：腹腔内压力不仅反映腹腔内容积和腹壁顺应性，还和胸内压直接相关。按照世界腹腔间隔室综合症协会的建议和定义：腹腔内压的正常值小于7mmHg，大于12mmHg则属于腹腔内高压[1]。

一例54岁的男性患者因术后腹腔内出血拟行剖腹探查术，气管插管时发生心跳聚停。因此对于此类患者应注意防止心跳聚停及腹腔内高压引起的其他并发症。

病情简介：男，54岁，因CT示右肝复发性肝脏肿瘤入院拟行肝叶部分切除术。患者6年前在我院行原发性肝癌切除术，术后3次行肝动脉化疗栓塞术。经充分术前准备，患者于全麻下行肝叶部分切除术，手术平稳顺利，术后安返监护室。

术后6小时引流瓶内有血性液体300ml，1小时后增加至800ml，心电监护示低血压及心动过速。输注2400ml浓缩红细胞、1200ml新鲜冰冻血浆和2000ml代血浆后，患者诉呼吸困难要求半卧位并改面罩吸氧。血气分析示pH7.28,PaO_2 98mmHg,$PaCO_2$ 38mmHg，碱剩余-8.1mmol/L，血红蛋白7.1g/L。床边急诊B超提示腹腔大量积液。按照Iberti’s[2]的方法测定患者半卧位时腹内压为38mmHg。静脉泵注10μg·kg^{-1}·min^{-1}多巴胺和10μg·kg^{-1}·min^{-1}去甲肾上腺素,有创压仅维持在80/50mmHg左右。

由于患者腹胀进行性加重以及呼吸循环功能持续恶化，决定行急诊剖腹探查术。当患者转移到手术床上平卧时，心率由130次/分下降到60次/分。静注芬太尼（2μg·kg^{-1}）和依托咪脂（0.2mg·kg^{-1}）行全麻诱导，静注依托咪脂时患者心跳聚停。10秒内完成气管插管术并静注0.5mg肾上腺素，患者心跳恢复。气道压高达46mmHg，开腹后逐渐降至21mmHg。气管插管后10min动脉血气分析示pH6.96,PaO_2 50mmHg, $PaCO_2$ 92mmHg,碱剩余-10.8mmol/L。开腹后发现右肝和膈面间有活动性出血，采用3-0丝线行“8”字缝合、氩气刀烧灼以及止血纱布填塞进行止血。术中共输注2800ml浓缩红细胞、1400ml新鲜冰冻血浆、1500ml代血浆以及150ml 5%碳酸氢钠。术后患者恢复良好于急诊剖腹探查术后18天出院。

讨论：腹内压已经成为一个重要的生理概念，早在1867年Wendt最早描述了腹内压升高与肾脏损害的关系。20世纪90年代，Sugrue通过两项前期瞻性研究报道了腹内压升高在普外科手术患者的发病情况以及在急诊普外科手术中的重要性[3]。腹内压升高可见于多种疾病状态，包括腹部创伤、大量腹水、肝移植、术后腹腔内出血、肠梗阻以及腹主动脉瘤破裂[4]。与下肢或胸腔间隔室综合症一样，腹内压升高的最佳治疗方案是手术减压，尤其是腹腔内出血引起的腹内压升高。

腹内压升高会导致许多脏器系统功能障碍，包括心血管系统、呼吸系统、肾脏等，并可能最终发展成腹腔间隔室综合症。

腹内压大于20mmHg时会显著影响心血管系统。腹内压升高压迫下腔静脉和门静脉引起静脉回流减少；引起胸内压升高，从而降低左室顺应性，导致心肌收缩力减弱和心输出量减少[5]。血容量不足时心输出量进一步减少，因此提高心输出量的最好方法是进行积极的容量复苏[6]。

腹内压升高压迫膈肌向胸腔移动导致呼吸功能障碍并最终引起呼吸衰竭。功能残气量减少，肺通气/血流比值失调加重从而影响氧合功能[7]。患者常表现为呼吸困难、通气量减少和呼吸顺应性下降。与基础值相比，氧分压下降、二氧化碳分压升高[8]。同时，由于肺-胸壁顺应性改

变，气道峰压和平均气道压均明显升高[9]。

对于该患者，低血容量、前负荷减少和腹内压升高使心排出量严重减少。当患者取平卧位时，膈肌进一步上抬，从而减少胸腔容积和顺应性并增加胸内压[10]。胸内压升高不仅引起前负荷进一步降低，还减少静脉回流并压迫心脏，从而引起左室未舒张容量下降[11]。通常情况下，创伤性以及心功能受损的患者应用依托咪脂有助于维持心血管稳定性[12]，但是依托咪脂也会引起平均动脉压和心指数下降，同时呈剂量依赖性抑制心肌收缩力[13]。因此，当患者静注依托咪脂时，心肌收缩力受到抑制，窦房性供血减少，心率减慢并最终引起心跳骤停。

通过该病例，我们主要强调对于腹内压升高的患者行全麻诱导时应格外当心，必需考虑到腹内压升高引起的器官功能受损。心动过缓的发生率可能较高，甚至引起心跳骤停。我们建议腹腔内高压患者，尤其是由腹腔内急性出血引起的腹内压升高时，行急诊手术全麻诱导时采取半卧位以及清醒状态下纤支镜气管插管以防止心跳聚停。

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麻醉诱导期化学气味性哮喘一例

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1. 临床资料

患者女，46岁，53kg，农民。因“经期腹痛半年，加重3天”入院，诊断为右卵巢子宫内膜异位囊肿。患者既往有“支气管哮喘”史11年，口服氨茶碱片。2001年前在硬膜外阻滞下行“胆囊切除术”，围术期无特殊。

此次住院术前准备期间，患者因“着凉”和“闻到烟味”发生较为明显的咳、喘症状，血常规：白细胞计数11.6×109/L，中性5.9×109/L，嗜酸性1.9×109/L，体温36.6℃，经“头孢呋辛、氨茶碱”治疗后咳嗽症状缓解，加用“甲强龙”后喘息症状缓解。术前麻醉访视患者呼吸平稳，两肺未及哮鸣音，术前检查心电图“ST改变”，余均正常。

患者于2011年3月16日在全麻下行“腹腔镜右附件切除术”，术前用药阿托品0.5mg肌注。麻醉诱导期间，静注1%利多卡因50mg+地塞米松2.5mg，并予麻醉面罩吸氧去氮，此时患者剧烈咳嗽，诉“面罩的气味受不了”，拒绝面罩供氧，反复多次心理辅导未果，静注丙泊酚100mg+维库溴铵8mg后面罩加压通气。手控通气期间，麻醉医生发现气道压力迅速加大，加用口咽通气道无改善，听诊两肺弥漫性呼气相哮鸣音，脉搏氧饱和度（SPO_2）降至93%，立即静注氨茶碱250mg，行气管插管，气道峰压达50mmHg，IPPV，潮气量500ml，频率12次/分，吸呼比1:2.5，开启安氟醚挥发罐，5分钟后症状无改善，$SPO_2$85%～90%。予肾上腺素0.25mg皮下注射+氢化可的松琥珀酸钠100mg静注，气道压力逐渐降低至18mmHg，SPO_2升至100%，两肺哮鸣音明显减少。手术历时1h，术中SPO_2维持100%，气道压18～20mmHg，可闻及两下肺少量哮鸣音，气管内吸引出较多白色痰液。术中血气分析变化见表一。

2.讨论

麻醉科医师就患者麻醉诱导期发生支气管哮喘的原因及防治措施展开讨论。

麻醉科住院医师甲：考虑到患者有支气管哮喘史多年并时常发作，全麻诱导时避免使用了可能诱发哮喘的药品，并予阿托品、地塞米松、利多卡因预防，而患者突然地哮喘发作，可能与麻醉面罩的气味刺激有关。

麻醉科主治医师乙：哮喘的发病原因复杂，一般认为是变态炎症反应使易感者对各种激发因子产生气道高反应性，多种细胞尤其是嗜酸性粒细胞参与气道炎症，导致支气管平滑肌收缩。该患者因手术室内气味刺激几分钟后即发生重症哮喘较为少见。在治疗上，同支气管痉挛的处理，去除变应原外，拟肾上腺素类应为首选，用药途径方面，气管内局部用药如沙丁胺醇气雾剂也应常规使用。

麻醉科麻醉护士丙：患者使用的麻醉面罩和螺纹管均由优氯净消毒处理，有轻微的刺激味，另外其本身的医用塑料味也可能诱发气道高反应。

麻醉科副主任医师丁：患者哮喘的突然发作且程度严重，此时需有效控制急性发作症状并维持最轻的症状或无症状。气管插管并吸入纯氧可提高肺泡氧分压，但由于肺内分流导致肺泡-动脉氧分压差增大，因此应用β2-受体激动剂等直接扩张支气管最为关键，而糖皮质激素因可降低气道反应性是过敏性哮喘的首选。茶碱类药物如氨茶碱虽有一定的扩张支气管效果，但作用机理复杂，部分是由于促内源性肾上腺素、去甲肾上腺素释放的结果，个体时效差异较大，不推荐为一线抗哮喘药物。另外，变态炎症反应常致气道分泌物增多，因此需注意保持气道通畅。

麻醉科副主任医师戊：一般认为哮喘的发生机制主要是Th2细胞所介导的变应原过度免疫反应导致的慢性呼吸道炎症。室内外空气污染物对哮喘急性发作的诱发作用是近年来关注的焦点，已肯定的可引起哮喘发作的化学气味达数百种之多，以油漆味和杀虫剂最为常见。依据患者曾因“闻到烟味”引发哮喘发作，可考虑化学气味性哮喘的临床诊断，而麻醉诱导时闻到面罩表面的刺激气味而剧烈咳嗽更应引起麻醉医师的警觉。对于哮喘患者，术前访视应询问有无特应性素质病史，有特应性素质的化学气味性

表1 患者术中血气分析结果

时间	pH	氧分压 mmHg	二氧化碳分压mmHg	氧饱和度%	HCO3－ mmol/L	血乳酸浓度 mmol/L	吸入氧浓度%
氨茶碱后5min	7.27	51	56	87	25.3	2.3	95
肾上腺素+氢考后5min	7.33	89	47	96	24.5	2.1	95
手术进行30min	7.36	169	45	100	24.1	1.5	95
手术结束	7.35	197	42	100	22.4	1.6	95
苏醒结束	7.43	95	35	97	23.4	1.1	21

哮喘患者往往与过敏有关。

讨论结果：患者为化学气味性哮喘患者，具备气道高反应基础，因全麻诱导时面罩、螺纹管的医用塑料和\或优氯净消毒水气味致敏，诱发哮喘急性发作。对于此类型患者，应重视病史回顾，去除变应原，并及时应用β2-受体激动剂和糖皮质激素等。

3. 后续治疗及转归

术后气管拔管无特殊，患者呼吸平稳，无不适主诉，未予以面罩给氧，苏醒后期未闻及肺哮鸣音，返病房。术后随访情况良好，追问病史，患者平素对多种气味不容忍，常有过敏性鼻炎表现，易引发哮喘发作的有烟味、汽油味、塑料味、冷空气等。

4. 小结

支气管哮喘(简称哮喘)是一种慢性呼吸系统疾病，病因十分复杂，遗传倾向及众多环境因素对哮喘均可能具有重要的诱发作用，最近40年全球哮喘的发病率却呈显著上升趋势[1]。虽然变应原所致变态反应是哮喘发作的最主要机制，然而近年来变应原内曝露监测结果表明约30%的哮喘与变应原无明显的相关性[2]，致使预防困难。哮喘的诱发因素除了尘螨、花粉、霉菌、动物皮屑、呼吸道感染等致敏因素外，还包括众多的非致敏性激发因素如空气污染物、食品添加剂、环境烟草曝露、化学烟雾(香水等)、冷空气、体育活动及情绪变化等。化学气味性哮喘是一种特殊类型的哮喘，约占所有需要机械通气的哮喘病人的20%。随着进入日常或工作环境中化学物品种类的逐年增多，化学气味性哮喘的发生率逐渐升高，其中有些化学气味如香水、农药、干漆、新地毯的气味、汽车排气、烟草烟雾、装饰材料气味等不仅接触范围更加广泛，而且可引起哮喘患者喘息、呼吸困难甚至严重哮喘发作[3]。尽管如此，许多医师对于化学气味性哮喘仍缺乏应有的重视和足够认识，这导致许多化学气味性哮喘患者处于危险状态。

化学气味性哮喘的典型临床表现为：在接触上述化学气味后5～120分钟（绝大多数患者的潜伏期30分钟以内）后，即会引起哮喘的突然发作，大多数患者具有接触可疑化学气味导致喘息及呼吸困难的病史，可发生于任何年龄段，女性多于男性，大多数患者有数年的过敏性鼻炎或鼻息肉，鼻窦炎或粘膜肥厚和嗅觉减退的病史。临床上不难做出化学气味性哮喘的诊断，关键在于临床工作中对此应有足够的认识和警觉。

本例患者为女性，术前曾有明确的化学气味性哮喘病史，麻醉诱导过程中，麻醉医师忽略了其主诉，未及时排除变应原（面罩及螺纹管的优氯净气味或塑料气味）刺激。患者在接触化学气味几分钟后发生典型的重症哮喘发作，两肺闻及弥漫性呼气相哮鸣音，气道分泌物增多，SPO_2下降，血气分析结果显示低氧血症及呼吸性酸中毒，先后应用氨茶碱、肾上腺素、氢考琥珀酸钠后症状改善，但术中两肺仍有轻度支气管痉挛表现，考虑原因为变应原持续存在及气道高反应状态未完全解除。手术结束后在无化学气味刺激下，患者支气管症状完全缓解，说明了去除变应原是防治此类型哮喘的根本手段。拟肾上腺素类药物可以迅速扩张痉挛的支气管，是控制各型哮喘急性发作的一线用药，但该病往往是在原有的哮喘的基础上发生，气道过敏性炎症和气道高反应性是急性发作的主要原因，因此，糖皮质激素仍然是目前化学气味性哮喘最有效的预防和治疗方法。对急性重度发作的化学气味性哮喘患者，应考虑在给予吸入足量的短效类β2-受体激动剂（沙丁胺醇）的同时给予较大剂量的吸入或全身应用糖皮质激素治疗。

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麻醉质量管理与病人安全性

Anesthesia Quality Management and the Safety of Patients

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质量管理的理念最早是在工业生产、商业管理中形成的。全球的医疗质量管理正是从学习和应用工商业质量管理的理论和经验中发展起来的[1-3]。加强医疗质量管理，向管理要效益，向管理要安全是现代医疗卫生事业改革的必然途径之一[3]。麻醉质量管理是整个医疗质量管理的重要组成部分，树立质量管理意识、建立有效的质量管理机构和不断完善质量管理体系是确保麻醉质量管理的基石[4-6]。关于最初提出的麻醉质量管理是指质量控制(quality control,QC)，以及随后发展为质量保证(quality assurance,QA)，两者的工作着重点放在麻醉的结构和结果，而现在的麻醉质量管理的目标是麻醉工作的持续质量改进(continuous quality improvement, CQI)[1]，将其工作着重点转移至麻醉的全过程和重视病人及其家属对麻醉的满意度。随着麻醉工作范围的不断扩大、麻醉医师风险责任的不断增加，与麻醉学科发展密切相关的麻醉质量管理越来越受麻醉界、医疗行业、乃至社会关注的同时，麻醉质量管理也越来越显示其重要性和紧迫性。下面就麻醉质量管理体系的组织结构、基本内容、规范操作/用药及应对策略进行讨论，以起抛砖引玉的作用。

一、组织与机构

权威性的质量管理组织或机构是实行质量管理的必要条件，表现为行政主管部门授予的行政权力的权威性和专家学术地位的权威性，并定期发布权威性的质控评审信息。根据我国国情，建立赋予相应行政职能的麻醉质控中心是提高麻醉质量、获得麻醉质量持续改进的重要保证和有效方法。在麻醉专业学会的呼吁、努力和卫生行政部门的领导下，于1989年在浙江省率先成立了麻醉质量控制中心(麻醉质控中心)，接着在天津、上海、安徽等省市相继建立了麻醉质控中心，至今有不少省市正在积极筹备建立之中。麻醉质控中心为提高麻醉医师的知识和水平，提高麻醉质量和麻醉安全性以及提高病人及其家属满意度和降低麻醉风险，做出了不懈努力，以及在为病人提供更高水平的医疗服务和努力实现麻醉质量全面管理的同时，推动了麻醉学科的整体发展。

麻醉质控中心的基本职能：①制定麻醉工作制度和诊疗常规、指南和标准，规范麻醉临床操作和用药，并及时予以审查和修订；②组织麻醉医师的专科培养和培训，提高麻醉医师的专业能力和综合素质；③检查和督促所属各医疗机构麻醉质量保证和持续改进的落实情况，如人员编制、学科/科室建制、麻醉仪器/设备、麻醉工作/质量信息统计、质控要求及医疗操作常规/指南等；④不定期调查并获取所属各医疗单位麻醉质量相关信息，针对薄弱环节，应提出改善质量管理的计划；⑤定期发布麻醉质量评审信息；加强各麻醉质控中心的联系，做到信息互通、资源共享。

质量管理机构通过质量管理体系发挥管理效能，不仅要符合医疗操作指南、质控要求及各项医疗规章制度，而且要达到确保病人安全，让病人及其家属满意的目的。应该充分利用现代信息技术，开发和推广麻醉质量管理软件系统，由此获得的麻醉质量信息，不仅有助于全面提升麻醉质量管理水平，而且有助于质量评审信息网络化和资源共享，造福于人民和社会。

除了麻醉质控中心领导、指导、督促麻醉质量管理外，各医疗机构、麻醉学科/科室应有麻醉质量管理小组或质量监查员，这是麻醉质量管理的基本单元，不可忽视。

二、麻醉质量管理的基本内容

麻醉质量管理的基本内容包括结构管理、过程管理、效益（结果管理）三个部分，也就是Donabedian提出的质量管理三联体。结构必须能足以履行职责，过程必须可操作并且有效率，两者必须对改进结果产生效益，质量持续改进的目标就是监测和提高这些质量管理的基本内容。

1. 结构管理

结构是提供医疗服务的各种设置，通常是指人员、设备及其组织形式。麻醉学科的结构则包括麻醉医师及相关人员的一般素质和业务水平，开展的业务范围和工作量、麻醉仪器及监测设备，手术室、麻醉恢复室、麻醉后监护单元（PACU）、外科重症监护单元（SICU）的规模设置，麻醉学科的建制及相关的工作制度、规章制度和法律法规等。因此，麻醉结构管理是实施麻醉质量管理的基础和保证。

2. 过程管理

过程管理是履行自己职责和各项规章制度、遵循指南或

医疗操作常规/规范实施麻醉工作的实际过程，即按既定目标/麻醉预案实现各项医疗活动顺序的过程，包括各因素间的相互协调和突发事件的处置。在过程管理中，涉及的各种因素、操作、事件等应给予明确的定义和详细的说明，最好记录在科室的服务指南或质量管理手册上，有据可循。过程管理是整个质量管理中最为重要的环节。好的过程管理是获得最佳医疗效果、最低麻醉风险、确保病人安全的必要保证。麻醉过程管理按围术期的不同时期可分为术前、术中、术后三大部分，具体包括：①术前过程管理，如术前检查、术前访视、病情评估、术前用药、病人知情同意、麻醉实施预案、术前准备及并存症的处理和特殊准备等；②术中过程管理，如麻醉机/呼吸机使用、麻醉监测、麻醉诱导与维持、有创操作、容量管理、血液保护、器官保护与救治等；③术后过程管理，如麻醉后恢复、术后随访、并发症处理、生命脏器维护和重大事件讨论和报告等。

3. 结果管理

是对结构管理、过程管理产生的医疗结果或结局进行测量、评估、分析、比较和总结，包括对结果/结局的测量和评估中所采用的各项指标和参数的正确定义、判断标准及过程规范化问题。无论结果的好与坏都应及时反馈给结构管理和过程管理，并对相关的诊疗操作常规、各种临床指南和标准进行完善和修正，目标是持续改进麻醉质量、降低麻醉风险、确保病人安全、提高服务效益。因此，结果管理的内容应包括：(1)数据管理：①建立安全、有效、实时、快捷的麻醉数据库，必须做到数据采集中所有项目和指标的定义明确、数据采集时的实时、正确、有效；②数据采集的方式：有条件者最好采用自动记录，以特殊或重大事件进行实时标识、修正记录；没有条件者，一般采用预先设计好的表格加扫描记录，特殊和重大事件采用叙述记录方式；③数据采集的内容：包括麻醉方法、麻醉数量、麻醉用药、有创操作、麻醉结果和随访、围术期致残率和死亡率、择期或急诊、疾病诊断、手术名称和部位、病情评估、ASA分级、突发事件的诊断和处理、术后镇痛治疗、术后恢复情况等等；④数据库的储存与分析：数据管理中还应具有数据分析和统计两大功能。(2)临床结果：各种检查、诊断、治疗、操作、监测的合适性、有效性、规范性；(3)健康结果：即经过各种医疗努力后患者疾病的改善和转归及患者生命质量的提高；(4)行为结果：即患者及其家属对医疗服务满意度的测定，尽管患者满意度的估计非常困难，但作为最终结果的指标已越来越受到人们的关注；(5)经济结果：医疗机构除了治病救人、服务社会以外，获取经济利益也是医疗服务的重要内容之一，更是改善就医环境、更新医疗设备、提高医疗质量、提高员工福利的最根本保证，测定和评估经济结果的指标包括单病种成本、人均成本等的成本和效益分析。

三、麻醉质量管理的基本原则

1. 制定麻醉相关的医疗操作常规、规范/标准、指南和工作制度

麻醉质量管理过程中，需要对质量进行检查和评估，必然涉及到各种诊疗操作的常规、规范、指南、标准。因此，有关各种诊疗操作的常规、规范、指南和标准的概念、定义及其作用的制定和更新必然成为麻醉质量管理所关注的重要内容。

所谓标准，即意味着任何人必须遵循和执行的行为或操作。其实，从法医学或医疗事故鉴定角度来说，医疗活动过程中应慎用或少用“标准”两字，一旦医疗行为挂上“标准”两字，就意味着医生所进行的医疗活动必须按标准严格甚至强制执行，否则按违规论处，面对医疗投诉、法律诉讼或医疗事故鉴定时，即使医疗行为非常规范而无可非议，也经常会使当事者处于被动和尴尬的局面。因此，各医疗卫生机构或专业学会在制订医疗服务相关的政策、规章制度、或各种医疗操作程序或工作程序时宜用指南、常规或规范比较科学和合理。

2. 监测

足够的麻醉监测和正确使用麻醉监测仪器/设备不仅能够提高麻醉质量而且能够降低麻醉风险。因此，必要的麻醉监测仪器和设备及基本的监测标准是麻醉质量保证和持续改进的重要手段和途径。现在基本共识是：对每一例麻醉，必须有ECG、无创动脉血压、脉搏、SpO_2；若需气管内插管全麻病人还要求有$PETCO_2$和体温监测。在特殊情况下，根据病情需要与可能，还应该施行与相应的特殊监测，如有创动脉血压、中心静脉压、肺动脉楔压等。保证病人安全仅有监测设备还是不够的，管理部门应加强对各种麻醉相关仪器、监测设备的原理、各参数的临床意义及其正确使用方法等内容展开多种形式的培训和继续教育，确保麻醉医师能重视和正确使用各种麻醉仪器和监测设备。

有资料表明良好的麻醉监测可预防相当数量的重大麻醉意外，为此美国哈佛医学院率先为其所有附属医院制定了麻醉病人最少监测项目的“实践标准”，必须强制执行。早在1986年10月美国ASA采用了全国性的政策“基本麻醉监测标准”，包括麻醉期间必须有人员在场，及必须持续监测氧合、通气、循环和体温。之后标准被更新、修订，最新版于1993年10月13日出版。出于同样的考虑，我国卫生行政部门和专业学会在麻醉质控要求和诊疗操作常规中提出和制定了相关要求。

3. 持续质量改进

质量管理通过制订计划和政策（结构管理）→实施（过程管理）→检查和整改（结果管理）循环模式，最终达到持续质量改进（CQI）、降低医疗风险、确保病人安全、以最小成本获取最大利益（包括病人利益、经济效益和社会效益）的目标[1]。因此，实施有效的持续质量改进计划的步骤有：①设立质量管理目标和对象如麻醉医师或麻醉科以及麻醉工作程序；②选择指标，通过群体调查、循证医学确认严重事件和并发症，通过序贯调查了解影响结果的工作程序差异和缺陷；③找出发生问题的原因；④采取积极有效的改进措施；⑤监测实施措施后的结果。因此，CQI是一个永无止境的质量循环管理过程。

实施CQI的管理重点虽然是整个系统和程序，而非针对个

人，但要保证CQI所依靠的还是实施医疗操作和提供医疗服务的人。因此，实施医疗操作和提供医疗服务的麻醉医师必须要了解麻醉质量管理的必要性和重要性，并自觉成为每天日常工作的重要组成部分。遵循标准和指南不仅是为了保证医疗服务质量，而且是规范医师自身行为和保护医师自己正当行为的重要措施。只有当麻醉医师积极参与麻醉质量管理活动，而不是害怕或抵制质量管理的时候，才能真正落实CQI计划。

四、质量管理的策略

1. 健全院、科两级医院质量管理网络

（1）建立医院麻醉质量管理小组或委员会

纳入医院医疗质量管理体系，是医院医疗质量管理的最高组织，负责麻醉学科相关科室的医疗质量、制度落实，工作总结。

（2）科室质量管理小组

是在院医疗质量管理委员会领导下的基层管理组织，由科主任、护士长及业务骨干组成，负责科室质量管理及有关规章制度的制定、执行与落实；检查麻醉相关设备和仪器的性能、维护、维修、保养及规范操作情况；检查麻醉记录的完整性、清晰性、实时性、合理性、有效性及错、漏项；检查特殊病例、重大麻醉事件的记录和讨论；并对存在的问题提出积极、科学、合理的整改意见等等，必须时提呈医院医疗质量管理委员会讨论。

（3）建立院部行政查房

由院领导、各职能科负责人参加，定期去临床科室进行行政查房，若发现质量相关问题，及时协调、及时解决。

（4）建立行政总值班

由院领导、各职能科负责人参加。负责非上班时间的日常工作与紧急工作处理。

2. 抓规章制度建设和落实[4]

（1）完善和修订医疗运行基本制度

这是医院质量管理的重要内容之一，应在临床工作中不断完善和修订。对新来的大学生、研究生或新调入的医师，在上岗前须进行为期至少 1 周的制度培训，内容有规章制度教育、医疗质量教育等。

（2）强调三级查房和疑难病例讨论、术前讨论制度

分管院长组织相关职能科室对各临床科室进行检查和监督，并对检查中暴露的问题，及时反馈、及时整改。

（3）加强督查力度

为了保证院部政令行通，职能部门加大落实力度，进行定期或不定期督查，重点查各项规章制度落实、医疗安全、医疗质量、劳动纪律、服务态度等，发现问题，限期改正。对少数违规者，进行处理。

3. 加强质量教育，保证医疗质量

加强和开展麻醉医师的质量意识教育，要充分认识到麻醉质量直接关系到科室、医院的生存和发展；加强医疗纠纷和事故防范与处理的学习，不断增强自我保护能力。麻醉过程中医疗质量情况应及时记录和通报，并组织讨论、分析原因、找出问题、提出改进措施，其目的并非要指责谁，而是减少或杜绝类似情况再次发生，减少缺陷，保证麻醉质量。

4. 规范麻醉记录，提高麻醉单质量

麻醉记录单质量是医院病历质量管理的重要组成部分，是麻醉医生在麻醉过程中留下的具有法律效应的唯一举证材料，也是反映医院医疗质量和医疗服务水平的重要方面。利用现代移动信息技术建立麻醉质量控制数据库，并提供临床麻醉和质量控制指南[9]。

5. 抓医疗安全、减少医疗纠纷、杜绝医疗事故

（1）加强医疗安全、麻醉风险教

科室早交班或业务学习要反复、经常强调医疗安全和麻醉风险教育，并邀请相关专家进行医疗安全、麻醉风险专题讲学，不断强化医疗安全、麻醉风险、自我保护意识。

（2）严格执行医疗安全制度，加强医疗安全报告制度

做到重大医疗事件立即报告，严重差错及时报告，一般差错如实报告，并定期向有关职能科室报告麻醉质量情况。

（3）签定医疗安全责任书，责任落实到人。

（4）定期举行病例讨论制度

通过讨论疑难麻醉病例和重大麻醉事件，认真总结经验教训，找出和分析问题的原因，并提出积极、有效的整改意见和防范措施。

6. 抓业务建设，重人才引进、培养

（1）做好重点人才引进工作

当前医疗市场的竞争就是人才和服务质量竞争，高素质优秀人才的引进是医院和科室继续发展的坚强后盾和保障。

（2）调动在职人员积极性，做好知识充电

鼓励在职人员参加成人教育、医学继续教育、专题讲座，去国内外著名院校进行进修和专项研修，参加高层次的学术会议[10]。

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麻醉科医疗设备管理与病人安全性

Medical Equipment Management and the Safety of Patients in Anesthesia Department

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伴随医院的发展与建设，医疗设备更新换代和高新科学技术的医疗设备不断涌现，如何安全使用医疗设备非常重要[1-3]。麻醉科医疗设备在医院医疗设备中占有相当重要位置，是医院设备管理的重要组成部分[4-5]。首先要求麻醉科医疗设备生产商必须建立一整套质量保证体系，生产出安全可靠符合规定的合格产品；生产商对用户的售后技术培训也是安全使用的至关紧要的一个环节。同时，要求使用者在日常工作中应严格按照设备的使用说明、操作规程及生产商提供的使用培训中所要求的步骤及程序，做好使用前的准备工作、使用中的操作工作、使用后的检查工作。建立完善的麻醉科医疗设备的运转日志制度，增强使用者的责任心。要使麻醉科医疗设备正常安全、高效的为临床麻醉服务，麻醉科医疗设备的维修和日常维护工作势必是非常关键的问题。首先应建立建全一套完整的维修制度。这包括建立麻醉科医疗设备的技术资料、档案，麻醉科医疗设备的分管负责人制度。其次所有的麻醉科医疗设备均应建立日常维护制度，建立预防性维修制度，防患于未燃。

麻醉科医疗设备的安全使用和维修工作都是临床麻醉工作及医院医疗活动过程中不可缺少的重要环节。麻醉科医疗设备的维修维护工作是麻醉科医疗设备安全使用的坚强后盾，它们在不断提高麻醉医疗水平、降低麻醉风险、确保麻醉安全中起到了基石与保障的作用。

一、麻醉科医疗设备与管理

设备管理大体上有三个层次组成，包括设备决策/行政管理、应用管理及技术维护维修管理[6]。

1. 设备决策/行政管理

具体包括设备采购需要分析、设备技术评估、运行效益分析、预算资金及设备采购计划管理、各级审批及许可手续、技术商务谈判、招标文件管理、合同管理、设备到货清关、安装验收文件管理及建立设备档案等。由于设备决策/行政管理很重要，直接关系到整个医院的技术发展方向及特色，涉及医院多个科室和部门的发展和利益，因此其第一负责人应是医院院领导，具体工作则在院长的直接领导下由器械或调和部门负责执行，其中涉及具体的临床和技术问题要由临床科室专家或主任以及设备技术人员负责。

2. 设备应用管理

主要由设备使用科室具体负责，涉及内容包括：①建立设备使用工作制度；②根据设备技术文件要求，制定设备操作规程；③人员技术培训和考核；④消耗品和易损件的管理（采购计划、库存管理、质量检验等）；⑤工作任务的制订和实施；⑥设备的日常使用和维护管理；⑦设备使用登记和统计；⑧污染控制和管理等。

3. 设备技术、维修管理

其目的是保障医疗设备在可控制的成本内安全稳定地运转，完成所承担的医疗任务，涉及内容包括：①寻找并建立设备维修和技术保障资源及档案；②设备运行环境的规划和设计；③设备的安装和检验验收；④设备安全运行技术保障如维护、维修、检测计量、升级、搬家；⑤维修器材采购和管理；⑥设备运行成本控制；⑦临床使用技术支持如培训、指导等；⑧院外技术支持资源关系及维修合同管理；⑨退役设备管理等。

二、医疗设备管理对麻醉安全性的影响

麻醉科医疗设备对麻醉安全性的影响主要体现在医疗设备安全（设备因素/固有因素）和医疗设备操作者（操者作因素/人为因素）二个方面。

1. 医疗设备安全与麻醉安全性

医疗设备由于其使用的特殊性，国家虽对其安全性能有严格的要求，但许多医疗设备本身还是带有相对的危险性，例如，高电压（如X线机、除颤仪）、高气压（如消毒锅）、高温度（如灭菌器、电烤箱等）、高频率（如电刀、微波仪等）、高辐射（如X刀、刀、X线等）。由于某些医疗设备部分或全部取代接受手术或治疗病人器官功能如麻醉机/呼吸机、体外循环机，其设备本身的正常运作和规范操作显得尤为重要。

（1）设备的故障与防范

较之人为错误，单纯由设备故障引起的严重事故或死亡是罕见的。除了明显人为操作失误如误用和不熟悉外，重大的设备故障可以通过正确的设备保养和维护加以避免和预防。若重大的设备/仪器故障给病人造成伤害，还可通过各种监测如ECG、BP、SpO_2、$P_{ET}CO_2$、气道压等及时发现。如果

麻醉医生能对设备/仪器相关的突发事件作出准确、及时的判断和恰如其分的反应，一般均可避免或中止事态的继续发展。如麻醉机突然失灵，不能进行机械控制呼吸甚至没有氧气供应，则应在能得到新麻醉机或氧气供应恢复之前，用手控呼吸囊进行通气支持。

在医疗设备正常工作状态下，维修管理人员应定期对医疗设备进行测试、调整、加油等工作，消灭故障于萌芽之中。这就要求设备维护人员应制定出针对不同设备要求的预防性维修计划，根据不同设备的性质、原理、功能，使用年限的不同，分别制定不同的维修维护计划。

在医疗设备发生故障后，设备维修人员一般可根据前期一系列日常维护工作中的工作情况记录以及设备的各种档案资料，结合设备本身提供的各种维修帮助，有针对性的进行检测、诊断、排查，同时利用设备工作中的数据变化，获取一些可利用的资料信息，用来判断维修。

（2）设备的检测与验收

购买前，应当证明设备组件符合国际应用标准（通常由认证的大的制造商生产者可以做到）。到达后，应当确保电器设备无危险，与用电标准匹配。像麻醉机和呼吸机这样复杂的设备应当由厂家代表实施安装和检查，必要时应对相关使用人员进行技术培训。此外，每一新添置设备或仪器应当注明生产者、型号、序列号和内部鉴定证书。这一举措允许快速辨认未来记忆和警报的设备，同时可作为出现的每一问题及解决问题、维护和服务的永久记录，直到被弃用为止。这一标识应当时刻保持。罕见但可怕的麻醉机潜在致命问题都带有快速辨别某一组件及其所处状态的报警告示。

（3）设备的维修与服务

有关应该由谁来维护和保养麻醉设备和仪器在国内外意见不一，不外乎有三类：厂家维护人员、经销商或独立服务承包商和医疗机构培养的工程师或技术员。由于其技术水平参差不齐，不能确保相关设备和仪器在任何时候均正常、安全运转是难免的。除了加强维护人员队伍的技术培训、掌握过硬本领外，设备使用者即麻醉人员也应接受相关的教育和培训，能对较为常见的一般性设备故障作出快速反应和采取及时、准确、有效的应对措施。

拥有一份完整的麻醉科医疗设备维护和服务手册是必要的。注意区别是损耗性故障还是致命性故障，前者因能观察到变化，是可以预防的，后者则是不可预防的。重点应当放在对机械部件的预防性保养和每4～6个月的检查。同时每年一次的安全检查也非常重要，内容包括每一麻醉位置及相邻区域、中间位置及麻醉设备本身。

（4）设备的日常维护

除了预防性的维护和服务，设备/仪器在日常临床使用过程的日常维护和保养是非常必要的。因人力紧张、工作繁重而疏忽设备和仪器的日常维护和保养如清洁、归类、分解、消毒、贮备和分发要付出代价的。日常维护工作不到位就等于制造了真正的“等待发生的事故”。

（5）设备的替换与废弃

及时更换废旧麻醉设备和监测设备、确保其安全有效运转是降低麻醉风险的关键要素。长期使用低质量的废旧麻醉设备和仪器可大大增加麻醉风险。一般认为，麻醉机预期的有效寿命是10年，超过10年的麻醉机通常不符合安全标准，况且与10年后的同类麻醉设备和仪器的各项技术难以兼容。但仅凭寿命来强制替换的做法也受到质疑，因为它还取决于设备和仪器的实际使用时间、日常维护和保养。

（6）故障处理程序

在临床工作中，设备和仪器一旦发生故障，应及时得到更换，使用科室或医疗单位应备有充足的替代品，以保万无一失。被停止使用的设备应当标有明显的标签（使它不会被好心的技术员或麻醉人员继续投入使用）。标签应当注明日期、时间、发现问题人员姓名以及关于问题的细节。同时，使用者应及时向负责人或相关部门领导通报，并及时移除设备、进入登记和开始修理。如果某麻醉组件疑与麻醉意外有关，应当被立即封存，任何人不得接触，尤其是操作者。如果严重事故发生，则仪器应当由制造商的经资格认证的代表、操作人员、相关保险公司、原告和辩护律师组成的小组进行检查。如果病人出现意外、损伤或者死亡，必须向国家食品药品监督管理局（SFDA）报告。

2. 医疗设备操作与麻醉安全性

麻醉科医疗设备的完好无损与正常运作对确保麻醉安全发挥着重要作用，但设备若操作不当不仅会损坏设备，而且会对病人或操作者伤害。所以，在医疗设备使用过程中，一定要充分了解设备性能、严格遵守操作规程，真正掌握使用条件、适用范围、禁忌症，正确选择使用参数，才能确保设备、病人和操作者的安全。

麻醉机作为一种重要的麻醉器械，对保障病人术中生命安全起着不可估量的作用，要求麻醉医师必须全面熟悉麻醉机的性能、操作要点及其可能出现的故障和危险。常见的故障有呼吸回路漏气、废气清除系统受阻、挥发罐或CO_2吸收罐漏气等等[7]，预防故障的最好方法是防患于未然，在麻醉机使用前严格按照操作规范对麻醉机的气密性以及呼吸机部分进行检查，确保术中麻醉机的正常使用，当更换麻醉挥发罐或钠石灰罐后一定要重新检查气密性。某些厂家的麻醉机（如Datex-Ohmeda、Penlon、Blease）设置了旁路（Bypass）开关，便于术中更换钠石灰罐，一定要在更换后及时归位，以免发生低氧血症。

高频电刀作为现代医疗手术的重要设备之一，是外科手术中广泛应用的手术器械之一，但是由于高频电刀是利用高频电流对人体组织直接进行切割、止血或烧灼的一种高频大功率电气设备，一旦出现安全问题，不仅使病员痛苦，更会引发病员与医院之间的纠纷。常见的有病人极板接触处肌体组织的灼伤和漏电引起的电烧伤甚至死亡，多是由于医务人员未严格按照使用规范操作仪器，个别的是因为机器故障造成。通常人体返回的电流密度的安全界限在0.02A/cm^2之内，当病人极板与病人接触不良或接触面积太小时常常会造成安全隐患，往往发生于单片金属电极板。使用中有时会出现外壳带电现象，这对病人和操作人员都是非常不安全的，预防措施是确保手术室有良好的地线。特别强调一点是高频电刀

在使用时，一定要避免在有易燃气体的环境中使用，不能使用易燃材料，防止火灾的发生[8]。

体外循环机由于直接用于人体泵血，也是常常引起危险的一种机器，曾有报道因为循环管路装反导致术中患者死亡的病例[9]。

总之，医疗设备都是双刃剑，用好了可以救人，用错了就会害人，作为医务人员一定要重视仪器的操作，不能仅仅满足于只会打麻醉、递手术刀。

3. 设备管理信息化、技术服务社会化

（1）设备管理信息化

信息化是现代管理的基础，在数据完整、准确、及时的条件下，对医院的设备和物流实行动态管理，并进行科学决策，是管理信息的目标。

①决策信息化：需要分析信息化、技术评估信息化、采购过程信息化（采购进程控制：谈判、论证、标书、合同、到货、付款等）；

②设备应用状况信息化：设备使用率、效益、运行成本、技术状况等；

③设备维修管理信息化：故障的发生、处理过程、检验结果、费用、时间、人员等，通过管理获得设备的故障率、稳定性、可靠性等数据；

④医院物流管理信息化：可及时、准确掌握院内医疗设备的状态，如设备的临床作用、收益、运行费用及维修成本分析等，既可对管理决策提供依据，又可对医工部门的管理进行评估与监控。

（2）设备技术服务社会化

所谓设备技术服务的社会化是指技术资源多元化、技术服务社会化和技术价值的市场化。

①技术资源多元化：在我国目前情况下，技术资源的来源是非常有限的，现在几乎还没有独立的医疗设备专业技术公司或队伍，即使有也是小股游击队。绝大部分有用资源垄断在设备供应商手中，出于市场竞争要求，供应商往往不喜欢与他人分享其技术，从而造成目前医疗设备维修费用过高的情况。要打破这种垄断局面，需要设备生产厂家的第三方技术服务公司的存在，以及扩大OEM厂家的进行，但任重而道远。

②技术服务社会化：众所周知，医疗设备的技术服务需要一定的技术条件和资源，但由于医疗设备的种类、型号繁多，仅靠医院内部力量是不可能对其所有设备提供维修条件的。因此，我们必须有所选择，根据自身力量把设备分为自己可以完全承担、部分承担和依靠院外力量承担等多种类型：(1)对自己可以承担的设备在引起谈判时把技术服务资源提供作为重要技术要求；(2)需要外修的设备在设备效益评估时要把设备保修费用列到运行成本中进行核算；(3)对自己有能力提供服务的项目要扩大其服务范围，包括对外服务。

③技术价值市场化：通过设备技术服务的社会化，在多元参与竞争的条件下，逐渐建立相对公平的市场价格，以真正体现技术服务和维修的劳动价值。

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2011广州中医药大学—耶鲁大学麻醉与镇痛论坛

尊敬的专家、学者：

您好！

2011广州中医药大学—耶鲁大学麻醉和镇痛论坛将于2011年7月29-31日在广州召开，诚挚地欢迎各位的到来。

广州中医药大学作为国家首批兴建的4所重点中医药高等学府之一，招收的港澳台、外国留学生（覆盖23个国家）一直是我国最多的大学之一。大学一直致力于和国外进行交流，中西文化的碰撞才能擦出灵感的火花。

耶鲁大学，美国历史上建立的第三所大学，一所超过300年的世界综合排名第二的大学，号称总统的摇篮。作为美国人文的高地，人文和医学的完美结合造成了耶鲁在医学领域创造了许多的第一。相信来自耶鲁大学的学者将给我们提供一道丰盛的学术大餐。

来自国内的特邀著名专家们更是把几十年的经验和智慧给予高度的提炼和浓缩，做的是演讲，奉献的却是心血。必将会使我们油然产生“听君一堂课，胜读十年书”的感慨。

聆听国内外最前沿的学术声音，跟踪国内外最新的发展动态，传递麻醉领域最新的学术进展，在交流中碰撞出灵感的火花，在探讨和交流中提高自我！

我们期待您的莅临，共同演绎一场关于麻醉领域的学术盛宴！

大会执行主席　马武华

2011广州中医药大学—耶鲁大学麻醉与镇痛论坛组委会

屠伟峰 向仕平 陈大军
张小妹 李圣杰
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摘要

目的：探讨临床麻醉在紧急医疗救援中重要性及具体做法。方法：回顾总结参加“5·02”纳尔吉斯强热带风暴跨国医疗救援中麻醉和复苏工作展开的经验和体会，包括出发前的医务人员思想、技术和生活物资方面的准备，麻醉及相关设备、器械、物品和药物的准备，以及灾区在进行医疗救援中麻醉与复苏工作的展开与实践等。结果：携带与麻醉相关的药物和耗材明显不合理；灾区12天共完成手术58例，局麻41例，静脉麻醉9例，区域阻滞8例，术后急性镇痛42人次，术后留观和输液治疗80余人次；手术患者多为受灾期间受伤后感染性/化脓性伤口甚至骨髓炎，及某些缺医少药未能得到治疗的外科疾病。结论：强热带风暴2周后赴灾区参加医疗救援时，麻醉和复苏工作的重点应围绕受灾期遭受各种创伤后未能得及时医疗而遗留下来急需外科处理感染性疾病展开，麻醉相关设备、物品、耗材和药品等的准备也才能做到有的放矢。

关键词：跨国医疗救援；纳尔吉斯强热带风暴；麻醉；复苏

强热带风暴跨国医疗救援中麻醉与复苏工作的实践与展开

Practices of Anesthesia and Resuscitation in Transnational Emergent Medical Relief Following Cyclone Nargis

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Abstract

Objective: To explore the importance of anessthesia and resuscitation during emergent medical relief following Cyclone Nargis.

Method: The experience and comprehension were retrospectively summarized in the transnational emergent medical relief following the “5·02” Cyclone Nargis.

Result: There was a lot of irrationality in anesthesia-related drugs and consumed medical materials. Fifty-eight operations were completed during the period of distrass for 12d, including 41 cases of local anesthesia, 9 case of intravenous anesthesia, 8 cases of field block anesthesia, in which 42 cases of postoperative pain was intravenously relieved. The patients to be stayed and observed or to receive transfusion therapy had more than 80 person-time. The operated patients included cases with post-injury infective/purulent wounds or osteomyelitis during the period of Cyclone Nargis distrass, or with surgical illness that was gotten to be cured for the shortages of doctors and medicines.

Conclusion: When emergent medical relief was needed to be attended after 2w of postdistrass, the focal points of anesthesia and resuscitation should rescue and care the patients with infective illness induced by diversed injuries subjected during the period of distrass but not to be gotten in time medical treatment and to need emergent surgical management. Therefore, the preparations of anesthesia-related equipment, items, comsumed medical materials, medicines and so on were albe to shoot the arrow at the target.

Key Words: transnational medical relief; Cyclone Nargis; anesthesia; resuscitation

2008年，“5·02纳尔吉斯”强热带风暴袭击[1-2]了东南亚地区，灾情十分严重。应邻邦受灾国政府的请求，中国政府在国内抗震救灾形势异常严峻的情况下，由外交部、国防部、商务部、卫生部等部委密切协作，从广州地区选派了包括3名博士后、2名博士、11名硕士在内的50名擅长热带地区灾后医疗救治和防疫的医护人员（其中包括卫勤保障人员23人），组成一支精干的中国医疗队，受国家的派遣赴受灾国执行为期2～4周医疗救援和卫生防疫任务。这次跨国远程医疗救援，要求独立自我保障，包括医疗救助各项工作的展开，生活所需的水、电、吃、住、行，以及医疗垃圾、生活垃圾的处理等等，国内尚属首次。下面就这次医疗救援过程中麻醉和复苏工作展开过程中成功经验作一汇报。

一、材料与方法

1. 人员组成

为配合医疗队外科手术的开展，麻醉科共派出1名麻醉专家和2名手术室护士。

2. 麻醉相关设备、仪器、耗材、药品等物资的准备

（1）麻醉相关设备与仪器（表1）

（2）麻醉相关药品（表2、3）

（3）麻醉相关耗材（表4）

表1 随身携带的麻醉相关设备

液体与止血药	数量	心血管用药	数量
便携式麻醉机(谊安)	1	野战手术床	1
多功能心电监护仪	2	野战手术灯	1
双通道微量输注泵	2	家用制氧仪(3～5L/min)	2
除颤仪	1	喉镜	1
人工复苏仪	1	氧气筒(考虑空运安全)	0
呼吸机	1	野战发电机(3000瓦时)	1
综合急救箱	2	野战手术展开台	1
简易呼吸囊	2	高频电刀/电凝	1

表2 随身携带的麻醉相关药品

品种	数量	品种	数量	品种	数量
丙泊酚(200mg/支)	200	曲马多(100mg/支)	50	0.75%布比卡因(5ml/支)	200
依托咪酯(20mg/支)	50	喷他佐辛(30mg/支)	100	2%利多卡因(20ml/支)	300
咪唑安定(5mg/支)	50	吗啡(10mg/支)	100	0.25%丁卡因(10ml/支)	20
氯胺酮(100mg/支)	100	哌替定(100mg/支)	100	2%丁卡因(10ml/支)	20
芬太尼(0.1mg/支)	100	氟哌利多(5mg/支)	50	苯巴比胺钠(100mg/支)	200
活宁(100ml/瓶)	10	氟哌啶醇(5mg/支)	50	阿托品(0.5mg/支)	200
维库溴铵(4mg/支)	100	异丙嗪(25mg/支)	100	东莨菪碱(0.3mg/支)	30

表3 随身携带的急救相关药品

液体与止血药	数量	心血管用药	数量	呼吸用药	数量
乳酸林格氏液(500ml)	210	碘胺酮	18	纳洛酮	100
血定安(500ml)	100	肾上腺素(1mg/支)	300	新斯的明	50
5%碳酸氢钠(250ml)	40	去甲肾上腺素(1mg/支)	50	洛贝林	80
20%甘露醇(250ml)	60	多巴胺(20mg/支)	400	尼可杀米	100
低分子右旋糖(500ml)	40	硝酸甘油(5mg/支)	100	氨茶碱(0.25g/支)	50
立止血	50	普罗帕酮	30		
维生素K1	200	西地兰	40		
		阿拉明	100		

表4 随身携带的麻醉耗材

耗材名称	数量	耗材名称	数量
一次性腰硬联合麻醉包	120	一次性气管内导管(ID3.0)	30
一次性硬膜外麻醉包	60	一次性气管内导管(ID4.0)	30
钠古灰(10kg，进口)	6	一次性气管内导管(ID4.5)	30
麻醉回路(成人)	10	一次性气管内导管(ID5.0)	50
麻醉回路(儿童)	5	一次性气管内导管(ID6.0)	100
氧气袋	5	一次性气管内导管(ID7.5)	90
口咽通气道(大)	20	电动气压止血带	2
口咽通气道(小)	10	血压计/听诊器（套）	10
一次性气管套管（ID7.0、7.5、8.0）	各20	高压氧气筒*	0
注：空中运输不安全			

3. 手术室建立与麻醉的展开

整个医疗队一所遭受强烈风暴肆虐后小破破烂烂的小学校礼堂内展开，室外下着瓢泼大雨，室内下着瓢泼小雨，找不着一块干净能供手术室展开的地方，在当地军人和老百姓帮助下，冒着大雨进行校所艰苦的维修工作，后来礼堂舞台上找了一块相对干净约有25m^{2}的角落，没有墙就用防雨布围着，地面很脏也用防雨布铺着，经过紧张有序的积极准备，我们到达灾区的第二天就开始手术。

4. 术后留观室与输液室的展开

到达灾区后第三天由于手术病人的增多及需输注治疗病人的增多，设法腾出了一间教室作为术后留观室和输液室（8张床）。

二、结果

1. 物资的消耗

我们所携带的麻醉设备和仪器基本能满足各种手术的展开，遗憾的是由于没有携带高压氧气，没能开展需气管插管全身麻醉下的手术（考虑空中运输高压氧气的安全性，没能携带）。故麻醉药物消耗仅用了咪唑安定（5支）、氯胺酮（12支）、曲马多（5支）、喷他佐辛（40支）及50支2%利多卡因和30支0.75%布比卡因。麻醉耗材只用了5个腰硬联合包及几十套一次性吸氧管。

2. 手术与麻醉情况

灾区12天时间共完成58台手术（表5），其中为17台手术（29.3%）实施了麻醉（不包括需监护的局麻下实施的手术，表6）。

表5 完成手术例数情况

手术名称	数量	手术名称	数量
清创一期、二期缝合术	29	正中神经吻合术	1
脓肿切开引流术	12	脓性指头炎切开引流术	1
骨髓炎病灶清除+石膏固定术	1	清创引流术	3
锁骨骨折切开复位钢板内固定术	1	异物取出术	2+2
巨痈切开引流术	1	清创拔甲术	2
腓骨神经探查松解术	1	脂肪瘤/纤维瘤切除术	8
旋转皮瓣转移术	1	清创植皮术	1

表6 完成麻醉例数情况

麻醉方法	数量
局部麻醉	41
局麻+静脉强化麻醉	7
臂丛神经阻滞麻醉	3
静脉全身麻醉	2
腰硬膜联合阻滞麻醉	5

3. 术后留观室与输液室情况

共接收术后留观病人20余人次，术后输液治疗、术后镇痛治疗及其他输液病人80余人次。

三、讨论

这次跨国执行抗灾救援和防疫任务，事来突然，任务重、时间紧、意义大，麻醉科、手术室是其重要组成部分，直接影响着各手术科室的医疗救治[3]。这样如此大规模奔赴异国他乡，进行强热风暴后医疗救援行动，又是独立自我保障，无论对于国家还是我们都是第一次，况且对对方的灾情和医疗需求资讯很不了解的情况下，在如此短的时间内，要组织和投送如此大规模的人和物资，无论对团队还是个人都是一次严峻的考验、残酷的挑战。此外，我们所赴灾区恰好又是灾后疫情肆虐的流行期，又是异国他乡，如何顺利完成了这次代表着国家利益、尊严的国际人道主义医疗救援任务，又能确保人人安全回国，同样是十分严峻的考验。

1. 麻醉相关救灾物资的准备

由于在如此短的时间内要筹集如此多的医疗物资，还要包括个人生活物资，是件十分困难的事，加上对所去灾区的灾情及医疗需求都不很清楚情况下准备物资和制订医疗预案，带有很多的盲目性和不确定性。医疗物资带少了或没有带就会影响相关医疗工作的展开和医疗救援质量，甚至带来不好的国际形象；相反，带多了不仅是资源浪费，而且增加运输压力和安全风险。因此，通过这次参加强热风暴后抗灾医疗救援的实践，对不同的灾害、不同的受灾区域、不同的受灾时间，及不同的医疗救援队规模、任务、滞留时间，应有不同的物资应急预案。就这次抗灾医疗救援而言，麻醉设备和仪器根据所需开展的手术台次决定；麻醉药物和麻醉耗材按“33”原则配备足以，即预计手术量的1/3需要麻醉，预计麻醉量的1/3需全身麻醉甚至气管内插管。

2. 麻醉的实施与管理

在灾区，又在异国他乡，在临时展开的医疗救治点为手术患者实施麻醉的风险较驻地现代化手术室实施麻醉大上百倍、千倍。这次援缅医疗过程中，虽然带了功能较齐全高档麻醉机，只因没有高压氧气，不仅无法实施气管内麻醉及其他麻醉的吸氧，而且成了搬运的负担[4-5]。灾区12天时间共完成了58台手术，其中为17台手术（29.3%）实施了麻醉（不包括需监护的局麻下实施的手术），包括5例腰硬联合神经阻滞麻醉和9例非气管内插管的全身静脉麻醉，需特别强调的是，其中2例全身静脉麻醉是在俯卧下完成的，当时若没1台家用制氧仪提供2～5L/min的氧气，结局不可想象。全身静脉麻醉和术后镇痛用药中，除了氯胺酮外，曲马多和喷他佐辛的合理使用发挥了积极作用，不仅有完全的镇痛效果，无致幻、呼吸抑制等副作用，十分安全，深受手术患者的欢迎。此外，咪唑安定在辅助静脉麻醉和术后患者镇静方面也发挥了积极的作用。当然，局部麻醉和区域阻滞麻醉仍为灾区医疗救援中最安全、最实用、最有效的麻醉手段[6]。

3. 手术的保驾护航

由于当我们到达灾区时已是强热风暴过后2周有余，故需手术治疗大多是幸存下来且受过伤的灾民由于缺医少药、没能得到及时有效的处理而遗留下来的感染性外科疾病或陈旧性骨折病人为主，且多见于四肢和体表部位，故紧急救治、复杂的急危重手术患者甚少，故1名麻醉医生同时监管1～2台手术是没有问题的，但需要注意和提醒的是来就诊手术的患者疫情史不详，时时刻刻要预防着被疫区传染性疾病传染的风险，除了为外科手术做好保驾护航工作外，也要为外科医生和自己做好疫区传染性疾病的防护工作。尽管防雨布手术条件恶劣，卫生消毒差，但由于我们在手术前后及时、有效做好手术室的消、杀、灭工作，无论是感染性手术还是无菌性手术均有1例发生术后继发感染。

就麻醉展开而言，虽然准备了充足的麻醉耗材和麻醉药品，也创建了设施比较完备的野战手术室（可同时展开2台手术），尽管带了野战麻醉机，但由于没有高压氧气，无法为复杂手术实施气管内插管全身麻醉，故也无法开展相关复杂手术[4-5]。但2台家用制氧仪（氧流量可达3～5L/min）发挥了积极作用，为58台作用顺利实施提供基本保证，尤其对17台需麻醉状态下顺利完成的手术。无1例发生麻醉意外和并发症。

4. 术后留观室的重要性

这次跨国医疗救援，是独立自我保障运行机制，无当地医院或卫生机构可依托，故设立术后留观室是确保手术患者安全的重要措施之一，是外科医疗救援“链”不可缺少的重要组成部分，尤其对中、大手术后患者显得尤为重要。若条件许可，至少1名麻醉医生和1～2名有外科或ICU经历的高年资护士进行监管，以确保术后病人监护的质量和安全。灾区短短12天中，术后留观室共接收了术后20余人次，术后输液治疗、术后镇痛治疗及其他输液病人80余人次，为58例手术患者顺利度过手术关及其他急危重需要输液治疗的内科患者提供了安全保障。

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关于召开2011年中国西部十一省麻醉学术年会、2011年第十六次长江流域麻醉学术会议、2011青海省麻醉学年会征文通知

为了更好地促进我国西部地区和长江流域地区麻醉学科之间的学术交流，进一步提高西部地区和长江流域的临床麻醉技术水平，经西部地区和长江流域麻醉学协作组研究决定，2011年关于召开2011年第十六次长江流域麻醉学术会议、2011年中国西部十一省麻醉学术年会、2011青海省麻醉学年会定于2011年6月17-19日在青海西宁市举行。届时，大会将邀请国内外知名专家学者作精彩的专题学术讲座，同时还将进行学术交流及病例讨论。现将会议有关事宜通知如下：

一、征文内容

（一）麻醉学基础研究；（二）临床麻醉与研究；（三）疼痛诊疗与研究；（四）重症医学与研究；（五）麻醉质量控制；（六）特殊病例报告及其他。

二、征文要求

（一）凡未在国内学术外刊物上正式发表的论文均可投稿。学术论文提交摘要800字以内，专题讲座4000字以内。

（二）所有摘要一律用word文档编排，标题3号黑体，正文5号宋体，A4纸格式，文稿顺序为题目、单位、邮编、作者姓名、摘要内容。一律采用网上投稿，将稿件发送至E-mail：zhaosjqh@163.com，zhujianxin69@sohu.com并在邮件主题注明“长江流域及西部麻醉年会稿件”字样，并附详细联系方式（通讯地址、职务、职称、办公室电话及手机、E-mail等），稿件发出后请投稿者以手机短信方式告知联系人：赵世军主任（13209786314）

（三）截稿日期：2011年4月30日，逾期不予受理。

中华医学会麻醉学分会
Chinese Society of Anesthesiology

學會與征文

2011广州中医药大学—耶鲁大学麻醉与镇痛论坛

2011 Anesthesia & Analgesia Forum by the Guangzhou University of Chinese Medicine and Yale University

尊敬的专家、学者：

您好！

2011广州中医药大学—耶鲁大学麻醉和镇痛论坛将于2011年7月29-31日在广州召开，诚挚地欢迎各位的到来。

广州中医药大学作为国家首批兴建的4所重点中医药高等学府之一，招收的港澳台、外国留学生（覆盖23个国家）一直是我国最多的大学之一。大学一直致力于和国外进行交流，中西文化的碰撞才能擦出灵感的火花。

耶鲁大学，美国历史上建立的第三所大学，一所超过300年的世界综合排名第二的大学，号称总统的摇篮。作为美国人文的高地，人文和医学的完美结合造成了耶鲁在医学领域创造了许多的第一。相信来自耶鲁大学的学者将给我们提供一道丰盛的学术大餐。

来自国内的特邀著名专家们更是把几十年的经验和智慧给予高度的提炼和浓缩，做的是演讲，奉献的却是心血。必将会使我们油然产生“听君一堂课，胜读十年书”的感慨。

聆听国内外最前沿的学术声音，跟踪国内外最新的发展动态，传递麻醉领域最新的学术进展，在交流中碰撞出灵感的火花，在探讨和交流中提高自我！

共同分享

共同进步

共同成长

我们期待您的莅临，共同演绎一场关于麻醉领域的学术盛宴！

会议基本信息 Basic information

会议名称： 2011广州中医药大学—耶鲁大学麻醉与镇痛论坛

2011 Anesthesia & Analgesia Forum by the Guangzhou University of Chinese Medicine and Yale University

会议时间：2011年7月29-31日

会议地址：广州中医药大学第一附属医院新门诊楼七楼学术会议室

主办单位：广州中医药大学第一附属医院

酒　店：东方宾馆

大会名誉主席：

徐志伟教授（广州中医药大学 校长）

樊粤光教授（广州中医药大学第一附属医院 院长）

大会执行主席：马武华教授

大会主席团：陈秉学 古妙宁 赵国栋 黄文起 彭书峻 佘守章 徐世元 黑子清 杨承祥 招伟贤 施冲 肖晓山 古展群 冼绍祥 严晋 朱敏 何伟 张伟程 郭文海 马武华

学术委员会（按姓氏笔画排序）

马武华 佘守章 古妙宁 黄文起 乔瑞东 刘克玄 刘建华 江伟航 许立新 许梅曦 李雅兰 杨承祥 杨晓峰 肖金仿 肖建斌 肖晓山 施冲 张志刚 陈秉学 招伟贤 林跃华 郑利民 赵国栋 胡祖荣 施冲 姚业兴 莫利求 徐世元 高晓枫 高晓秋 黄绍农 黄焕森 曹阳 曹铭辉 屠伟峰 彭书峻 曾维安 董庆龙 黑子清 程明华 靳三庆 黎玉辉 刘继云 孙来保 周少朋 朱新运 余革 詹鸿 李有武 尧新华 翟中云

大会执行主席 马武华

2011广州中医药大学—耶鲁大学

麻醉与镇痛论坛组委会

中华医学会麻醉学分会
Chinese Society of Anesthesiology

學會與征文

Welcome Message of CSM 2011 Shanghai Satellite Meeting — 'East Meets West——Anesthesiologist Talks Today'

In order to better promote the solidarity, cooperation, friendship and academic achievement of CSM2011, the Chinese Society of Anesthesiology will hold the satellite meeting with the theme of "East Meets West——Anesthesiologist Talks Today" from May 19th to May 20th, 2011, in Kerry Hotel Pudong, Shanghai (No.1388 Hua Mu Road, Pudong, Shanghai, 201204, China). This Satellite Meeting will comprise of a one-and-a-half day programme commencing on the afternoon of 19 May with hospital visits. Kerry Hotel Pudong, Shanghai is the first of a new luxury hotel brand of the Shangri-La group located in the heart of Pudong. Within easy reach of the Shanghai New International Expo Centre, and downtown. This Satellite Meeting will provide an invaluable opportunity for delegates to meet with specialists in China, visit local hospitals and sample the wonderful history and culture of Shanghai.

Shanghai is located 1300km (2 ½ hours flying time) from Hong Kong, on China's Eastern coast, and at the mouth of the Yangtze River. It is the most populous city in the world and one of the most prosperous cities in China. It has a fascinating history and rich cultural heritage, welcoming people and an abundance of tourism resources. It is regarded as a centre of commerce between East and West and has become a multinational hub of finance and business. The city is renowned for its historical landmarks such as the Bund and City God Temple, and its modern and ever-expanding Pudong skyline including the Oriental Pearl Tower.

When you come, you will see the great achievements that have been made in the 30 years since China adopted the opening policy and get a feeling for the on-going development and progress of Mainland China for yourself. We sincerely invite you to come to Shanghai and join us in working with the Chinese Society of Anesthesiology to make the satellite meeting of CSM2011a great success.

We are looking forward to meeting you at the event.

●Meeting Chairman

Yu Buwei M.D., Ph.D.

President, Chinese Society of Anesthesiology (CSA)

Chair, Department of Anesthesiology, Ruijin Hospital, Shanghai Jiaotong University, School of Medicine, Shanghai, China

Chief Editor, Forum of Anesthesia & Monitoring

●Meeting Executive Chairman

Yu Weifeng M.D.,Ph.D.

Vice Secretary-General & Member of Standing Committee, Chinese Society of Anesthesiology (CSA)

Professor, Department of Anesthesia & Intensive Care, Eastern Hepatobiliary Surgery Hospital, the Second Military Medical University

Website: http://www.csaol.cn; http://www.ehbhane.com

2011联合麻醉科学会议上海卫星会会议通知

受澳大利亚新西兰新麻醉学会和香港麻醉医师协会委托，中华医学会麻醉学分会主办的以“中西交融---醉给力（East meets West---Anesthesiologist Talks Today）”为主题的联合麻醉科学会议（Combined Scientific Meeting，CSM2011）上海卫星会将于2011年5月19-20日在中国上海浦东花木路1388号上海浦东嘉里大酒店举行。

此前，由澳新麻醉学会（The Australian and New Zealand College of Anaesthetists, ANZCA）及其疼痛医学分部（The Faculty of Pain Medicine, FPM）、香港麻醉医师协会（The Hong Kong College of Anaesthesiologists, HKCA）合办的联合麻醉科学会议（CSM2011）于2011年5月14日-17日在香港举行，会后与会代表将移师上海参加本次卫星会。

本次会议旨在促进中西方麻醉科学家的大联合，加强彼此间的交流与合作，推动麻醉、疼痛和危重病等学科方面的发展。会议将邀请了国际麻醉领域的知名专家做学术报告，届时仅与会的外方代表将超过200人，来自澳大利亚人、新西兰和香港的麻醉专家还将参观上海市10家大医院，与大陆的麻醉同道共同交流和分享麻醉与疼痛学的热点话题。

上海素有“东方明珠”之美誉。正焕发迷人的风采，既怀旧又摩登，既富东方神韵又有西方风味，更是一座极具现代化而又不失中国传统特色的海派文化都市，五月的上海春意盎然，一定会以海纳百川的热情欢迎和款待来自五湖四海的麻醉同道。

●大会主席：于布为教授（中华医学会麻醉学分会主任委员，交通大学医学院附属瑞金医院麻醉科主任， 麻醉与监护论坛主编）

●大会执行主席：俞卫锋教授（中华医学会麻醉学分会常委兼副秘书长，第二军医大学附属东方肝胆外科医院麻醉与危重病科主任）

大会网址：http://www.csaol.cn; http://www.ehbhane.com

中华医学会麻醉学分会
Chinese Society of Anesthesiology

學會與征文

Welcome Message of the 1st Global Conference of Chinese Anesthesiologists（GCCA）in Shanghai, 2011

In order to better promote the solidarity, cooperation, friendship and academic achievement of global Chinese anesthesiologists, the Chinese Society of Anesthesiology (CSA) will hold the first Global Conference of Chinese Anesthesiologists (GCCA) with the theme of "Innovation Decides Tomorrow----Anesthesiologist Talks Today" from May 19th to May 20th, 2011, in Kerry Hotel Pudong, Shanghai (No.1388 Hua Mu Road, Pudong, Shanghai, 201204, China).

Looking at the development of modern anesthesia, Chinese and ethic Chinese anesthesiologists have made remarkable academic achievements and an indelible contribution. The goals of this conference are to promote the development of anesthesia, pain and critical care medicine, enhance the friendship of fellow Chinese anesthesiologists, further improve their research capabilities and clinical services, and ultimately benefit their patients.

Shanghai, also known as the Pearl of the Orient, is one of the best examples where East meets West. When you come, you will see the great achievements that have been made in the 30 years since China adopted the opening policy and get a feeling for the on-going development and progress of Mainland China for yourself. You will also have the opportunity to enjoy the beauty of Shanghai, its long history and unique Shanghai culture, a combination of Chinese and Western elements. We sincerely invite you to come to Shanghai and join us in working with the Chinese Society of Anesthesiology to make the first Global Conference of Chinese Anesthesiologist a great success.

We are looking forward to meeting you at the event.

●1st Global Conference of Chinese Anesthesiologists Chairman

Yu Buwei M.D., Ph.D.

President, Chinese Society of Anesthesiology (CSA)

Chair, Department of Anesthesiology, Ruijin Hospital, Shanghai Jiaotong University, School of Medicine, Shanghai, China

Chief Editor, Forum of Anesthesia & Monitoring

●1st Global Conference of Chinese Anesthesiologists Executive Chairman

Yu Weifeng M.D.,Ph.D.

Vice Secretary-General & Member of Standing Committee, Chinese Society of Anesthesiology (CSA)

Professor, Department of Anesthesia & Intensive Care, Eastern Hepatobiliary Surgery Hospital, the Second Military Medical University

Website: http://www.csaol.cn; http://www.ehbhane.com

2011首届全球华人麻醉大会（GCCA）通知

为了更好地宣扬华人麻醉同道的学术成就，构筑一个相互交流和联系的国际化学术平台，由中华医学会麻醉学分会主办的以“创新凝聚未来——醉·给力”为主题的首届全球华人麻醉大会（1st Global Conference of Chinese Anesthesiologists，GCCA）将于2011年5月19-20日在中国上海浦东花木路1388号上海浦东嘉里大酒店举行。

综观现代麻醉学的发展，华人、华裔同道做出了不可磨灭的贡献。华人麻醉学家的学术成就也为世人所瞩目。召开全球华人麻醉大会旨在促进海内外麻醉界华人科学家的大联合，加强彼此间的交流与合作，推动麻醉、疼痛和危重病等学科方面的发展。

上海素有“东方明珠”之美誉。正焕发迷人的风采，既怀旧又摩登，既富东方神韵又有西方风味，更是一座极具现代化而又不失中国传统特色的海派文化都市，五月的上海春意盎然，一定会以海纳百川的热情欢迎和款待来自五湖四海的华人麻醉同道。2011年首届全球华人麻醉会议诚邀全球华裔麻醉学家热情参与，积极奉献。

●**大会主席**：于布为教授

●**大会执行主席**：俞卫锋教授

大会网址：http://www.csaol.cn; http://www.ehbhane.com

现将学术论文征文有关事项通知如下：

一、征文内容及分类：1、麻醉学基础研究；2、临床麻醉与研究；3、疼痛治疗与研究；4、重症监测治疗与研究；5、麻醉相关新技术、新业务进展；6、其它。

二、征文要求：1、凡报送参加年会交流的论文，均提交论文摘要一份（800～1000字以内），并请在稿件左上角按上述征文分类注明论文类别（请自留底稿，恕不退稿）。

2、格式要求：论文摘要一律4号字体，A4版面，文稿顺序为题目、单位、邮编、作者姓名、摘要内容。

3、凡已在学术会议上或公开发行的刊物上发表过的论文，不予受理。

4、论文需经所在单位审查后方可电邮；请在电邮题目注明“2011全球华人麻醉会议”字样。

三、投稿方式：本次会议只接受网上征文，不接受信件等纸质投稿，投稿邮箱ehbhane@126.com；

四、截稿日期：2011年3月16日；过期恕不受理。与个人邀请外宾来参加会议并拟进行学术交流者，也请通知俞卫锋教授并在上述截稿日期前交来论文摘要，以便统一安排。

五、有其它相关事宜，请联系大会学术秘书组，杨立群副教授（021-81875235，15921969001）

2011年中华医学会全国麻醉学术年会
征 文 通 知（草案）

医学术便函（2010）第0号

各省、自治区、直辖市医学会：

各有关医疗单位：

中华医学会麻醉学分会拟定于2011年9月7—10日在济南召开“2011年中华医学会全国麻醉学术年会”，本次会议是中华医学会一类学术会议，麻醉分会各专业学组年会将同时并会召开，因此是2011年度的重要学术盛会。年会将设各专业学组分会场、专题板块和学术论文报告相结合的形式进行学术交流；现将会议学术论文征文的有关事项通知如下：

一、征文内容及分类：

1. 麻醉学基础研究；
2. 临床麻醉与研究；
3. 疼痛治疗与研究；
4. 重症监测治疗与研究；
5. 麻醉相关新技术、新业务进展；
6. 特殊病例报告；
7. 其它。

二、征文要求：

（一）、年会征文：

1. 凡报送参加年会交流的论文，均提交论文摘要一份（800——1000字以内），并请在稿件左上角按上述征文分类注明论文类别（请自留底稿，恕不退稿）。

2. 格式要求：论文摘要请用Microsoft Word2000或2003编辑，页面设置请用4号字体，A4纸，文稿顺序为题目、单位、邮编、作者姓名、联系电话、摘要内容。

3. 凡已在全国性学术会议上或全国公开发行的刊物上发表过的论文，不予受理。

4. 本次年会仍将进行中青年优秀论文评选，参评条件为1966年9月1日以后出生（投稿时请将身份证复印件扫描成图片格式粘贴在文章的首页）。凡申请参加中青年优秀论文评选的论文，均需提交中、英论文摘要各一份（800--1000字以内）及中文全文一份，论文一律用word文档撰写（请网上投稿）；征文要求同上；并请在稿件右上角注明“中青年优秀论文评奖”字样。评选设一等奖1名，二等奖3名，三等奖5名（具体参评要求届时见有关会议通知）；获奖者将获得临床科研奖金。

5. 各专业学组征文也按年会要求一并投稿，学科管理学组、疼痛学组、ICU学组、儿科麻醉学组、神经外科麻醉学组、心胸外科麻醉学组、气道管理学组、器官移植麻醉学组、产科麻醉学组及青年委员会，都将在年会期间组织学术活动。

（注：年会还将继续进行2011年度SCI论文奖评选；获奖者将获得优秀论文奖金；具体评选办法请登录年会网址查询）。

三、投稿方式：

1. 网上征文与报名：年会网址：http://www.csaol.cn/；

2. 书面邮寄：“北京东四西大街42号中华医学会麻醉学分会办公室白雪同志收（邮编：100710；投寄的论文请在信封上注明“2011年麻醉年会征文”字样）。联系电话010-85158614，传真：010—85158753；邮箱：csa2011@live.cn）；（请尽量采用网上投稿；以保证投稿和注册的准确性；二种方式只选一种）。

四、截稿日期：

年会：2011年3月31日

五、凡个人邀请外宾来参加全国年会并拟进行学术交流者，请与麻醉学分会办公室白雪同志联系（联系方式同上）。

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2011全国小儿麻醉暨第二届中美小儿麻醉学术交流会会议通知

尊敬的国内外专家、同仁们、朋友们：

你们好！

小儿麻醉作为麻醉学中的一个亚学科，受到同仁的关注，近年得到长足发展，由于小儿解剖学、生理学的特殊性，“小儿不是成人的缩影”，需要根据小儿解剖生理、药效和药代动力学及心理特点进行儿科麻醉的方法、药物剂量和器械设备等方面的研究。小儿麻醉在临床和研究领域还需要继续深入和拓展，因此，需要我们深刻理解小儿麻醉学在学科领域中的定位，完善小儿麻醉医师的培训与考核制度，鼓励小儿麻醉新技术和新方法的开展，加大力度支持儿科麻醉的基础和临床研究。

由海南省医学会主办，海南省医学会麻醉学分会和海南省人民医院、温州医学院附属第二医院、育英儿童医院承办的“2011全国小儿麻醉暨第二届中美小儿麻醉学术交流会”将于2011年5月27～29日在风景如画的海南三亚市召开。此次盛会邀请了多位国内外颇具盛名的小儿麻醉专家出席，并针对目前儿科麻醉临床与研究中需要解决的热点问题进行多层次、多角度的交流和知识更新专题讲座，内容涉及儿科麻醉中的安全、多样和合理的麻醉方式选择、气道管理和技术改进、新生儿麻醉、急门诊手术及手术室外麻醉、围术期麻醉及管理、小儿亚专科麻醉、新型麻醉药的应用及术前心理诱导、镇痛、麻醉管理等多方面问题。

期待各方麻醉同仁们在水天一色、令人心旷神怡的海南团聚，一起努力为中国的小儿麻醉学的发展做出贡献！

大会主席： 吴新民

大会组委会主席：云 露 连庆泉 梁 敏

Distinguished Guests,

Ladies and Gentlemen,

It gives me great pleasure to welcome you to this meeting to discuss pediatric anesthesiology issues in Shanya, China. I would like to take this opportunity to express my sincere thanks to all of you for taking the time from your busy schedule to attend to this meeting.

Pediatric anesthesiology has grown from general anesthesiology into one of the sub-disciplines of anesthesiology, gaining attention by the world of the medical profession in recent years. Children are no longer regarded as miniatures of adults because of their particularity of anatomy and physiology□as lots of problems remain to be solved. Modern clinical pediatric anesthesia requires applying new techniques and methods according to their anatomic physiological needs, efficacy and pharmacokinetic, psychological characteristics of pediatric. They need special clinical norms, instruments, to further carry out basic research and clinical studies on the pediatric anesthesiology, as well as on the clinical training.

The 2011 Chinese Annual Pediatric Anesthesiology Conference & the 2nd China-US Pediatric Anesthesia Symposium is to be held in the lovely and picturesque city of Sanya, May 27-29, 2011, hosted by Hainan Medical Association, Organized by Anesthesiology Branch of Hainan Medical Association, Hainan Provincial People's Hospital and the Second Hospital and Yuying Children's Hospital of Wenzhou Medical College. We are greatly honored to invite well-known experts from China and USA to make presentations on a variety of topics regarding pediatric anesthesia clinical skills, research and training. We believe it is a good opportunity to exchange ideas and promote cooperation for further development of pediatric anesthesiology locally and across the boundaries of nations.

We wish you most fruitful days of interesting and stimulating discussions and sharing of knowledge. Enjoy the Conference. Enjoy Shanya, China.

Thank you very much.

大 会 主 席 ：吴新民

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会议讯息

2011 Information of Notification、Exhibition and Scientific Meeting 展

国内会议信息

第48届世界传统医学大会
时　　间：2011–05–07 至 2011–05–09
地　　点：四川 成都
主办单位：国际补充医学研究学会
联 系 人：王老师
电　　话：010–67534765/15300094072
邮　　箱：yxhy1742@163.com

中华医学会第五届全国老年呼吸病学术大会
时　　间：2011年5月
地　　点：北京
主办单位：中华医学会老年分会呼吸病学组
联 系 人：周继宏 王艺燕
电　　话：13901310681 13611071328

2011北医麻醉学论坛
时　　间：2011–05–13 至 2011–05–15
地　　点：北京
主办单位：北京大学医学部麻醉学系
联 系 人：张超 郭敏敏
电　　话：010–81458365/15712954537

第十届华东六省一市麻醉学会议暨2011年上海市医学会麻醉年会
时　　间：2011–05–20 至 2011–05–22
地　　点：上海
主办单位：华东地区麻醉学协作委员会
　　上海市医学会麻醉分会
邮　　箱：huadongmazui@163.com

第17届灾害及救援医学国际会议
时　　间：2011–05–31 至 2011–06–04
地　　点：北京市东城区
主办单位：中华医学会
　　中华医学急诊医学分会
电　　话：010–85158149
邮　　箱：catherineli@cma.org.cn

2011年天坛·国际神经外科麻醉论坛
时　　间：2011–06–03 至 2011–06–05
地　　点：北京
主办单位：首都医科大学附属北京天坛医院
　　首都医科大学麻醉学系
　　北京医学会麻醉学分会
联 系 人：董老师
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2011全国青年麻醉学科医师学术论坛
时　　间：2011–06–03 至 2011–06–05
地　　点：安徽合肥
主办单位：中华医学会麻醉学分会青年委员会
联 系 人：张野
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2011年第十六次长江流域麻醉学术会议、2011年中国西部十一省麻醉学术年会、2011青海省麻醉学年会
时　　间：2011–06–17 至 2011–06–19
地　　点：青海西宁市
主办单位：青海省医学会麻醉学分会
联 系 人：俞文军/靳晓红
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中华医学会第五次重症医学大会
时　　间：2011–05–26 至 2011–05–30
地　　点：北京
主办单位：中华医学会重症医学分会
电　　话：010–85158128
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第17届世界灾难及急救医学学术会议暨第14次全国急诊医学会学术年会
时　　间：2011–05–30 至 2011–06–03
地　　点：北京
主办单位：世界灾难与急救医学学会授权
　　中华医学会
　　中华医学会急诊医学分会
联 系 人：李清敏
电　　话：010–85158149

第二次全国中医药防治疼痛学术年会
时　　间：2011–07–25 至 2011–07–27
地　　点：黑龙江省哈尔滨市
主办单位：中华中医药学会
　　黑龙江省中医药管理局
承办单位：中华中医药学会疼痛学分会
　　黑龙江省中医药学会
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2011IEEE年人类健康与生物医学工程国际会议(HHBE2011)
时　　间：2011–08–19 至 2011–08–21
地　　点：吉林省吉林市
主办单位：IEEE、IEEE SMC学会
　　北华大学
联 系 人：pro.li
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中国康复医学会第十一届全国运动疗法学术大会
时　　间：2011–08–19 至 2011–08–21
地　　点：上海市黄浦区
主办单位：中国康复医学会全国运动疗法专业委员会
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2011亚太地区高原医学会议
时　　间：2011–08–20 至 2011–08–23
地　　点：青海省西宁市
主办单位：亚太地区高原医学协会
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第四届首都急诊医学高峰论坛
时　　间：2011–08–27 至 2011–08–28
地　　点：北京
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2011年中华医学会全国麻醉学术年会
时　　间：2011–09–07 至 2011–09–10
地　　点：济南
主办单位：中华医学会麻醉学分会
联 系 人：白雪
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第九届胸腔麻醉亚洲会议（2011 ASCA）
时　　间：2011–09–30 至 2011–10–02日
地　　点：NTUH International Convention Center, Taipei, Taiwan
主办单位：National Taiwan University
电　　话：+886–2–8226–1010
网　　址：www.asca2011.org/index.html

国内展会信息

第二届中国大连国际DNA和基因组活动周
时　　间：2011–04–25 至 2011–04–29
地　　点：大连
主办单位：国家外国专家局国外人才信息研究中心
联 系 人：李梦思
电　　话：0411–84799609–826

第十一届中国国际家庭医疗保健、康复器械及健康用品（北京）展览会
时　　间：2011–05–07 至 2011–05–09
地　　点：北京
主办单位：中国医疗保健国际交流促进会
　　美国国际健康产品协会
联 系 人：徐良
电　　话：13167331017/13810331731

2011安徽省医疗器械展览会
时　　间：2011–05–12 至 2011–05–14日
地　　点：安徽芜湖
主办单位：中国国际贸易促进委员会
联 系 人：许沛东
电　　话：13205532761

2011第九届中国上海国际医疗器械展览会
时　　间：2011–06–27 至 2011–06–29
地　　点：上海
主办单位：中国医促会
联 系 人：杨浩
电　　话：13795367353

2011第九届中国（上海）家用医疗用品展览会
时　　间：2011–06–27 至 2011–06–29
地　　点：上海
主办单位：中国医促会
联 系 人：杨浩
电　　话：137953673532/021–54175192

2011中国（上海）检验医学及输血用品展览会
时　　间：2011–06–27 至 2011–06–29
地　　点：上海
主办单位：中国医促会
联 系 人：杨浩
电　　话：13795367353

2011第十二届（上海）国际营养健康产业博览会
时　　间：2011–08–22 至 2011–08–24
地　　点：上海
主办单位：中国保健营养理事会
联 系 人：田振（经理）
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第二十届中国国际医用仪器设备展览会暨技术交流会
时　　间：2011–11–08 至 2011–11–20
地　　点：北京国家会议中心
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联 系 人：马冉/南易/张珍桢
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国际展会信息

2011医学和教育信息化国际会议
时　　间：2011–08–05 至 2011–08–07
地　　点：日本 北海道
主办单位：早稻田大学
　　厦门大学
承办单位：日本早稻田大学
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