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小兒日間手術中超重/肥胖與胃液特徵：禁食指南與肺吸入風險的關係

Overweight/Obesity and Gastric Fluid Characteristics in Pediatric Day Surgery: Implications for Fasting Guidelines and Pulmonary Aspiration Risk

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Anesth Analg 2009 109: 727-736.

背景:超重/肥胖患兒日間手術前 2 小時飲用清飲料的安全性尚未驗證。健康患兒與肥胖成年人術前禁食 2 小時殘留胃內容（GFVs）較少，通常認爲肺吸入風險較低。作者擬研究日間手術的超重/肥胖患者殘留胃容量流行情況，並假設體重指數（BMI）與術前禁食時間對 GFV 或胃液 pH 值無顯著影響。在術

前兩小時禁流質的患兒中，推測超重/肥胖患兒術中將不會增加 GFV，並且嘔吐/肺吸入可能性極低。

方法：連續調查 1000 例年齡 2-12 歲患兒的人口統計學參數、手術史及身高體重。1000 例日間手術病人（年齡 2-12 歲）中接受氣管內全麻的患兒入選。氣管插管後，將 14 -18F 的胃管插入並抽取胃內容物。記錄用藥、禁食時間、胃液量、pH 值及嘔吐情況。根據疾病控制和預防中心生長發育表（2000 年）確定對應於年齡和性別的理想體重（理想體重爲第 50 百分位）和病人的分類：正常（體重 25 - 75 百分位數），超重（體重大於等於 85 ，小於 95 百分位），或肥胖（體重大於等於 95 百分位）。

結果：日間手術的患者中，14.0%的患者體重超重，13.3%爲肥胖。肥胖患兒的 GFV 體重比更低（P<0.001）。當修正的理想體重時，GFV（IBW）與 BMI 分類具有一致性（平均 0.96ml/kg，sd 0.71，中位數 0.86 ml/kg，四分位間距 0.96）。術前服用對乙醯氨基酚和咪唑安定會增加 GFV（IBW）（P = 0.025 和 P = 0.001）。低 GFV（IBW）與 ASA III（P = 0.024），男性（P = 0.012），胃食管反流疾病（P = 0.049），質子泵抑制劑服用（P = 0.018）相關。 GFV（IBW）與禁食時間長短無關。年輕人（P = 0.005），體重百分比高（P = 0.036），美洲和非洲種族（P = 0.033）的胃酸濃度較低。8 例患者在誘導期發生嘔吐（50%的人屬於肥胖，P = 0.052，75%的人有阻塞性睡眠呼吸暫停綜合症，P = 0.061）。嘔吐的發生是與 ASA 分級有關而不是禁食時間長短（P = 0.006）。並且患者沒有發生肺吸入。

結論:小兒日間手術病人中有 27%患兒爲超重/肥胖。無論 BMI 和禁食時間長短，這些患兒在術前兩小時可飲用清飲料（1 ml/kg）。偶爾的嘔吐發生與禁食時間長短沒有關係。

（陳毓雯　譯　陳傑　校）

BACKGROUND: The safety of 2-h preoperative clear liquid fasts has not been established for overweight/obese pediatric day surgical patients. Healthy children and obese adults who fasted 2 h have small residual gastric fluid volumes (GFVs), which are thought to reflect low pulmonary aspiration risk. We sought to measure the prevalence of overweight/obesity in our day surgery population. We hypothesized that neither body mass index (BMI) percentile nor fasting duration would significantly affect GFV or gastric fluid pH. In children who were allowed clear liquids up until 2 h before surgery, we hypothesized that overweight/obese subjects would not have increased GFV over lean/normal subjects and that emesis/pulmonary aspiration events would be rare.

METHODS: Demographics, medical history, height, and weight were recorded for 1000 consecutive day surgery patients aged 2–12 yr. In addition, 1000 day surgery patients (age 2–12 yr) undergoing general endotracheal anesthesia were enrolled. After tracheal intubation, a 14–18F orogastric tube was inserted and gastric contents evacuated. Medications, fasting interval, GFV, pH, and emetic episodes were documented. Age- and gender-specific Center for Disease Control and Prevention growth charts (2000) were used to determine ideal body weight (IBW = 50th percentile) and to classify patients as lean/normal (BMI 25th–75th percentile), overweight (BMI ≥85th to <95th percentile), or obese (BMI ≥95th percentile).

RESULTS: Of all day surgery patients, 14.0% were overweight and 13.3% were obese. Obese children had lower GFV per total body weight ($P < 0.001$). When corrected for IBW, however, volumes GFV(IBW) were identical across all BMI categories (mean 0.96 mL/kg, sd 0.71; median 0.86 mL/kg, IQR 0.96). Preoperative

acetaminophen and midazolam contributed to increased GFV(IBW) ($P = 0.025$ and $P = 0.001$). Lower GFV(IBW) was associated with ASA physical status III ($P = 0.024$), male gender ($P = 0.012$), gastroesophageal reflux disease ($P = 0.049$), and proton pump inhibitor administration ($P = 0.018$). GFV(IBW) did not correlate with fasting duration or age. Decreased gastric fluid acidity was associated with younger age ($P = 0.005$), increased BMI percentile ($P = 0.036$), and African American race ($P = 0.033$). Emesis on induction occurred in eight patients (50% of whom were obese, $P = 0.052$, and 75% of whom had obstructive sleep apnea, $P = 0.061$). Emesis was associated with increased ASA physical status ($P = 0.006$) but not with fasting duration. There were no pulmonary aspiration events.
CONCLUSIONS: Twenty-seven percent of pediatric day surgery patients are overweight/obese. These children may be allowed clear liquids 2 h before surgery as GFV(IBW) averages 1 mL/kg regardless of BMI and fasting interval. Rare emetic episodes were not associated with shortened fasting intervals in this population.

輕于 5Kg 的嬰兒和新生兒即時超聲引導頸內靜脈置管的一個有效的新型皮膚牽引方法

A Novel Skin-Traction Method Is Effective for Real-Time Ultrasound-Guided Internal Jugular Vein Catheterization in Infants and Neonates Weighing Less Than 5 Kilograms

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背景：小兒患者頸內靜脈穿刺較困難，因爲靜脈直徑小且血管易塌陷。爲了頸靜脈穿刺置管方便，作者研發了一種新的皮膚牽引法（STM），頸靜脈穿刺過程中，皮膚穿刺點向上拉伸。在這項研究中檢測了 STM 是否能增加靜脈的橫截面積以及是否對頸靜脈穿刺有幫助。
方法：這項前瞻性研究從 2006 年 12 月至 2008 年 6 月。28 名先天性心臟病手術嬰兒和體重<5 千克新生兒入組。患兒隨機分組，一組爲實驗組（STM 組），另一組爲對照組（非 STM 組）。在平臥位和 10°垂頭仰臥位時分別測量運用 STM 與不運用 STM 時的右側頸內靜脈的橫截面積與直徑。破皮後穿刺步驟如下：（一）第一次血液返流，（二）插入導引絲（三）導管插入。同時研究穿刺針改進後（估計改進後的穿刺針前後徑較改進前小）穿刺次數、成功率、併發症以及頸內靜脈的塌陷程度。
結果：兩種體位中 STM 均顯著增加頸內靜脈的橫截面積及前後徑。STM 組中插入導管需要的時間明顯縮短，主要原因可能是由於導引絲插入時間較短。在 STM 組中運用改進後的穿刺針時頸內靜脈塌陷程度低很多。
結論：STM 通過擴張頸內靜脈及防止靜脈塌陷，使嬰兒和體重<5 公斤的新生兒的頸內靜脈穿刺更便捷。
（陳毓雯　譯　陳傑　校）

BACKGROUND: Internal jugular vein (IJV) catheterization in pediatric patients is sometimes difficult because of the small sizes of veins and their collapse during catheterization. To facilitate IJV catheterization, we developed a novel skin-traction

method (STM), in which the point of puncture of the skin over the IJV is stretched upward with tape during catheterization. In this study, we examined whether the STM increases the cross-sectional area of the vein and thus facilitates catheterization.
METHODS: This was a prospective study conducted from December 2006 to June 2008. We enrolled 28 consecutive infants and neonates weighing <5 kg who underwent surgery for congenital heart disease. The patients were randomly assigned to a group in which STM was performed (STM group) or a group in which it was not performed (non-STM group). The cross-sectional area and diameter of the right IJV in the flat position and 10° Trendelenburg position with and without applying STM were measured. We determined time from first skin puncture to the following: (a) first blood back flow, (b) insertion of guidewire, and (c) insertion of catheter. Number of punctures, success rate, complications, and degree of IJV collapse during advancement of the needle (estimated as decrease of anteroposterior diameter during advancement of the needle compared with the diameter before advancement) were also examined.
RESULTS: STM significantly increased the cross-sectional area and the anteroposterior diameter of the IJV in both positions. The time required to insert the catheter was significantly shorter in the STM group, probably mainly due to a shorter guidewire insertion time. The degree of IJV collapse during advancement of the needle was much lower in the STM group.
CONCLUSIONS: STM facilitates IJV catheterization in infants and neonates weighing <5 kg by enlarging the IJV and preventing vein collapse.

增加異氟烷的吸入時程可以降低 7 天而非 60 天大鼠的最低肺泡麻醉濃度

Increasing the Duration of Isoflurane Anesthesia Decreases the Minimum Alveolar Anesthetic Concentration in 7-Day-Old but Not in 60-Day-Old Rats

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背景：作者在研究大鼠神經系統毒性時發現當增加異氟烷的吸入時程時，其最低肺泡麻醉濃度（MAC）隨之降低了，這種情形發生在 7 天大鼠但 60 天大鼠卻不會發生。對 7 天大鼠麻醉 15min，其 MAC 爲 3.5%，而麻醉 4 小時後的大鼠其 MAC 已降至 1.3%。本文作者研究了其藥效或藥代因素是否介導這種變化。
方法：測定 7 天大鼠異氟烷在 MAC 時的吸入壓和腦分壓作爲麻醉維持的依據。對 60 天大鼠，測定異氟烷在 MAC 時的部分吸入壓力作爲吸入維持的依據。最後，測定給予納洛酮 1mg/kg 並推遲 MAC 的起始時間（通過夾尾試驗）對 7 天大鼠的影響。
結果：對於 7 天大鼠，MAC 的吸入壓和腦分壓在 1 至 4h 均下降。吸入壓下降了 56%，腦分壓下降了 33%。4 小時時，MAC 的吸入壓接近腦分壓（即部分腦分壓沒有顯著變化）。無論是給予 1mg/kg 的納洛酮還是把鉗夾時間推遲

到 3 小時都無法逆轉 MAC 的下降。對於 60 天大鼠，MAC 時異氟烷的吸入壓在 1 至 4 小時之間是穩定的。
結論：異氟烷的 MAC 在 1 至 4 小時的麻醉過程中是下降的，這種情況見於 7 天大鼠而非 60 天大鼠。藥效學和藥動學都支持 7 天大鼠 MAC 的下降。內啡肽和感覺脫敏均不參與此藥效學的構成。
（李潺　譯　陳傑　校）

BACKGROUND: While studying neurotoxicity in rats, we observed that the anesthetic minimum alveolar anesthetic concentration (MAC) of isoflurane decreases with increasing duration of anesthesia in 7-day-old but not in 60-day-old rats. After 15 min of anesthesia in 7-day-old rats, MAC was 3.5% compared with 1.3% at 4 h. We investigated whether kinetic or dynamic factors mediated this decrease.
METHODS: In 7-day-old rats, we measured inspired and cerebral partial pressures of isoflurane at MAC as a function of duration of anesthesia. In 60-day-old rats, we measured inspired partial pressures of isoflurane at MAC as a function of duration of anesthesia. Finally, we determined the effect of administering 1 mg/kg naloxone and of delaying the initiation of the MAC determination (pinching the tail) on MAC in 7-day-old rats.
RESULTS: In 7-day-old rats, both inspired and cerebral measures of MAC decreased from 1 to 4 h. The inspired MAC decreased 56%, whereas the cerebral MAC decreased 33%. At 4 h, the inspired MAC approximated the cerebral MAC (i.e., the partial pressures did not differ appreciably). Neither administration of 1 mg/kg naloxone nor delaying tail clamping until 3 h reversed the decrease in MAC. In 60-day-old rats, inspired MAC of isoflurane was stable from 1 to 4 h of anesthesia.
CONCLUSIONS: MAC of isoflurane decreases over 1–4 h of anesthesia in 7-day-old but not in 60-day-old rats. Both pharmacodynamic and a pharmacokinetic components contribute to the decrease in MAC in 7-day-old rats. Neither endorphins nor sensory desensitization mediate the pharmacodynamic component.

聽覺事件相關電位，腦電雙頻指數和熵在區分 ICU 病人不同鎮靜水準的差異

Auditory Event-Related Potentials, Bispectral Index, and Entropy for the Discrimination of Different Levels of Sedation in Intensive Care Unit Patients

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背景：鎮靜方案--包括鎮靜量表的應用，規律的鎮靜中止，可以縮短病人機械通氣和在 ICU 的停留時間。由於臨床鎮靜深度的評估是一項勞動密集型間歇操作的工作，並且受鎮靜和睡眠的影響，腦電生理信號逐漸成爲替代指標受到人們的青睞。作者假設聽覺事件相關電位(ERPs)，腦電雙頻指數（BIS）和熵能夠區別臨床相關鎮靜水準。

方法：選取 10 位在全身麻醉下行胸部或腹部手術的入住 ICU 的術後病人，術後即刻記錄腦電圖、BIS、狀態熵（SE）、反應熵(RE)和聽覺事件相關電位。鎮靜水準依據 Richmond 躁動—鎮靜評分（RASS）分爲幾個層面—5 分（極深度鎮靜），4 分（深度鎮靜），3 分至 1 分（中度鎮靜）和 0 分（清醒）。鎮靜方法選擇丙泊酚和瑞芬太尼靶控輸注，劑量逐漸減少。基礎水準的參考在術前或術後幾天進行。

結果：基礎水準、RASS 5 分、4 分、3 至 1 分、0 分時 BIS 值分別爲 94 [4] (中位數，四分位數間距), 47 [15], 68 [9], 75 [10], 88 [6]; 狀態熵（SE）分別爲 87 [3], 46 [10], 60 [22], 74 [21], 87 [5]; 反應熵(RE) 分別爲 97 [4], 48 [9], 71 [25], 81 [18], 96 [3]（$P < 0.05$，Friedman 檢驗）。BIS 值和熵值變異度較大。當單獨考慮事件相關電位（ERP）N100 波幅時，ERPs 在不同鎮靜水準的變化無統計學意義。但是，在對 ERP 進行判別分析包括雙變數的主生成分析時，對於區分深度、中度和重度鎮靜水準得到的預測概率 P_K 爲 0.89。對於 RE,SE 和 BIS 相應的 P_K 分別爲 0.88，0.89 和 0.85。

結論：無論事件相關電位（ERPs）還是腦電雙頻指數（BIS）或熵都不能取代臨床標準的鎮靜評分系統。ERPs 和處理後腦電圖可以區別全身麻醉後極深度鎮靜、深度至中度鎮靜和非鎮靜水準，兩者 P_K 值相似。個體間及個體本身熵和 BIS 的高變異性使得不能確定靶值範圍，從而限制了其在評估危急重病人鎮靜中的應用。目前對 ERPs 的變異性尚不清楚。

（李潺　譯　陳傑　校）

BACKGROUND: Sedation protocols, including the use of sedation scales and regular sedation stops, help to reduce the length of mechanical ventilation and intensive care unit stay. Because clinical assessment of depth of sedation is labor-intensive, performed only intermittently, and interferes with sedation and sleep, processed electrophysiological signals from the brain have gained interest as surrogates. We hypothesized that auditory event-related potentials (ERPs), Bispectral Index® (BIS), and Entropy® can discriminate among clinically relevant sedation levels.

METHODS: We studied 10 patients after elective thoracic or abdominal surgery with general anesthesia. Electroencephalogram, BIS, state entropy (SE), response entropy (RE), and ERPs were recorded immediately after surgery in the intensive care unit at Richmond Agitation-Sedation Scale (RASS) scores of –5 (very deep sedation), –4 (deep sedation), –3 to –1 (moderate sedation), and 0 (awake) during decreasing target-controlled sedation with propofol and remifentanil. Reference measurements for baseline levels were performed before or several days after the operation.

RESULTS: At baseline, RASS –5, RASS –4, RASS –3 to –1, and RASS 0, BIS was 94 [4] (median, IQR), 47 [15], 68 [9], 75 [10], and 88 [6]; SE was 87 [3], 46 [10], 60 [22], 74 [21], and 87 [5]; and RE was 97 [4], 48 [9], 71 [25], 81 [18], and 96 [3], respectively (all $P < 0.05$, Friedman Test). Both BIS and Entropy had high variabilities. When ERP N100 amplitudes were considered alone, ERPs did not differ significantly among sedation levels. Nevertheless, discriminant ERP analysis including two parameters of principal component analysis revealed a prediction probability P_K value of 0.89 for differentiating deep sedation, moderate sedation, and awake state. The corresponding P_K for RE, SE, and BIS was 0.88, 0.89, and 0.85, respectively.

CONCLUSIONS: Neither ERPs nor BIS or Entropy can replace clinical sedation assessment with standard scoring systems. Discrimination among very deep, deep to moderate, and no sedation after general anesthesia can be provided by ERPs and processed electroencephalograms, with similar P_Ks. The high inter- and intraindividual variability of Entropy and BIS precludes defining a target range of values to predict the sedation level in critically ill patients using these parameters. The variability of ERPs is unknown.

壓力支持通氣和雙相氣道正壓通氣通過肺血流重分佈而改善氧合

Pressure Support Ventilation and Biphasic Positive Airway Pressure Improve Oxygenation by Redistribution of Pulmonary Blood Flow

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背景：在機械通氣時，自主呼吸活動通過恢復之前萎陷區域的肺泡而改善氣體交換。PSV 和 BIPAP 通常使用自主呼吸模式；但是對於這些輔助機械通氣的模式是如何提高肺功能的機理還知之甚少。本文作者研究的目的是探討 PSV 和 BIPAP 改善氣體交換的機理。

方法：五頭豬，用表面活性劑消耗法造急性肺損傷模型，行俯臥位元下機械通氣。穩定之後， BIPAP 開始設定爲 5 cm H_2O 並逐漸提高，最後通氣達到 6-8ml/kg 的潮氣量。減輕麻醉深度，同時當自主呼吸大於等於每分通氣量的 20%時，行 PSV 或 BIPAP+SB 一小時（隨機順序）。呼末暫停階段行整個胸部的螺旋 CT，同時記錄功能變數。靜脈注入螢光微粒體來標記肺血流，然後用三維重構分析方法評價各種通氣模式對肺血流再分佈的作用。

結果：急性肺損傷造成肺功能損傷，增加了肺損傷相關區域通氣減弱或無通氣（P<0.05）。較機械控制通氣相比，PSV 和 BIPAP+SB 都能提高氧合，減少靜脈混合（P<0.05）。儘管如此，自主呼吸會增加相關區域的非通氣區域，同時伴隨著正常通氣區域的減少。6 個肺區域中 5 個觀測到 PSV 和 BIPAP+SB 通氣期間肺血流量分佈是從損傷相關區到非相關區。

結論：在這個急性肺損傷模型中，PSV 或 BIPAP+SB 的輔助機械通氣改善氧合和靜脈血混合是由於肺血流流向損傷非相關區而不是恢復肺損傷相關區。（張婷　譯　陳傑　校）

BACKGROUND: Spontaneous breathing (SB) activity may improve gas exchange during mechanical ventilation mainly by the recruitment of previously collapsed regions. Pressure support ventilation (PSV) and biphasic positive airway pressure (BIPAP) are frequently used modes of SB, but little is known about the mechanisms of improvement of lung function during these modes of assisted mechanical ventilation. We evaluated the mechanisms behind the improvement of gas exchange with PSV and BIPAP.

METHODS: Five pigs (25–29.3 kg) were mechanically ventilated in supine position, and acute lung injury (ALI) was induced by surfactant depletion. After stabilization, BIPAP was initiated with lower continuous positive airway pressure equal to 5 cm H_2O and the higher continuous positive airway pressure titrated to achieve a tidal volume between 6 and 8 mL/kg. The depth of anesthesia was reduced, and when SB represented ≥20% of total minute ventilation, PSV and BIPAP + SB were each performed for 1 h (random sequence). Whole chest helical computed tomography was performed during end-expiratory pauses and functional variables were obtained. Pulmonary blood flow (PBF) was marked with IV administered fluorescent microspheres, and spatial cluster analysis was used to determine the effects of each ventilatory mode on the distribution of PBF.
RESULTS: ALI led to impairment of lung function and increase of poorly and nonaerated areas in dependent lung regions ($P < 0.05$). PSV and BIPAP + SB similarly improved oxygenation and reduced venous admixture compared with controlled mechanical ventilation ($P < 0.05$). Despite that, a significant increase of nonaerated areas in dependent regions with a concomitant decrease of normally aerated areas was observed during SB. In five of six lung clusters, redistribution of PBF from dependent to nondependent, better aerated lung regions were observed during PSV and BIPAP + SB.
CONCLUSIONS: In this model of ALI, the improvements of oxygenation and venous admixture obtained during assisted mechanical ventilation with PSV and BIPAP + SB were explained by the redistribution of PBF toward nondependent lung regions rather than recruitment of dependent zones.

健康成人吸入氧濃度和呼末 CO2 對於大腦組織氧合指數的影響

The Effect on Cerebral Tissue Oxygenation Index of Changes in the Concentrations of Inspired Oxygen and End-Tidal Carbon Dioxide in Healthy Adult Volunteers

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背景：作者使用近紅外波譜儀行非創傷性的腦組織氧飽和度(ScO_2)監測。ScO2 用 NIRO 300 波譜儀(Hamamatsu Photonics, Japan)測定，ScO2 稱爲腦組織的氧合指數(TOI)，用來評估大腦氧運輸和利用之間的平衡。本實驗目的是探討系統和顱內生理改變對腦組織氧合指數（TOI）的影響。
方法：研究 15 名健康志願者在正常 CO2 低氧血症和高氧血症及正常氧時的過度通氣和通氣不足時腦氧。用 NIRO 300 波譜儀測定了絕對大腦氧合指數和氧合血紅蛋白以及去氧血紅蛋白濃度。同時監測動脈血氧飽和度，呼末 CO2，心率，平均動脈血壓以及大腦中動脈血流速度。用總的大腦血紅蛋白濃度變化計算腦血流量的變化。
結果：基礎腦組織氧合指數爲 67.3%，其四分位間距爲 65.2%-71.9%。腦組織氧合指數平均下降 7.1%（四分位間距 5.4%-9.1%）時發生低氧血症，腦組織氧合指數平均增加 2.3%（四分位間距 2.0%-2.5%）產生高氧血症

（P<0.0001）。通氣不足導致 TOI 減少基礎值的 2.1%（四分位間距 1.3%-3.3%）（P<0.0001），過度通氣導致 TOI 增加 2.6%（四分位間距 1.4%-3.7%）（P<0.0001）。氧飽和度（P<0.0001），呼末 CO2（P<0.0001），大腦血流量（P=0.0003），以及平均動脈壓（P=0.03）都顯著影響了 TOI。大腦中動脈血流速度（P=0.7）和心率（P=0.2）對 TOI 影響不顯著。

結論：TOI 能提供即時、多點、無創評估大腦氧運輸和利用的簡易監測儀。然而，TOI 是個複雜的變數，它會受到氧飽和度和呼末 CO2 的影響，以及平均動脈壓和大腦血流量改變的影響，但後兩者影響程度較小。臨床醫生應注意全身和顱內生理改變對ＴＯＩ的影響，從而在臨床監測中合理解釋 TOI 的變化。

（張婷　譯　陳傑　校）

BACKGROUND: A variety of near-infrared spectroscopy devices can be used to make noninvasive measurements of cerebral tissue oxygen saturation (ScO_2). The ScO_2 measured by the NIRO 300 spectrometer (Hamamatsu Photonics, Japan) is called the cerebral tissue oxygenation index (TOI) and is an assessment of the balance between cerebral oxygen delivery and utilization. We designed this study to investigate the effect of systemic and intracranial physiological changes on TOI.
METHODS: Fifteen healthy volunteers were studied during isocapneic hyperoxia and hypoxemia, and normoxic hypercapnea and hypocapnea. Absolute cerebral TOI and changes in oxy- and deoxyhemoglobin concentrations were measured using a NIRO 300 spectrometer. Changes in arterial oxygen saturation (Sao_2), $ETco_2$, heart rate, mean arterial blood pressure (MBP), and middle cerebral artery blood flow velocity (V_{mca}) were also measured during these physiological challenges. Changes in cerebral blood volume (CBV) were subsequently calculated from changes in total cerebral hemoglobin concentration.
RESULTS: Baseline TOI was 67.3% with an interquartile range (IQR) of 65.2%–71.9%. Hypoxemia was associated with a median decrease in TOI of 7.1% (IQR –9.1% to –5.4%) from baseline ($P < 0.0001$) and hyperoxia with a median increase of 2.3% (IQR 2.0%–2.5%) ($P < 0.0001$). Hypocapnea caused a reduction in TOI of 2.1% (IQR –3.3% to –1.3%) from baseline ($P < 0.0001$) and hypercapnea an increase of 2.6% (IQR 1.4%–3.7%) ($P < 0.0001$). Changes in Sao_2 ($P < 0.0001$), $ETco_2$ ($P < 0.0001$), CBV ($P = 0.0003$), and MBP ($P = 0.03$) were significant variables affecting TOI. Changes in V_{mca} ($P = 0.7$) and heart rate ($P = 0.2$) were not significant factors.
CONCLUSION: TOI is an easy-to-monitor variable that provides real-time, multisite, and noninvasive assessment of the balance between cerebral oxygen delivery and utilization. However, TOI is a complex variable that is affected by Sao_2 and $ETco_2$, and, to a lesser extent, by MBP and CBV. Clinicians need to be aware of the systemic and cerebral physiological changes that can affect TOI to interpret changes in this variable during clinical monitoring.

持續非同步電針刺激對低溫痛閾的影響

The Impact of Asynchronous Electroacupuncture Stimulation Duration on Cold Thermal Pain Threshold

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持續非同步電針術能影響痛覺減退。健康志願者隨機接受不同的非同步電針術刺激(在 5mA 電流下，交替使用低/高[2/100 赫茲]的頻率)，持續時間分別爲 0，20，30 或 40min。應用實驗性人冷溫痛閾模型，結果發現與 0-，20-，或 40-min 刺激（P<0.05）相比，30min 的非同步 2 / 100 赫茲的刺激，產生最顯著的痛覺減退效果應並在持續至少 60min。結論：非同步電針刺激最佳時間是 30min。

（張燕　譯　陳傑　校）

The durations of asynchronous electroacupuncture can affect the resultant hypoalgesia. Healthy volunteers were randomized to receive different durations (0 min, 20 min, 30 min, or 40 min) of asynchronous electroacupuncture stimulations (alternating low/high [2/100 Hz] frequency at 5 mA). Using a human experimental cold thermal pain threshold model, we found that 30 min of asynchronous 2/100 Hz stimulation resulted in the most significant hypoalgesic effect that was sustained for at least 60 min after stimulation compared with 0-, 20-, or 40-min stimulations ($P < 0.05$). We conclude that the most optimal duration for asynchronous electroacupuncture stimulation is 30 min.

中樞給予二甲胺四環素和利魯唑預防大鼠嗎啡導致的耐受

Central Administration of Minocycline and Riluzole Prevents Morphine-Induced Tolerance in Rats

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Anesth Analg 2009 109: 936-942.

背景：長期使用阿片類藥物導致對鎮痛藥的耐受，這種現象的神經生物學機制並不完全清楚。在這項研究中，作者評估中樞給予二甲胺四環素（四環素衍生物）和利魯唑（谷氨酸拮抗劑）對大鼠嗎啡導致耐受的影響。

方法：每日注射嗎啡(10 mg/kg, IP)的大鼠隨機分爲生理鹽水組（10 μL/rat，側腦室注射[ICV]），1% 聚山梨醇酯 80 組 (10 μL/rat，[ICV])，二甲胺四環素組(60, 120, 和 240 μg/10 μL, ICV)和利魯唑組(20, 40, 80 μg/10 μL per rat, ICV)。用熱盤儀(55°C ± 0.5°C)評估大鼠對傷害性刺激的反應。記錄大鼠舔足反應時間爲熱盤潛伏期。每天記錄每只大鼠基礎潛伏期，然後注射嗎啡(10 mg/kg)。20min 後給予上述藥物 10min 後測定潛伏期。

結果：側腦室注射二甲胺四環素和利魯唑延遲了嗎啡導致的耐受。對照組在 8 天后對嗎啡完全耐受，而在二甲胺四環素組 (120 μg/10 μL per rat) 和利魯唑組(80 μg/10 μL per rat)第 13 天才耐受。另外，二甲胺四環素和利魯唑增強了嗎啡的鎮痛作用。

結論：二甲胺四環素對一氧化氮和谷氨酸系統的作用和利魯唑對谷氨酸系統的作用是延遲嗎啡耐受的重要機制。

（唐穎　譯　陳傑　校）

BACKGROUND: Long-term exposure to opiates induces tolerance to the analgesic effect. The neurobiological mechanism of this phenomenon is not completely clear. In this study, we evaluated the effects of central administration of minocycline (a tetracycline derivative) and riluzole (an antiglutamatergic drug) on morphine-induced tolerance in rats.
METHODS: Groups of rats received daily morphine (10 mg/kg, IP) in combination with saline (10 μL/rat, intracerebroventricular [ICV]) or 1% Tween 80 (10 μL/rat, ICV) or minocycline (60, 120, and 240 μg/10 μL per rat, ICV) or riluzole (20, 40, 80 μg/10 μL per rat, ICV). Nociception was assessed using hotplate apparatus (55°C ± 0.5°C). Hotplate latency was recorded when the rat licked its hindpaw. Baseline latencies were determined once per day for each rat, then morphine (10 mg/kg) was injected. After 20 min, the above-mentioned drugs were administered and postdrug latency was measured 10 min after the injection of drugs or vehicles.
RESULTS: Results showed that ICV administration of minocycline and riluzole delayed morphine-induced tolerance. Morphine tolerance was complete after 8 days in the control groups but was complete in the groups treated with minocycline (120 μg/10 μL per rat) and riluzole (80 μg/10 μL per rat) on the 13th day. In addition, our results showed that minocycline and riluzole increased the total analgesic effect of morphine (area under the curve of the percentage of maximal possible effect values).
CONCLUSION: The effects of minocycline on nitric oxide and the glutamatergic system and the effect of riluzole on the glutamate system are potentially important mechanisms in delaying morphine-induced tolerance.

大鼠炎症和神經病理痛模型中外周活性鈉通道（$Na_v1.7$ ）阻滯劑逆轉痛覺過敏和異常性疼痛

A Peripherally Acting $Na_v1.7$ Sodium Channel Blocker Reverses Hyperalgesia and Allodynia on Rat Models of Inflammatory and Neuropathic Pain

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背景：初級感覺神經元上的電壓門控鈉通道（Nav1）可以影響動作電位的產生和傳播的興奮性。最近，人類基因資料表明，一個鈉離子通道亞型，Nav1.7，在疼痛中起著重要作用。作者對此研究苄基吼嗪（BZP）抗傷害效應，非中樞神經系統（CNS）的小分子滲透物 Nav1.7 比 Nav1.8 和 Nav1.5 有更高親和力和優先選擇性。
方法：與標準鎮痛藥作比較，評估 BZP 在大鼠炎症和神經病理疼痛臨床前模型中效應 。使用福氏佐劑炎性痛模型及脊神經結紮神經性疼痛的模型。另行苄基吼嗪運動協調試驗，以評估其對中樞神經系統的副作用。
結果：在臨床前慢性疼痛模型中，苄基吼嗪效果與當前的鎮痛藥相當。在福氏佐劑的模式中，苄基吼嗪生產的防止痛覺過敏作用與非甾體抗炎藥相當，而在脊神經結紮模型中，苄基吼嗪生產的止痛作用與加巴噴丁與美西律相當。與中樞神經系統滲透化合物加巴噴丁和美西律不同，苄基吼嗪並沒有引起任何運動協調功能障礙。

結論：這些資料表明，經外周作用的鈉通道阻滯劑，首先通過 Nav1.7 發生作用，可緩解慢性臨床疼痛，且不引起目前疼痛治療中常見的中樞神經系統副作用。
（楊秋娟　譯　陳傑　校）

BACKGROUND: Voltage-gated sodium channels (Na_v1) are expressed in primary sensory neurons where they influence excitability via their role in the generation and propagation of action potentials. Recently, human genetic data have shown that one sodium channel subtype, $Na_v1.7$, plays a major role in pain. We performed these studies to characterize the antinociceptive effects of *N*-[(*R*)-1-((*R*)-7-chloro-1-isopropyl-2-oxo-2,3,4,5-tetrahydro-1*H*-benzo[*b*]azepin-3-ylcarbamoyl)-2-(2-fluorophenyl)-ethyl]-4-fluoro-2-trifluoromethyl-benzamide (BZP), a non-central nervous system (CNS) penetrant small molecule with high affinity and preferential selectivity for $Na_v1.7$ over $Na_v1.8$ and $Na_v1.5$.
METHODS: BZP was evaluated in rat preclinical models of inflammatory and neuropathic pain and compared with standard analgesics. Two models were used: the complete Freund's adjuvant model of inflammatory pain and the spinal nerve ligation model of neuropathic pain. BZP was also evaluated in a motor coordination assay to assess its propensity for CNS side effects.
RESULTS: In preclinical models of chronic pain, BZP displayed efficacy comparable with that of leading analgesics. In the complete Freund's adjuvant model, BZP produced reversal of hyperalgesia comparable with nonsteroidal antiinflammatory drugs, and in the spinal nerve ligation model, BZP produced reversal of allodynia comparable with gabapentin and mexiletine. Unlike the CNS penetrant compounds gabapentin and mexiletine, BZP did not induce any impairment of motor coordination.
CONCLUSIONS: These data suggest that a peripherally acting sodium channel blocker, preferentially acting through $Na_v1.7$, could provide clinical relief of chronic pain without the CNS side effects typical of many existing pain treatments.

全髖關節成形術後細胞因數基因表達：手術部位與迴圈中的嗜中性粒細胞反應

Cytokine Gene Expression After Total Hip Arthroplasty: Surgical Site versus Circulating Neutrophil Response

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Anesth Analg 2009 109: 959-964.

背景：術後細胞因數和趨化因數在手術創口部位釋放，導致術後疼痛，局部炎症，和組織修復。傷口部位多種類型細胞能釋放細胞因數/趨化因數，然而，這些分子的確切細胞來源還不清楚。作者希望能更好的瞭解在全髖關節術後最初階段，嗜中性粒細胞對細胞因數/趨化因數在手術傷口部位基因表達的作用。
方法：收集了 6 位經歷過標準全髖關節成形術後 24 小時內的關節引流液。另外，採集術前和術後 24 小時的靜脈血。將嗜中性粒細胞分離，萃取全部 RNA，生成生物標記 cRNA 探針。探針和包括將近 100 個寡核苷連續表達各

種各樣人類的細胞因數/趨化因數或者受體蛋白的微矩陣 cDNA 雜交。在微矩陣中證實可以看見基因表達的各種改變是通過逆轉錄集合酶鏈反應。
結果：在分析關節引流嗜中性粒細胞的微矩陣中，和術前血中的嗜中性粒細胞相比，白細胞介素-1 受體對抗劑(IL1RN)，白細胞介素-18 受體 1 (IL18R1)，巨噬細胞移動抑制因數(MIF)，巨噬細胞炎性蛋白 3α(CCL20)上調，但是，白細胞介素-8 受體 β (IL8RB/CXCR2)卻始終是下調的。所有的這些改變被證實是由逆轉錄聚合酶鏈反應引起的。
結論：和術前迴圈中的嗜中性粒細胞相比，全髖關節成形術後 24 小時內，傷口部位中的嗜中性粒細胞有明顯的細胞因數基因表達。當我們知道這些改變以後，我們就可以在不削弱傷口癒合的情況下，通過控制嗜中性粒細胞的活性來減少術後疼痛和炎症。
（陳靈科　譯　陳傑　校）
BACKGROUND: After surgery, cytokines and chemokines are released at the surgical wound site, which can contribute to postoperative pain, local inflammation, and tissue repair. Multiple cell types are present that can release cytokines/chemokines at the wound site and, thus, the exact cellular source of these molecules is unclear. We sought to better understand the contribution of neutrophils to cytokine/chemokine gene expression at the surgical wound site during the initial postsurgery phase of total hip arthroplasty (THA).
METHODS: Hip drain fluid was collected at 24 h postsurgery from six patients undergoing standardized THA. In addition, venous blood was collected presurgery and 24 h postsurgery. Neutrophils were isolated, total RNA extracted, and a biotinylated cRNA probe generated. The probes were hybridized with a cDNA microarray containing approximately 100 oligonucleotide sequences representing various human cytokines/chemokines or receptor genes. Changes in gene expression seen in the microarray were verified by reverse transcription polymerase chain reaction.
RESULTS: In the microarray analysis of hip drain neutrophils, interleukin-1 receptor antagonist (IL1RN), interleukin-18 receptor 1 (IL18R1), macrophage migration inhibitory factor (MIF), and macrophage inflammatory protein 3α (CCL20) were upregulated, whereas interleukin-8 receptor β (IL8RB/CXCR2) was consistently downregulated, compared with presurgery blood neutrophils. All of these changes were confirmed by reverse transcription polymerase chain reaction.
CONCLUSION: There is a distinct cytokine gene expression profile in neutrophils at the THA surgical wound site at 24 h postsurgery when compared with that found in presurgery circulating neutrophils. Understanding these changes may allow us to knowledgeably manipulate neutrophil activity to reduce postoperative pain and inflammation without impairing wound healing.

區域麻醉應用於血管通路手術

Regional Anesthesia for Vascular Access Surgery
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背景：大約 25%的最初的動靜脈瘺(AVF)建立術失敗是由於血栓的形成或是不能建立適當的動靜脈管徑和合適的血流量。瘺道的形成受病人個體差異和

手術技術的影響，但是增加靜脈直徑和提高瘺內血流量是作爲一個成功的動靜脈瘺手術最重要的因數。在血管外科手術使用的麻醉技術（局監，區域阻滯，和全身麻醉）可以影響這些因素和瘺的失功。

方法：作者在 PubMed/ MEDLINE 資料庫中使用關鍵字進行文獻檢索。七篇文章提到了麻醉對動靜脈瘺建立的作用，包括交感神經阻滯，靜脈擴張，血流速率，不良預後，或通暢率，本文對其綜述。

結果：區域阻滯後血管擴張可見在頭靜脈及貴要靜脈。血管舒張的特點有助瘺的選址。在術中和術後，使用區域阻滯，與其他麻醉方法相比，可以明顯增加瘺血流量。較強的交感神經阻滯促進血管擴張，降低血管痙攣。在動靜脈瘺建立中使用區域阻滯技術產生了更短的瘺形成時間，更低的失敗率，以及較高的通暢率。

結論：區域阻滯產生顯著的血管擴張，增加瘺血流量，如交感神經的影響，從而提高血管通道手術的成功率及縮短瘺形成時間。然而，在比較不同麻醉方法之間的差異，我們還需要一個大規模，前瞻性的臨床試驗來驗證這些結果。

（張蕾　譯　陳傑　校）

BACKGROUND: Approximately 25% of initial arteriovenous fistula (AVF) placements will fail as a result of thrombosis or failure to develop adequate vessel size and blood flow. Fistula maturation is impacted by patient characteristics and surgical technique, but both increased vein diameter and high fistula blood flow rates are the most important predictors of successful AVFs. Anesthetic techniques used in vascular access surgery (monitored anesthesia care, regional blocks, and general anesthesia) may affect these characteristics and fistula failure.

METHODS: We performed a literature search using key words in the PubMed/ MEDLINE database. Seven articles that related to the effects of anesthesia on AVF construction, including sympathetic block, vein dilation, blood flow, adverse outcomes, or patency rates, comprised the sources for this review.

RESULTS: Significant vasodilation after regional block administration is seen in both the cephalic and basilic veins. These vasodilatory properties may assist with AVF site selection. In the intraoperative and postoperative periods, use of a regional block, compared with other anesthetic techniques, resulted in significantly increased fistula blood flow. The greater sympathetic block contributed to vessel dilation and reduced vasospasm. Use of regional techniques in AVF construction yielded shorter maturation times, lower failure rates, and higher patency rates.

CONCLUSION: Use of regional blocks may improve the success of vascular access procedures by producing significant vasodilatation, greater fistula blood flow, sympathectomy-like effects, and decreased maturation time. However, a large-scale, prospective, clinical trial comparing the different anesthetic techniques is still needed to verify these findings.

腹橫肌平面阻滯的解剖研究：Petit 腰部三角及鄰近神經的定位

An Anatomical Study of the Transversus Abdominis Plane Block: Location of the Lumbar Triangle of Petit and Adjacent Nerves

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背景：腹横肌區域（TAP）阻滯是爲前腹壁鎮痛的一項新技術。以往很多的研究都以 Petit 腰三角作爲阻滯的標誌。在本次屍體解剖中，作者確定了 Petit 腰三角的精確位置和大小，並找出了 TAP 阻滯所影響的神經。

方法： 26 具屍體標本可捫及可靠的表面標誌來估計單側 Petit 腰三角位置。同時，也通過一系列的解剖來暴露 TAP 阻滯的神經。

結果：沿著腋中線，髂脊到 Petit 腰三角底端中點的平均距離在皮下組織水準是 6.9cm（範圍 4.5-9.2cm），相應的，在皮膚表面則是 9.3cm（範圍 4-15.1cm）。Petit 腰三角中點距髂脊 1.4cm。在 Petit 腰三角方位，TAP 的深度爲 0.5-4cm，而在腋中線爲 0.5-2cm。Petit 腰三角的平均大小是 2.3cm*3.3cm*2.2cm，其平均面積爲 3.63 ± 1.93 cm^2 。在我們解剖的三具屍體標本中 TAP 阻滯的神經經側支（與）腰三角（相連）。偶然發現 66%的標本其 Petit 腰三角都包含了肋下動脈的小分支。

結論：在本項研究中，這些標本的 Petit 腰三角（位置）比文獻記載的要稍後。Petit 腰三角位置變異很大且面積較小。本研究中在 Petit 腰三角被阻滯的相關神經並未進入腹横肌區域。相對的，在腋中線上，所有的神經都進入了腹横肌區域。

（鄒巧群　譯　陳傑　校）

BACKGROUND: The transversus abdominis plane (TAP) block is a new technique for providing analgesia to the anterior abdominal wall. Most previous studies have used the lumbar triangle of Petit as a landmark for the block. In this cadaveric study, we determined the exact position and size of the lumbar triangle of Petit and identified the nerves affected by the TAP block.

METHODS: The position of the lumbar triangle of Petit was assessed unilaterally in 26 cadaveric specimens relative to reliably palpable surface landmarks. In addition, a series of dissections were performed to explore the course of the nerves blocked by the TAP.

RESULTS: The mean distance from the midaxillary line along the iliac crest to the center of the base of the lumbar triangle of Petit at the level of the subcutaneous tissue and over the skin surface was 6.9 cm (range, 4.5–9.2 cm) and 9.3 cm (range, 4–15.1 cm), respectively. The center of the lumbar triangle of Petit was 1.4 cm above the iliac crest. The depth of the TAP at the lumbar triangle of Petit position was 0.5–4 cm and at the midaxillary line it was 0.5–2 cm. The average size of the lumbar triangle of Petit was 2.3 cm x 3.3 cm x 2.2 cm, with an average area of 3.63 ± 1.93 cm^2. The three cadaveric specimens we explored showed the nerves blocked by TAP passed lateral to the triangle. An incidental finding was that in 66% of specimens the lumbar triangle of Petit contained small branches of the subcostal artery.

CONCLUSIONS: The lumbar triangles of Petit found in the specimens in this study were more posterior than the literature suggests. The position of the lumbar triangle of Petit varies largely and the size is relatively small. The relevant nerves to be blocked had not entered the TAP in the specimens in this study at the point of the lumbar triangle of Petit. At the midaxillary line, however, all the nerves were in the TAP.

關於兒童圍手術期應用視覺類比量表（VAS）—焦慮心理測試有效性的研究——臨床實踐常規中使術後疼痛管理最優化的一個特定有用的工具

The Perioperative Validity of the Visual Analog Anxiety Scale in Children: A Discriminant and Useful Instrument in Routine Clinical Practice to Optimize Postoperative Pain Management

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背景：由於兒童的焦慮情緒會影響其對疼痛的感知，因此在臨床實踐中應該有一個特定的、有用的、準確度高的工具來評估圍手術期的焦慮情緒，從而優化疼痛管理。在本次研究中，我們應用視覺類比量表（VAS）——焦慮心理測試對兒童的情緒進行評估，並研究其在臨床實踐中的圍手術期相關性。

方法：100 位行擇期全麻手術的兒童被納入研究範圍。在四個時間點進行測量，將視覺類比量表（VAS）——焦慮測試結果與以下三個量表測量結果做對比，包括兩個版本的 Spielberger 心理狀態問卷調查（青年焦慮品質狀態調查表[STAIY]和兒童焦慮品質狀態調查表[STAIC]）以及 Yale 圍手術期焦慮量表修訂版。另外用視覺類比量表（VAS）對兒童的疼痛、父母的焦慮情緒以及父母代表兒童所表述的焦慮情緒進行評估。

結果：兒童焦慮品質狀態調查表[STAIC]與視覺類比量表（VAS）——焦慮測試兩者間的相關性在出院當日最爲明顯。兒童焦慮品質狀態調查表[STAIC]不同時間點間的變化並不十分明顯，而視覺類比量表（VAS）——焦慮測試不同時間點間的變化在 7-11 歲和 12-16 歲這兩個年齡組的敏感度尤爲高。參考 Yale 圍手術期焦慮量表修訂版，將視覺類比量表（VAS）——焦慮測試的受試者特徵性曲線上 30 定義爲區分焦慮嚴重與否的截止點。當兒童在術後焦慮時（VAS >=30），疼痛水準也明顯增加。而且當父母焦慮時，兒童的焦慮以及疼痛將更加嚴重。

結論：對於 7-16 歲的兒童而言，視覺類比量表（VAS）——焦慮測試是一個評估圍手術期焦慮情緒非常有用且準確度高的工具。由於兒童及父母的焦慮情緒對於兒童術後疼痛會產生影響，因此建議推薦術後臨床實踐中常規使用視覺類比量表（VAS）——焦慮測試，從而使焦慮情緒以及疼痛達到最優化的處理。（單嘉琪譯 薛張綱校）

BACKGROUND: Because children's anxiety influences pain perception, perioperative anxiety should be evaluated in clinical practice with a unique, useful, and valid tool to optimize pain management. In this study, we evaluated psychometric properties of the visual analog scale (VAS)-anxiety for children and to study its perioperative relevance in clinical practice.

METHODS: One hundred children scheduled for elective surgery and general anesthesia were included. VAS-anxiety was measured at four timepoints and compared with both versions of State Spielbergers' questionnaires (State-Trait Anxiety Inventory for Youth [STAIY] and State-Trait Anxiety Inventory for Children

[STAIC]) and the modified Yale Preoperative Anxiety Scale. Children's pain, parents' anxiety, and parents' proxy report of children's anxiety were evaluated using VAS. **RESULTS:** The correlation between STAIC and VAS-anxiety was significant on the day of discharge. Moreover, changes over time were not significant with STAIC, whereas VAS-anxiety was significantly sensitive to changes over time in the two groups of age (7-11 yr and 12-16 yr). A receiver operating characteristic curve, using modified Yale Preoperative Anxiety Scale as reference, determined a VAS-anxiety cutoff at 30 to identify high-anxiety groups. Pain levels were significantly higher when children were anxious (VAS >=30) in the postoperative period. Moreover, children's anxiety and pain were higher when parents were anxious. **CONCLUSION**: VAS-anxiety is a useful and valid tool to assess perioperative anxiety in children aged 7-16 yr. The influence of children's and parents' anxiety on children's postoperative pain suggests that VAS-anxiety should be recommended routinely for postoperative clinical practice to optimize anxiety and pain management.

常規使用鼻胃管不減少術後噁心與嘔吐

Routine use of nasogastric tubes does not reduce postoperative nausea and vomiting.

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雖然現有的資料資料不相一致，但人們仍建議通過常規使用鼻胃管來預防術後的噁心與嘔吐。爲此，此項研究對該假說進行了檢驗，即常規使用鼻胃管並不減少術後噁心嘔吐的發生。本研究基於的資料資料源於一包含 4055 名患者的大

型試驗，其最初被設計用於量化聯合止吐療法對於預防術後噁心嘔吐的效力。分析則採用傾向性評分對病例進行匹配以確保各組基線因素間相互可比。將術中和圍手術期使用鼻胃管的患者分別與不使用鼻胃管的病患按各自所存在的潛在混雜因素進行匹配。運用傾向性評分確定匹配的爲 1032 名術中使用或不使用鼻胃管的患者和 176 名圍手術期使用或不使用鼻胃管的病患。在術中組中，使用和不使用鼻胃管的患者其術後噁心嘔吐的發生率分別爲 44.4%和 41.5%（P=0.35），近似地，圍手術期組爲 27.8%和 31.3%（P=0.61）。根據研究結果所提供的證據表明常規使用鼻胃管並不減少術後噁心嘔吐的發生率。
（范羽譯 薛張綱校）

Routine use of a nasogastric (NG) tube has been suggested to prevent postoperative nausea and vomiting (PONV) despite conflicting data. Accordingly, we tested the hypothesis that routine use of a NG tube does not reduce PONV. Our work is based on data from a large trial of 4055 patients initially designed to quantify the effectiveness of combinations of antiemetic treatments for the prevention of PONV. This analysis uses propensity scores for case matching to ensure group comparability on baseline factors. Intraoperative NG tube use patients and perioperative NG tube use patients were respectively matched to nonuse patients on all available potential confounders. Matched-pairs were identified using propensity scores for 1032 patients with or without intraoperative NG tube use and 176 patients with or without perioperative NG tube use. The incidences of PONV in the intraoperative group were 44.4% vs 41.5% (P = 0.35) with and without tube use, respectively, and 27.8% vs 31.3% (P = 0.61) in the perioperative group. Our results provide evidence that routine use of a NG tube does not reduce the incidence of PONV.

肥胖病人中羅庫溴銨用量應該依照實際體重還是理想體重？

Should dosing of rocuronium in obese patients be based on ideal or corrected body weight?

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背景：藥代動力學研究表明肥胖病人的羅庫溴銨用量應該按照理想體重計算。但是這有可能會造成藥物起效時間延長以及氣管插管條件下降。本次研究中，我們比較了在肥胖病人中，三種不同插管劑量下，羅庫溴銨的起效時間，插管條件以及維持時間。

方法：研究物件爲擇期行腹腔鏡下胃囊帶術或胃旁路術的肥胖病人。平均體重均數爲44(34-72)/kg/m2。麻醉採用丙泊酚複合瑞芬太尼。將41名研究物件隨機分爲三組各17名。第一組病人按理想體重給予0.6mg/kg的劑量。第二組17按理想體重的120%給予0.6mg/kg的羅庫溴銨，第三組按理想體重的140%給予劑量。按照理想體重的140%計算，丙泊酚給予200mg的負荷劑量後按5mg/kg/h的速率輸注;瑞芬太尼按1ug/kg/min的速率輸注。神經肌肉傳導功能用四連串神經刺激

以及加速度法監測。將四連串神經刺激後出現第四個震顫的時間定義爲作用持續時間，並將其作爲主要的終止標準。
結果：三組的平均作用時間分別爲32(18-49)分鐘，38(25-66)以及42(24-66)。在理想體重組和140%理想體重組間有顯著性差異P=0.001。起效時間(85s,84s,80s)及90s後插管條件在三組間沒有顯著差異。
結論：行胃囊帶術或胃旁路術的肥胖病人中，按理想體重計算給予羅庫溴銨可以提供較短的作用時間而不會明顯的影響起效時間及氣管插管條件。
（黃劍譯 薛張綱校）

BACKGROUND: Pharmacokinetic studies in obese patients suggest that dosing of rocuronium should be based on ideal body weight (IBW). This may, however, result in a prolonged onset time or compromised conditions for tracheal intubation. In this study, we compared onset time, conditions for tracheal intubation, and duration of action in obese patients when the intubation dose of rocuronium was based on three different weight corrections.
METHODS: Fifty-one obese patients, with a median (range) body mass index of 44 (34-72) kg/m2, scheduled for laparoscopic gastric banding or gastric bypass under propofol-remifentanil anesthesia were randomized into three groups. The patients received rocuronium (0.6 mg/kg) based on IBW (IBW group, n = 17), IBW plus 20% of excess weight (corrected body weight [CBW]20% group, n = 17), or IBW plus 40% of excess weight (CBW40% group, n = 17). Propofol was administered as a bolus of 200 mg and an infusion at 5 mg x kg(-1) x h(-1) and remifentanil was administered at 1.0 microg x kg(-1) x min(-1), both according to CBW40%. Neuromuscular function was monitored with train-of-four nerve stimulation and acceleromyography. The primary end point was duration of action, defined as time to reappearance of the fourth twitch in train-of-four.
RESULTS: The median (range) duration of action was 32 (18-49), 38 (25-66), and 42 (24-66) min in the IBW, CBW20%, and CBW40% groups, respectively (P = 0.001 for comparison of the IBW and CBW40% group). There were no significant differences in onset time (85 vs 84 vs 80 s) or in intubation conditions 90 s after administration of rocuronium.
CONCLUSIONS: In obese patients undergoing gastric banding or gastric bypass, rocuronium dosed according to IBW provided a shorter duration of action without a significantly prolonged onset time or compromised conditions for tracheal intubation.

前瞻性調查：上唇咬診試驗結合 SMD、TMD 和 IID 對於預估喉鏡檢查和插管法的診斷價值

The diagnostic value of the upper lip bite test combined with sternomental distance, thyromental distance, and interincisor distance for prediction of easy laryngoscopy and intubation: a prospective study.

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背景：上唇咬診試驗(ULBT)準確性與 Mallampati 氣道分級的比較。在這項研究中，我們調查 ULBT 分別與 sternomental 距離(SMD)，甲頦距離(TMD)和 interincisor 距離(IID)組合或聯合評分相對於單獨測試是否能提高對喉鏡檢查和插管法的預估能力。
方法：在一個前瞻性調查中，隨機選擇了 380 名預定行外科手術的患者並予以登記。在麻醉誘導前，進行氣道評估，ULBT 分類並測定 SMD、TMD 和 IID。誘導後進行喉鏡檢查，根據 Cormack 和 Lehane 分級系統分級，並定義等級 3 和 4 爲“困難氣道”。通過使用接收器運行特徵分析，計算出了測試的最佳分界點。終於，這些測試和他們與 ULBT 組合的敏感性、特異性、確定性和消極性的預估價值和準確性被計算了。
結果：困難插管率爲 5%（19 例）。ULBT 三級，IID＜4.5 釐米，TMD＜6.5 釐米和 SMD＜13 釐米定義爲預估的困難插管。他們對困難插管的評估無統計學差異（P＜0.05），但是這些試驗和喉鏡檢查有顯著差異（P＜0.05，Mc-Nemar test）。ULBT 的特異性和準確性均顯著高於單獨的 TMD,SMD 和 IID（特異性分別爲 91.69%，82.27%，70.64%和 82.27%，準確率分別爲 91.05%，71.32%，81.84%和 76.58%分別）。ULBT 和 SMD 結合可得到最高的靈敏度。
結論：我們的結論是 ULBT 的特異性及準確度大大高於其他測試，可更準確地進行氣道評估。但是，ULBT 聯合其他測試可以更可靠地預測喉鏡檢查和插管。
（李瑩譯 薛張綱校）

BACKGROUND: Accuracy of upper lip bite test (ULBT) has been compared with the Mallampati classification. In this study, we investigated whether the combination of the ULBT classification with sternomental distance (SMD), thyromental distance (TMD), and interincisor distance (IID) or a composite score can improve the ability to predict easy laryngoscopy and intubation compared with each test alone.
METHODS: In a prospective study, 380 patients who were scheduled for elective surgery were selected randomly and enrolled in the study. Before inducing anesthesia, the airways were assessed, and ULBT class, SMD, TMD, and IID determined. Laryngoscopic view according to the Cormack and Lehane grading system was determined after induction of anesthesia and Grades 3 and 4 defined as "difficult intubation." By using receiver operating characteristic analysis, the best cutoff points of the tests were calculated. Finally, sensitivity, specificity, positive and negative predictive values and accuracy of these tests and their combinations with the ULBT were calculated.
RESULTS: The prevalence of difficult intubation was 5% (n = 19). Class III ULBT, IID <4.5 cm, TMD <6.5 cm, and SMD <13 cm were defined as predictors of difficult intubation. There was no significant difference regarding difficult intubation based on gender (P < 0.05), whereas there were significant differences between the older tests and laryngeal view (P < 0.05, Mc-Nemar test). Specificity and accuracy of the ULBT were significantly higher than TMD, SMD, and IID individually (specificity was 91.69%, 82.27%, 70.64%, and 82.27%, respectively, and accuracy was 91.05%, 71.32%, 81.84%, and 76.58%, respectively). The combination of the ULBT with SMD provided the highest sensitivity.
CONCLUSION: We conclude that the specificity and accuracy of the ULBT is significantly higher than the other tests and is more accurate in airway assessment. However, the ULBT in conjunction with the other tests could more reliably predict easy laryngoscopy or intubation.

維持或停止生命支援的實踐和病史記錄：荷蘭兩個重症監護室的回顧性分析

The Practice of and Documentation on Withholding and Withdrawing Life Support: A Retrospective Study in Two Dutch Intensive Care Units

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目標：重症監護室中死亡或出重症監護室早期死亡的患者，是由我們決定何時繼續生命支持何時停止生命支持，並且評估病史來決定是否改變生命支持方面的醫囑。

方法：這是一所大學附屬醫院和一所綜合性教學醫院的回顧性研究。該研究分析了 2005 年死於重症監護室或出重症監護室 7 天內死亡的病例。

結果：2578 例重症監護室病人中，356 例（14%）在監護室死亡或是出監護室 7 天內死亡。9 位元病人的資料缺失，剩下 347 例病人資料可供分析。77 位病人（22%）死時有完整的生命支持，，85 例（25%）死時仍維持治療，185 例（53%）死時治療措施正被撤離。266 位病人（77%）的一項或多項生命支持方面的醫囑有變動。但只有 8%的病人在改變醫囑後被記錄下了能力下降。病人生命支持方面的優先度只在不到四分之一的病例中有記錄。近三分之一的病例裏沒有提到哪一個治療小組參與了撤除病人生命支持的決定。在有記錄的病例裏，7%是與病人共同決定的，59%是與病人家屬共同決定的。

結論：重症監護室死亡及出重症監護室後短期死亡的患者主要與與維持或撤離生命支持相關。放棄所有生命支援的決定的病史記錄非常不足。

（姚敏敏譯 薛張綱校）

OBJECTIVE: We determined how often life support was withheld or withdrawn in patients who died in the intensive care unit (ICU) or early after ICU discharge and evaluated documentation on decisions regarding these changes in life support orders.

METHODS: This was a retrospective study in a university hospital and a general teaching hospital. Charts of patients who died during ICU stay or within 7 days after ICU discharge in 2005 were reviewed.

RESULTS: Of 2578 admitted patients, 356 patients (14%) died either in the ICU or within 7 days after ICU discharge. For 9 patients data were missing, leaving 347 patients for analysis. Seventy-seven patients (22%) died with full life support, 85 (25%) died while treatment was being withheld, and 185 (53%) patients died while treatment was being withdrawn. One or more changes in life support orders were noted in 266 patients (77%). Only 8% of the patients were recorded to be incapacitated at the time of the change. Patients' preferences regarding life support were documented in less than one-quarter of cases. In approximately one third of cases, it was not documented which member(s) of the ICU team were involved in an end-of-life decision. In the documented cases, end-of-life decisions were made along with the patient (7%) or with the patient's representatives (59%).

CONCLUSION: ICU nonsurvivors and patients who die shortly after ICU discharge predominantly die with orders to withhold or withdraw life support. Documentation on the decisions to forgo full life support is poor.

創傷病人緊急氣管內插管的成功案例：一家重要成人創傷轉診中心的 10 年經驗

The Success of Emergency Endotracheal Intubation in Trauma Patients: A 10-Year Experience at a Major Adult Trauma Referral Center

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Anesth Analg 2009 109: 866-872.

背景：緊急氣道管理對於很多麻醉醫生來說是一項必需的技術。我們研究了一流創傷中心的 10 年經驗，來判定在入院最初 24 小時內氣管插管嘗試的結果。
方法：我們檢查了從 1996 年 7 月到 2006 年 6 月創傷掛號，品質管制和賬目管理記錄，得出入院 1 小時內需要氣管插管的病人數量，從而估計在最初 24 小時內需要氣管插管的病人數量。我們回顧了建立外科氣道（氣管切開或環甲膜切開）的病人資料，瞭解這些病人當時的特徵和他們不能經口或經鼻插管的原因。
結果：所有的插管嘗試都在對創傷病人處理有經驗的麻醉醫生的監督下完成。在整個研究期間，用直接喉鏡快速序貫誘導插管作爲標準的途徑。入院後第一個小時內，6088 個病人接受了插管，其中 21 個（0.3%）建立了外科氣道。在最初的 24 小時內，共進行了大約 32000 次插管嘗試，總共 31 名病人建立了外科氣道。未預料的上呼吸道解剖異常造成的困難氣道是外科氣道建立的主要原因。31 個病人中的 4 個死于外傷，無人因爲插管失敗死亡。
結論：對於有經驗的麻醉醫生來說，快速序貫誘導後用直接喉鏡插管是緊急氣道管理非常有效的途徑。一個據此設計的公式可以取得高水準的成功。
（俞佳譯 薛張綱校）

BACKGROUND: Emergency airway management is a required skill for many anesthesiologists. We studied 10 yr of experience at a Level 1 trauma center to determine the outcomes of tracheal intubation attempts within the first 24 h of admission.
METHODS: We examined Trauma Registry, quality management, and billing system records from July 1996 to June 2006 to determine the number of patients requiring intubation within 1 h of hospital arrival and to estimate the number requiring intubation with the first 24 h. We reviewed the medical record of each patient in either cohort who underwent a surgical airway access procedure (tracheotomy or cricothyrotomy) to determine the presenting characteristics of the patients and the reason they could not be orally or nasally intubated.
RESULTS: All intubation attempts were supervised by an anesthesiologist experienced in trauma patient care. Rapid sequence intubation with direct laryngoscopy was the standard approach throughout the study period. During the first hour after admission, 6088 patients required intubation, of whom 21 (0.3%) received a surgical airway. During the first 24 h, 10 more patients, for a total of 31, received a

surgical airway, during approximately 32,000 attempts (0.1%). Unanticipated difficult upper airway anatomy was the leading reason for a surgical airway. Four of the 31 patients died of their injuries but none as the result of failed intubation.
CONCLUSIONS: In the hands of experienced anesthesiologists, rapid sequence intubation followed by direct laryngoscopy is a remarkably effective approach to emergency airway management. An algorithm designed around this approach can achieve very high levels of success.

長效局麻藥減弱實驗鼠身上 FMLP 導致的急性肺損傷

Long-Acting Local Anesthetics Attenuate FMLP-induced Acute Lung Injury in Rats

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背景：內皮素—1 是一種肺部疾病介質和強烈的肺血管收縮劑。它是除了血栓烷 A2 外的另一個參與肺水腫形成的介質。利多卡因和甲派卡因都減少肺動脈壓的升高和肺水腫的發展。我們試驗了普魯卡因、布比卡因和羅呱卡因在實驗引起的 PAP 升高和 ET－1 釋放中所起的效果。
方法：在實驗鼠肺部灌注賀氏羥乙基澱粉溶液時測量 PAP 和肺品質。溶液中加入 10–2–10–7 mg/kg 的布比卡因、羅呱卡因或普魯卡因。用酶免疫試驗測量灌流液中的 ET－1 水準，用放免法測量血栓烷 A2 的水準。n -甲醯- l -亮氨酸-甲硫基- l -苯丙氨酸用來啓動人類中性粒細胞。
結果：布比卡因、羅呱卡因和普魯卡因顯著地減少了 PAP 的增加（P < 0.05）並且治療組與假設組相比較肺品質減少了 P < 0.05)。長效局麻藥布比卡因和羅呱卡因而非普魯卡因可減少 ET－1 的水準，產生低的炎症速度，且在 10–3 to 10–6 mg/kg 的劑量範圍內不影響肺結構。
結論：布比卡因和羅呱卡因減少 n -甲醯- l -亮氨酸-甲硫基- l -苯丙氨酸誘發的肺動脈高壓，減少肺水腫，減少 ET－1 釋放。利多卡因和甲派卡因在降低肺動脈壓和減少肺水腫形成上更有效，但長效局麻藥還抑制 ET－1 的耗竭因而增加了抗炎性。
（張玥琪譯 薛張綱校）
BACKGROUND: Endothelin-1 (ET-1) is a mediator of lung diseases and a potent pulmonary vasoconstrictor. In addition to thromboxane A2, it participates in the formation of lung edema. Both lidocaine and mepivacaine attenuate the increase of pulmonary arterial pressure (PAP) and lung edema development. We examined the effects of procaine, bupivacaine, and ropivacaine on experimentally evoked PAP increase and ET-1 release.

METHODS: PAP and lung weight were measured in isolated rat lungs during perfusion with Krebs-Henseleit hydroxyethyl starch buffer. Bupivacaine, ropivacaine, or procaine was added to the solution at concentrations of 10–2–10–7 mg/kg. ET-1 levels were measured in the perfusate by enzyme-immunoassay, and thromboxane A2 levels were assayed by radioimmunoassay. N-formyl-l-leucine-methionyl-l-phenylalanine was used to activate human polymorphonuclear neutrophils.
RESULTS: Bupivacaine, ropivacaine, and procaine significantly attenuated increases of PAP ($P < 0.05$) and resulted in a reduction of lung weight in these treatment groups compared with the sham group ($P < 0.05$). The long-acting anesthetics bupivacaine and ropivacaine ($P < 0.05$), but not procaine, reduced ET-1 levels, produced low inflammation rates, and did not affect lung structures at doses from 10–3 to 10–6 mg/kg.
CONCLUSION: Bupivacaine and ropivacaine attenuated N-formyl-l-leucine-methionyl-l-phenylalanine-induced PAP, reduced lung edema, and diminished ET-1 release. Lidocaine and mepivacaine are more effective in reducing PAP and edema formation, but long-acting local anesthetics also inhibit ET-1 depletion and therefore have increased anti-inflammatory properties.

深低溫可減緩心搏停止後大鼠的小神經膠質細胞的增殖但不影響神經細胞死亡

Deep hypothermia attenuates microglial proliferation independent of neuronal death after prolonged cardiac arrest in rats.

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引言：對於失血性心搏驟停患者進行常規復蘇往往無法成功。新的急救措施是通過對心搏驟停病人進行主動脈衝洗誘導深低體溫，進而通過體外迴圈實施後期復蘇。一系列顱腦損傷模型證明米諾環素可降低小神經膠質細胞活性而具有神經保護功能。我們假設深低體溫和米諾環素可通過減慢神經細胞死亡和小神經膠質細胞的活性來改善大鼠失血性心搏停止的預後。
方法：在異氟醚麻醉下，使大鼠處於致命的失血性休克狀態。在心搏停止 5 分鐘後，通過主動脈衝洗誘導低體溫。分爲三組進行研究：用冰預冷的沖洗液組（IC），與室溫相同的沖洗液組（RT），先用米諾環素治療後再使用與室溫相同的沖洗液組（RT-M）。在心搏停止 20 分鐘後，通過體外迴圈來完成復蘇。評估 72 小時後的生存數量，總體情況分類(1 = 正常, 5 = 死亡)，神經功能缺損評分(0%-10% = 正常, 100% = 最大缺損)，神經細胞死亡情況(Fluoro-Jade C 方法)和小神經膠質細胞增生情況（Iba1 免疫染色）。
結果：IC 組的大鼠與其他組相比在心搏停止期具有較低的鼓膜溫度（IC, 20.9 攝氏度 +/- 1.3 攝氏度; RT, 28.4 攝氏度 +/- 0.6 攝氏度; RT-M, 28.3 攝氏度 +/- 0.7 攝氏度; $P < 0.001$)。儘管生存數量在各組相似(RT, 6/9; IC, 6/7; RT-M, 6/11)，但在神經預後方面 IC 組優於其他組（總體情況分類：IC, 1 +/- 1; RT, 3 +/- 1; RT-

M, 2 +/- 1; P < 0.05;神經功能缺損評分：IC, 8% +/- 9%; RT, 55% +/- 19%; RT-M, 27% +/- 16%; P < 0.05).評估倖存者的組織損傷發現在海馬 CA1 區和齒狀回的選擇性神經壞死在各組相似(P = 0.15)。各組相比，IC 組可明顯減緩小神經膠質細胞的增殖 (P < 0.01)。

結論：在倖存者中，IC 組誘導的深度低體溫較 RT 組可帶來更好的神經預後。深低體溫可減弱小神經膠質細胞活性卻不減緩海馬神經細胞的死亡。米諾環素對倖存者的神經預後有一定的益處，但是並不減緩大腦小神經膠質細胞的活性。我們的研究結果表明甚低體溫可影響失血性心搏停止後小神經膠質細胞的增殖。

（張釗譯 薛張綱校）

INTRODUCTION: Conventional resuscitation of exsanguination cardiac arrest (CA) victims is generally unsuccessful. Emergency preservation and resuscitation is a novel approach that uses an aortic flush to induce deep hypothermia during CA, followed by delayed resuscitation with cardiopulmonary bypass. Minocycline has been shown to be neuroprotective across a number of brain injury models via attenuating microglial activation. We hypothesized that deep hypothermia and minocycline would attenuate neuronal death and microglial activation and improve outcome after exsanguination CA in rats.

METHODS: Using isoflurane anesthesia, rats were subjected to a lethal hemorrhagic shock. After 5 min of no flow, hypothermia was induced with an aortic flush. Three groups were studied: ice-cold (IC) flush, room-temperature (RT) flush, and RT flush followed by minocycline treatment (RT-M). After 20 min of CA, resuscitation was achieved via cardiopulmonary bypass. Survival, Overall Performance Category (1 = normal, 5 = death), Neurologic Deficit Score (0%-10% = normal, 100% = max deficit), neuronal death (Fluoro-Jade C), and microglial proliferation (Iba1 immunostaining) in hippocampus were assessed at 72 h.

RESULTS: Rats in the IC group had lower tympanic temperature during CA versus other groups (IC, 20.9 degrees C +/- 1.3 degrees C; RT, 28.4 degrees C +/- 0.6 degrees C; RT-M, 28.3 degrees C +/- 0.7 degrees C; P < 0.001). Although survival was similar in all groups (RT, 6/9; IC, 6/7; RT-M, 6/11), neurological outcome was better in the IC group versus other groups (Overall Performance Category: IC, 1 +/- 1; RT, 3 +/- 1; RT-M, 2 +/- 1; P < 0.05; Neurologic Deficit Score: IC, 8% +/- 9%; RT, 55% +/- 19%; RT-M, 27% +/- 16%; P < 0.05). Histological damage assessed in survivors showed selective neuronal death in CA1 and dentate gyrus, similar in all groups (P = 0.15). In contrast, microglial proliferation was attenuated in the IC group versus all other groups (P < 0.01).

CONCLUSIONS: Deeper levels of hypothermia induced by the IC versus RT flush resulted in better neurological outcome in survivors. Surprisingly, deep hypothermia attenuated microglial activation but not hippocampal neuronal death. Minocycline had modest benefit on neurologic outcome in survivors but did not attenuate microglial activation in brain. Our findings suggest a novel effect of deep hypothermia on microglial proliferation during exsanguination CA.

外周神經阻滯對大鼠炎症誘導前列腺素 E2 和環氧化酶表達的影響

The Effect of a Peripheral Block on Inflammation-Induced Prostaglandin E2 and Cyclooxygenase Expression in Rats

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背景:外周炎症性疼痛與脊髓 COX-2 的增量調節有關，COX-2 的增加導致中樞 PGE2 增加，而 PGE2 水準的升高與痛覺過敏的產生相關。在本項研究中，我們通過大鼠外周炎症模型來評估布比卡因神經阻滯或組織途徑給藥對脊髓 PGE2 和 COX 表達的影響。
方法：研究中所有大鼠均隨機接受三種藥物注射：1)左後爪皮下注射 0.2mL2% 角叉菜膠或生理鹽水，2)0.2ml0.5%布比卡因或生理鹽水行左側坐骨神經阻滯，3)組織注射（肩胛間皮下注射 0.2ml0.5%布比卡因或生理鹽水）。測量局部水腫、溫度、機械的痛覺過敏、腦脊液 PGE2 濃度以及脊髓背根神經節處 COX-1 和 COX-2 的表達。
結果：我們證實布比卡因神經阻滯能減輕炎症疼痛模型中痛覺過敏和局部的炎症反應。這種影響與抑制背根神經節和脊髓中因周圍炎症導致的 COX-2 的增加相關，隨之在腦脊液中 PGE2 的產生也減少。而組織途徑使用布比卡因不能調節痛覺過敏或改變局部炎症反應和 COX 的表達。
結論：這些結果強烈表明局麻藥通過組織途徑和神經阻滯給藥產生不同水準的作用效果。
（朱蘭芳譯 薛張綱校）

BACKGROUND: Peripheral inflammatory pain is associated with an upregulation of spinal cord COX-2 (cyclooxygenase-2), with a subsequent increase in central prostaglandin E2 (PGE2) levels associated with the development of hyperalgesia. In this study, we evaluated the effect of bupivacaine administered via a nerve block or via a systemic route on the spinal expression of PGE2 and COX in a model of peripheral inflammation in rats.
METHODS: All rats randomly received three injections: 1) a left subcutaneous hindpaw injection (0.2 mL with either carrageenan 2% w/v or saline), 2) a left sciatic block (0.2 mL with either bupivacaine 0.5% or saline), and 3) a systemic injection (subcutaneous interscapular with 0.2 mL with either bupivacaine 0.5% or saline). Local edema, thermal, and mechanical hyperalgesia as well as cerebrospinal fluid PGE2 concentration and COX-1 and COX-2 expression in the spinal cord in dorsal root ganglions were measured.
RESULTS: We confirmed that a bupivacaine block attenuates hyperalgesia and local inflammation in a model of inflammatory pain. This effect was associated with an inhibition of the increase in COX-2 expression induced by peripheral inflammation in dorsal root ganglions and cord. The subsequent production of PGE2 in cerebrospinal fluid was also impaired. Systemic bupivacaine did not modify either the hyperalgesia and local inflammation or COX expression.
CONCLUSION: These results constitute a key element strongly suggesting that local anesthetics act at a different level when administered systematically or via a nerve block.

椎管內給予低濃度的阿密曲替林對軸索的作用

The Neuraxial Effects of Intraspinal Amitriptyline at Low Concentrations

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背景：因爲阿密曲替林有多種作用，理論上可有用作椎管內麻醉或用來治療頑固的神經痛。先前有關阿密曲替林安全性的研究並沒有發現單劑量給予低於0.5%濃度的阿密曲替林有毒性作用；一些有關阿密曲替林的病理生理假設也提示低濃度使用具有一定的臨床作用，但是可能是安全的。因此，我們設計了這項研究，目的是評估椎管內使用有效的最低濃度阿密曲替林的臨床及組織學毒性作用。
方法：21 條狗隨機分爲三組，分別在椎管內注射 1ml 生理鹽水（0.9%），0.15%的阿密曲替林,或 0.3%的阿密曲替林。麻醉蘇醒後 1 小時和 21 天后分別對狗進行評估。在第 21 天，把所有的動物都殺死，提取其脊髓和周圍的腦膜組織進行組織學分析。
結果：所有的狗術後都恢復了運動功能、肛門括約肌張力和感覺功能。除了一隻 0.15%阿密曲替林組的狗，其他所有阿密曲替林組的狗均出現了明顯的粘連性蛛網膜炎，而對照組均沒有出現上述症狀。但是神經膠質纖維酸性蛋白質的組織學染色沒有提示其對神經有直接損傷作用。
結論：椎管內給予阿密曲替林，即使是低劑量的，仍會出現明顯的粘連性蛛網膜炎。儘管沒有證據提示其有毒性左右，但是低濃度使用也是不安全的。
（陳珺珺譯 薛張綱校）

BACKGROUND: As a result of amitriptyline's vast array of actions, it could potentially be used as an intraspinal adjuvant in neuraxial anesthesia and/or in the treatment of refractory neuropathic pain. None of the previous studies examining the safety profile of intraspinal single doses of amitriptyline found signs of toxicity at concentrations below 15.4 mM/L (0.5%) and the current hypothesis regarding the pathophysiology of amitriptyline toxicity suggests it might be safe at low concentrations while still having relevant clinical effects. Hence, we conducted this study to assess the clinical and histological toxicity of intraspinal amitriptyline at the lowest dosages previously known to be effective.
METHODS: Twenty-one dogs were randomized to receive a 1-mL single intraspinal dose of one of the three solutions: saline (0.9%), amitriptyline (0.15%), or amitriptyline (0.3%). The dogs were evaluated clinically 1 h after awakening from anesthesia and 21 days later. At 21 days, all animals were killed, and histological sections of the spinal cord and surrounding meninges were retrieved for analysis.
RESULTS: All dogs recovered motor function, anal sphincter tone and sensibility. With the exception of one dog in the 0.15% amitriptyline group, all animals in both amitriptyline groups had marked adhesive arachnoiditis, which was absent in the control group. No evidence of direct neural damage was found on histological sections stained by glial fibrillary acidic protein technique in any of the study animals.
CONCLUSION: The intraspinal administration of amitriptyline to dogs even in low concentrations is strongly associated with the development of intense meningeal adhesive arachnoiditis and is not safe even at low concentrations for which there was no previous evidence of toxicity.

抗凝血酶水準較低時磺達肝素的抗凝作用降低

The Reduced Anticoagulant Effect of Fondaparinux at Low Antithrombin Levels

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背景：抗凝血酶水準低下可能會影響到肝素或肝素相關物質（例如磺達肝素）的抗凝作用。
方法：我們將 10 種不同濃度磺達肝素加入含正常(n = 25，抗凝血酶 95.4% ± 9.2%)或低抗凝血酶(n = 22，抗凝血酶 45.5% ± 13.2%)的血漿樣本，使用 Heptest 凝血實驗的方法比較其抗凝作用。
結果：在抗凝血酶不足的血樣中加入任何濃度磺達肝素，Heptest 凝血時間均會較正常血樣短，這表明磺達肝素的抗凝作用在抗凝血酶低下時會降低。磺達肝素的抗凝作用有飽和效應，較高濃度磺達肝素不會進一步縮短 Heptest 凝血時間。提高抗凝血酶濃度會改變劑量效應曲線。當加入抗凝血酶濃縮劑時，Heptest 凝血時間可延長，一直到磺達肝素濃度爲 10 μg/mL。
結果：在常規預防和治療劑量範圍，用抗凝血酶濃縮劑治療和或增加磺達肝素劑量，均能使抗凝作用趨於正常。高濃度磺達肝素的抗凝作用有飽和效應。抗凝血酶水準增加可以增強磺達肝素的抗凝作用。
（張瑩譯 馬皓琳 李士通校）

BACKGROUND: Low antithrombin levels may compromise the anticoagulant effect of heparin and heparin-related compounds, such as fondaparinux.
METHODS: We compared the anticoagulant effect of 10 concentrations of fondaparinux added to plasma samples with normal range (n = 25, antithrombin 95.4% ± 9.2%) and low antithrombin (n = 22, antithrombin 45.5% ± 13.2%) levels, using the Heptest coagulation assay.
RESULTS: Heptest clotting time was shorter at any given fondaparinux concentration in the antithrombin-deficient samples, indicating less anticoagulant effect than in the group with normal antithrombin levels. At a high fondaparinux concentration, a saturation effect is observed with no further increase in Heptest clotting time. Addition of antithrombin concentrates results in a shift of the dose-response curve. When antithrombin concentrate was added, Heptest clotting time increased up to a fondaparinux concentration of 10 μg/mL.
CONCLUSIONS: In the conventional prophylactic and therapeutic dose range, not only treatment with antithrombin concentrates but also an increase in fondaparinux dose normalizes the anticoagulant effect. A saturation effect is observed at high fondaparinux concentrations. Higher levels of antithrombin lead to an exaggerated effect of fondaparinux on Heptest.

比較右美托咪啶與異丙酚用於兒童磁共振成像的睡眠研究

A Comparison of Dexmedetomidine with Propofol for Magnetic Resonance Imaging Sleep Studies in Children

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背景：磁共振成像(MRI)的睡眠研究可用於指導處理保守治療難以治療的阻塞性睡眠呼吸暫停症(OSA) 兒童。因爲有 OSA 的患兒對於鎮靜藥及麻醉藥的呼吸抑制作用較敏感，爲這類患兒的成像研究提供麻醉是有挑戰性的。研究顯示右美托咪啶具有模擬自然睡眠、呼吸抑制極小的藥理學特性。我們假設，與異丙酚相比，右美托咪啶可能對上呼吸道張力及氣道塌陷影響更小，對於 OSA 患兒在動態 MRI 氣道成像過程中能提供更有利的條件，對掃描過程產生的干擾更少，更少需要有創性的氣道干預。
方法：在這項回顧性描述研究中，我們對 2006 年 7 月到 2008 年 3 月期間在 MRI 的睡眠研究中接受右美托咪啶麻醉的 52 位患兒及接受異丙酚麻醉的 30 位元患兒的資料進行了回顧研究。82 例受試著中有 67 例可得到用整夜多道睡眠記錄儀測得的 OSA 嚴重程度的資料，我們單獨分析這些受試者。分析的資料包括人口統計資料、OSA 的嚴重程度、合併症、血流動力學變化、人工氣道的使用、額外的氣道處理及 MRI 掃描的成功完成情況。
結果：兩組在人口統計特徵、多道睡眠記錄儀反映的 OSA 嚴重程度、麻醉誘導、血流動力學的基礎值方面相近。右美托咪啶組中 98%的患兒及異丙酚組中 100%的患兒獲得了可判斷的 MRI 睡眠研究。在 82 個患兒中，右美托咪啶組中有 46 個患兒(88.5%)而異丙酚組中有 21 個患兒(70%)沒有使用人工氣道而成功完成了 MRI 睡眠研究($P = 0.03$)。右美托咪啶組中有 5 個患兒（12%）而異丙酚組中有 9 個患兒(35%)需使用人工氣道來完成研究($P = 0.06$)。右美托咪啶組中有 1 個患兒（2%）而異丙酚組中有 3 個患兒(10%)需要額外的氣道處理（提下頜及肩抬高）來完成研究($P = 0.14$)。右美托咪啶組中的患兒曾發生心率下降，而異丙酚組中的患兒曾發生動脈壓下降，這些下降有統計學意義，但無臨床意義。
結論：在 OSA 患兒的 MRI 睡眠研究中，右美托咪啶所提供的麻醉深度是可接受的，該組患兒的自然氣道能獲得大量的可判斷的研究結果。在 MRI 的睡眠研究中，與異丙酚組相比，右美托咪啶組對人工氣道支援的需求明顯減少。在有嚴重 OSA 病史的患兒的 MRI 睡眠研究中，右美托咪啶可能是優選的麻醉藥，且有益於有睡眠呼吸障礙且需要麻醉的患兒或用於其他診斷性成像研究的麻醉。
（裘毅敏譯 馬皓琳、李士通校）

BACKGROUND: Magnetic resonance imaging (MRI) sleep studies can be used to guide management of children with obstructive sleep apnea (OSA) refractory to conservative therapy. Because children with OSA are sensitive to the respiratory-depressant effects of sedatives and anesthetics, provision of anesthesia for imaging studies in this patient population can be challenging. Dexmedetomidine has been shown to have pharmacological properties simulating natural sleep with minimal respiratory depression. We hypothesized that, compared with propofol, dexmedetomidine would have less effect on upper airway tone and airway collapsibility, provide more favorable conditions during dynamic MRI airway imaging in children with OSA, have fewer scan interruptions, and require less aggressive airway interventions.

METHODS: In this retrospective descriptive study, we reviewed the records of 52 children receiving dexmedetomidine and 30 children receiving propofol for anesthesia during MRI sleep studies between July 2006 and March 2008. Documentation of the severity of OSA by overnight polysomnography was available for 67 of the 82 subjects, who were analyzed separately. Data analyzed included demographics, severity of OSA, comorbidities, hemodynamic changes, use of artificial airways, additional airway maneuvers, and successful completion of the MRI scan.
RESULTS: Demographics, OSA severity by polysomnography, anesthetic induction, and baseline hemodynamics were comparable in both groups. An interpretable MRI sleep study was obtained for 98% of children in the dexmedetomidine group and 100% in the propofol group. Of 82 children, MRI sleep studies were successfully completed without the use of artificial airways in 46 children (88.5%) in the dexmedetomidine group versus 21 children (70%) in the propofol group ($P = 0.03$). An artificial airway was required to complete the study in five children (12%) in the dexmedetomidine group versus nine children (35%) in the propofol group ($P = 0.06$). Additional airway maneuvers (chin lift and shoulder roll) were required to complete the study in one child (2%) in the dexmedetomidine group and three children (10%) in the propofol group ($P = 0.14$). Children in the dexmedetomidine group experienced reductions in heart rate, whereas those in the propofol group experienced reductions in arterial blood pressure; these reductions were statistically, but not clinically, significant.
CONCLUSIONS: Dexmedetomidine provided an acceptable level of anesthesia for MRI sleep studies in children with OSA, producing a high yield of interpretable studies of the patient's native airway. The need for artificial airway support during the MRI sleep study was significantly less with dexmedetomidine than with propofol. Dexmedetomidine may be the preferred drug for anesthesia during MRI sleep studies in children with a history of severe OSA and may offer benefits to children with sleep-disordered breathing requiring anesthesia or anesthesia for other diagnostic imaging studies.

滴定丙泊酚鎮靜作用的自動回應監測儀

Automated Responsiveness Monitor to Titrate Propofol Sedation

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背景：我們過去的研究顯示對自動響應監測儀（ARM）的回應失敗先於回應缺失引起的潛在的嚴重鎮靜相關副作用，而且 ARM 對假陽性反應不敏感。然而，對 ARM 的回應缺失和恢復是否發生在相似的鎮靜水準仍然未知。我們假設在各個受試者中對 ARM 的回應缺失和恢復發生在相似鎮靜水準，並不依賴於丙泊酚作用的滴定方案。
方法：21 名 20-45 歲的健康志願者應用效應部位靶控輸注系統和兩種不同劑量規程方案。對所有的受試者，我們都增加丙泊酚效應部位濃度(Ce)直到發生對

ARM 的回應缺失。隨後按固定百分比(20%、30%、40%、50%、60%和 70%; 固定百分比規程，$n = 10$)或線性下降(0.1、0.2、和 0.3 $\mu g \cdot mL^{-1} \cdot min^{-1}$, $n = 11$)降低 Ce 直到 ARM 回應恢復。隨後維持丙泊酚 Ce 在新的目標 6 分鐘（Ce 平臺），在此期間取得動脈血樣用於丙泊酚測定，並進行臨床鎮靜評估（觀察者的警覺/鎮靜評估〔OAA/S〕分）。兩種方案的每個參加者以隨機順序經歷了丙泊酚 Ce 的每種百分比或線性降低。由每種 Ce 平臺開始和結束時的血漿濃度（Cp）檢驗假設的穩態。評估對 ARM 的回應概率作爲丙泊酚 Ce 的一個函數、腦電圖雙頻指數（BIS）和 OAA/S 評分，然而方案類型對這些評估值的影響是用嵌套模式（NONMEM）進行評價的。還用分級概率模式來評估丙泊酚 Ce 和 BIS 指數對 ARM 回應概率的聯合影響（$P_{BIS/Ce}$）。

結果：在 Ce 平臺期開始和結束時測得的丙泊酚 Cp 基本一致。對 ARM 回應的丙泊酚 Ce_{50} 是 1.73 (95% 可信區間: 1.55–2.10) μg/mL，然而相應的 BIS_{50} 是 75 (71.3–77)。ARM 回應的 OAA/S_{50} 概率是 12.5/20 (12–13.4)。BIS 和 Ce 的聯合效應的分級概率模式($P_{BIS/Ce}$)與資料匹配最佳，估計其中 63%由 BIS 提供。對於單獨的受試者 ARM 缺失和恢復發生在相似的鎮靜水準。

結論：在單獨的受試者中可重現的 ARM 動力學與臨床和腦電鎮靜終點相似，提示 ARM 可用作獨立的儀器來指導丙泊酚單獨鎮靜時的藥物效果。

（朱 慧譯 馬皓琳 李士通校）

BACKGROUND: In previous studies, we showed that failure to respond to automated responsiveness monitor (ARM) precedes potentially serious sedation-related adversities associated with loss of responsiveness, and that the ARM was not susceptible to false-positive responses. It remains unknown, however, whether loss and return of response to the ARM occur at similar sedation levels. We hypothesized that loss and return of response to the ARM occur at similar sedation levels in individual subjects, independent of the propofol effect titration scheme.

METHODS: Twenty-one healthy volunteers aged 20–45 yr underwent propofol sedation using an effect-site target-controlled infusion system and two different dosing protocol schemes. In all, we increased propofol effect-site concentration (Ce) until loss of response to the ARM occurred. Subsequently, the propofol Ce was decreased either by a fixed percentage (20%, 30%, 40%, 50%, 60%, and 70%; fixed percentage protocol, $n = 10$) or by a linear deramping (0.1, 0.2, and 0.3 $\mu g \cdot mL^{-1} \cdot min^{-1}$; deramping protocol, $n = 11$) until the ARM response returned. Consequently, the propofol Ce was maintained at the new target for a 6-min interval (Ce plateau) during which arterial samples for propofol determination were obtained, and a clinical assessment of sedation (Observer's Assessment of Alertness/Sedation [OAA/S] score) performed. Each participant in the two protocols experienced each percentage or deramping rate of Ce decrease in random order. The assumption of steady state was tested by plotting the limits of agreement between the starting and ending plasma concentration (Cp) at each Ce plateau. The probability of response to the ARM as a function of propofol Ce, Bispectral Index (BIS) of the electroencephalogram, and OAA/S score was estimated, whereas the effect of the protocol type on these estimates was evaluated using the nested model approach (NONMEM). The combined effect of propofol Ce and BIS on the probability for ARM response was also evaluated using a fractional probability model ($P_{BIS/Ce}$).

RESULTS: The measured propofol Cp at the beginning and the end of the Ce plateau was almost identical. The Ce_{50} of propofol for responding to the ARM was 1.73 (95% confidence interval: 1.55–2.10) μg/mL, whereas the corresponding BIS_{50} was 75 (71.3–77). The OAA/S_{50} probability for ARM response was 12.5/20 (12–13.4). A

fractional probability ($P_{BIS/Ce}$) model for the combined effect of BIS and Ce fitted the data best, with an estimated contribution for BIS of 63%. Loss and return of ARM response occurred at similar sedation levels in individual subjects.
CONCLUSIONS: Reproducible ARM dynamics in individual subjects compares favorably with clinical and electroencephalogram sedation end points and suggests that the ARM could be used as an independent instrumental guide of drug effect during propofol-only sedation.

氯胺酮抑制骨髓來源的樹突狀細胞的成熟和 Th1 型免疫反應的啓動

Ketamine Inhibits Maturation of Bone Marrow-Derived Dendritic Cells and Priming of the Th1-Type Immune Response

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背景：樹突細胞（DCs）在抗原呈遞細胞中起關鍵作用，而且越來越多的證據表明樹突細胞影響 T 細胞的啓動並調節免疫反應的極性。有報導氯胺酮具有免疫調節特性，能夠影響免疫細胞，包括巨噬細胞和天然殺傷細胞。然而，氯胺酮對樹突細胞的作用尚未明確。我們檢驗了氯胺酮對樹突細胞的免疫調節作用。
方法：我們使用來源於骨髓的粒細胞-單核細胞集落刺激因數和白介素（IL）-4 誘導分化的骨髓來源樹突細胞，來分析共同刺激分子（CD40、CD80 和 CD86）的表達、主要組織相容複合物族Ⅱ分子以及 IL-12p40 的分泌。我們還進一步評價了樹突細胞和 T 細胞的混合細胞培養的免疫反應以及在整體動物的接觸性超敏反應。
結果：氯胺酮抑制樹突細胞中 CD40、CD80 和主要組織相容性複合物族Ⅱ分子的表達。使用氯胺酮處理過的樹突細胞分泌 IL-12p40 也減少，且胞吞作用更強。在 CD4+T 細胞和樹突細胞的混合細胞培養中，氯胺酮處理的樹突細胞刺激 CD4+T 細胞增殖和從 CD4+T 細胞分泌干擾素的傾向較弱。而且，氯胺酮處理的樹突細胞損害細胞介導免疫反應的誘導。
結論：我們的發現表明氯胺酮抑制樹突細胞的功能成熟，並干擾整體動物中樹突細胞對 Th1 免疫的誘導。 這些新發現爲氯胺酮的免疫藥理作用提供了新的視點。
（顏濤 譯， 馬皓琳 李士通 校）
BACKGROUND: Dendritic cells (DCs) play a key role as antigen-presenting cells and growing evidence suggests that DCs influence T-cell activation and regulate the polarity of the immune response. Ketamine has been reported to have immunomodulatory properties that affect immune cells, including macrophages and natural killer cells. However, the effect of ketamine on DCs has not been characterized. We examined the immunomodulation of DCs by ketamine.
METHODS: We used bone marrow-derived DCs induced by granulocyte–monocyte-colony stimulating factor and interleukin (IL)-4 from bone marrow and analyzed the expression of costimulatory molecules (CD40, CD80, and CD86), major histocompatibility complex class II molecules, and secretion of IL-12p40.

Furthermore, we evaluated the immune response in mixed cell cultures of DCs and T cells and the contact hypersensitivity response in a whole animal.
RESULTS: Ketamine suppressed the expression of CD40, CD80, and major histocompatibility complex class II molecules in DCs. DCs treated with ketamine also secreted less IL-12p40 and displayed greater endocytosis. In mixed cell cultures with $CD4^+$ T cells and DCs, ketamine-treated DCs showed less propensity to stimulate the proliferation of $CD4^+$ T cells and the secretion of interferon from $CD4^+$ T cells. Furthermore, ketamine-treated DCs impaired the induction of a cell-mediated immune response.
CONCLUSION: Our findings suggest that ketamine inhibits the functional maturation of DCs and interferes with DC induction of Th1 immunity in the whole animal. These novel findings provide new insight into the immunopharmacological role of ketamine.

用於電視喉鏡檢查的 Macintosh 喉鏡片減少正常氣道患者導管芯的使用

A Macintosh Laryngoscope Blade for Videolaryngoscopy Reduces Stylet Use in Patients with Normal Airways

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背景：儘管大部分直接喉鏡氣管插管並不是用帶導芯的氣管導管進行的，但是仍然建議，導芯可以與間接電視喉鏡一起使用。最近，有多份關於帶導芯的氣管導管和電視喉鏡併發症的報告。在這項研究中，我們對接受氣管插管用於擇期手術的患者比較了三種電視喉鏡（VLSs）：GlideScope ® Ranger™（GlideScope，Bothell，華盛頓州）、V - MAC™Storz® BerciDCI®（Karl Storz, Tuttlingen，德國）與 McGrath® (McGrath 系列 5, Aircraft medical, 愛丁堡，英國），並驗證是否可以用間接電視喉鏡而不使用導芯完成病人的氣管插管。
方法：行擇期手術進行氣管插管的 450 名連續的成人（ASA 分級 I - II），隨機應用上述三個設備之一進行氣道管理。用於氣管插管的麻醉誘導包括芬太尼、異丙酚、羅庫溴銨。首先由一名不知道分組的麻醉醫生使用 Cormack-Lehane 分級系統對用經典的金屬 Macintosh 窺視片進行的直接喉鏡檢查視野進行評分。在之後的經面罩正壓通氣吸入氧氣和七氟醚 1 分鐘後，使用三個 VLSs 之一氣管插管。插管時，收集下列資料：插管時間、插管嘗試次數、有無使用額外的工具幫助完成插管及插管條件的整體滿意度評分。
結果：每一位病人的氣管插管都使用 VLSs，並沒有任何一位元病人需要改爲經典的 Macintosh 喉鏡。與傳統的 Macintosh 喉鏡相比，所有這三種 VLSs 均能提供相同或更好的 Cormack-Lehane 分級評分的聲門視野，包括聲門入口更大的視角。用 GlideScope 的平均插管時間爲 34 ± 20s，而用 V- MAC Storz 爲 18 ±

12s，McGrath VLS 爲 38 ± 23s。與其他兩種 VLS 相比，用 Storz 喉鏡能更快地完成氣管插管（P＜0.05），並需要更少的額外工具（P＜0.01），因此有更高的首次插管成功率。Storz 組的病人有 7%必須通過應用導芯才能完成氣管插管，而其他兩組中有 50%病人使用了導芯。

結論：雖然這三個所研究的 VLSs 表現出明顯不同的結果，但對大部分的正常氣道病人可以用特定的 VLS 喉鏡片而不使用導芯成功完成氣管插管。與其他兩種喉鏡相比，Storz VLS 取代了經典的 Macintosh 喉鏡的軟組織結構，爲氣管導管置入提供了空間，並限制了使用導芯的需要。雖然 VLSs 提供了一些包括更好的聲門入口和插管條件的優點，良好的喉部視野並不保證容易和成功的氣管導管置入。我們建議應該更詳細地研究 VLSs 的幾何結構，包括窺視片的設計。

（黃麗娜 譯 馬皓琳 李士通 校）

BACKGROUND: Although most tracheal intubations with direct laryngoscopy are not performed with a styletted endotracheal tube, it is recommended that a stylet can be used with indirect videolaryngoscopy. Recently, there were several reports of complications associated with styletted endotracheal tubes and videolaryngoscopy. In this study, we compared three videolaryngoscopes (VLSs) in patients undergoing tracheal intubation for elective surgery: the GlideScope® Ranger™ (GlideScope, Bothell, WA), the V-MAC™ Storz® Berci DCI® (Karl Storz, Tuttlingen, Germany), and the McGrath® (McGrath series 5, Aircraft medical, Edinburgh, UK) and tested whether it is feasible to intubate the trachea of patients with indirect videolaryngoscopy without using a stylet.

METHODS: Four hundred fifty consecutive adults (ASA PS I–II) undergoing tracheal intubation for elective surgery were randomly allocated for airway management with one of the three devices. Anesthesia induction for tracheal intubation consisted of fentanyl-propofol-rocuronium. An independent anesthesiologist used the Cormack-Lehane grading system to score an initial direct laryngoscopic view using a classic metal Macintosh blade. After subsequent positive-pressure ventilation using a face mask and an oxygen-sevoflurane mixture for 1 min, the trachea was intubated using one of the three VLSs. During intubation, the following data were collected: intubation time, number of intubation attempts, use of extra tools to facilitate intubation, and overall satisfaction score of the intubation conditions.

RESULTS: The trachea of every patient was intubated using the VLSs, and none of the patients required conversion to the classic Macintosh laryngoscope. All three VLSs offered equal or better view of the glottis as assessed by the mean Cormack-Lehane grade, compared with the traditional Macintosh laryngoscopy, including a larger viewing angle of the glottic entrance. The average intubation time was 34 ± 20 s for the GlideScope, 18 ± 12 s for the V-MAC Storz, and 38 ± 23 s for the McGrath VLS. Intubation with the Storz was faster ($P < 0.05$) than the other two VLS tested and necessitated fewer additional tools ($P < 0.01$), resulting in a higher first-pass successful intubation rate. A stylet had to be used in 7% of the patients in the Storz group versus about 50% of the patients when the other two VLS were used.

CONCLUSIONS: The trachea of a large proportion of patients with normal airways can be intubated successfully with certain VLS blades without using a stylet, although the three studied VLSs clearly differ in outcome. The Storz VLS displaces soft tissues in the fashion of a classic Macintosh scope, affording room for tracheal tube insertion and limiting the need for stylet use compared with the other two scopes. Although

VLSs offer several advantages, including better visualization of the glottic entrance and intubation conditions, a good laryngeal view does not guarantee easy or successful tracheal tube insertion. We recommend that the geometry of VLSs, including blade design, should be studied in more detail.

麻醉病人使用不同技術鼻胃管插管：一個前瞻性、隨機研究

Nasogastric Tube Insertion Using Different Techniques in Anesthetized Patients: A Prospective, Randomized Study

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背景：在麻醉狀態下，常常難以正確地放置鼻胃管。我們假設簡單地改進插鼻胃管技術將提高成功率。
方法： 200 個病人入組本研究。病人被隨機地分爲四組：對照組、導絲組、裂縫氣管導管組和頸部俯屈且側壓頸部組。當鼻胃管開始插入選擇的鼻孔的時間作爲操作的開始點。成功地插入鼻胃管或者連續兩次失敗作爲結束點。記錄技術的成功率、插管的持續時間和併發症（出血、捲曲、扭折和扭結等）的發生率。用χ^2、方差分析，和 Student 氏 t 檢驗來分析資料。
結果：相對於對照組，所有干預組的成功率明顯提高。裂縫氣管導管組插入鼻胃管所需的時間明顯延長。鼻胃管扭結和出血是最常見的併發症。
結論：使用輸尿管導絲作爲導芯、裂縫氣管導管作爲插管器或者頭部俯屈且側壓頸部都能提高鼻胃管插管的成功率。頭部俯屈並側壓頸部是成功率高且併發症最少的最容易的技術。
（王宏翻譯，馬皓琳 李士通校正）

BACKGROUND: It is often difficult to correctly place nasogastric (NG) tubes under anesthesia. We hypothesized that simple modifications in technique of NG tube insertion will improve the success rate.
METHODS: Two hundred patients were enrolled into the study. The patients were randomized into four groups: control, guidewire, slit endotracheal tube, and neck flexion with lateral neck pressure. The starting point of the procedure was the time when NG tube insertion was begun through the selected nostril. The end point was the time when there was either a successful insertion of the NG tube or a failure after two attempts. The success rate of the technique, duration of insertion procedure, and the occurrence of complications (bleeding, coiling, kinking, and knotting, etc.) were noted. χ^2, analysis of variance, and Student's *t*-test were used to analyze the data.
RESULTS: Success rates were higher in all intervention groups compared with the control group. The time necessary to insert the NG tube was significantly longer in the slit endotracheal tube group. Kinking of the NG tube and bleeding were the most common complications.
CONCLUSION: The success rate of NG tube insertion can be increased by using a ureteral guidewire as stylet, a slit endotracheal tube as an introducer, or head flexion with lateral neck pressure. Head flexion with lateral neck pressure is the easiest technique that has a high success rate and fewest complications.

低潮氣量通氣在豬的急性肺損傷模型中改善腦組織氧合作用

Low Tidal Volume Ventilation in a Porcine Model of Acute Lung Injury Improves Cerebral Tissue Oxygenation

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背景：我們研究了不同潮氣量對豬的急性肺損傷（ALI）模型的腦組織氧合作用和腦代謝的影響。我們假設在實驗性誘導的 ALI 後小潮氣量（LT）的機械通氣能改善腦組織氧合作用和腦代謝。

方法：通過去除肺表面活性物質來造成實驗性 ALI 後，我們研究 2 種情況下的 10 只母豬：1）6mL/kg 體重的低潮氣量通氣和 2）12mL/kg 體重的高潮氣量通氣。對氣體交換、血流動力學、持續腦組織氧分壓（$p_{ti}O_2$）、腦微透析和全身細胞因數這些參數進行分析。在誘導 ALI 後 2、4 和 8 小時進行資料的記錄。最重要的終結點是 $P_{ti}O_2$ 的改變。組間進行 t 檢驗。$P<0.05$ 考慮爲有統計學差異。

結果：在基礎水準和 ALI 誘導後，兩組間的 $P_{ti}O_2$ 沒有差異；然而在 4 小時和 8 小時後高潮氣量組的 $P_{ti}O_2$ 顯著低於低潮氣量組。兩組在所有時間點的 P_aO_2 和 P_aCO_2 沒有顯著性差異。對於腦微透析，在 2、4 和 8 小時後在高潮氣量組細胞外的乳酸水準顯著高於低潮氣量組。在高潮氣量組細胞因數釋放導致白介素 6 和 8 水準高於低潮氣量組。

結論：在豬的 ALI 模型中，與高潮氣量相比，保護性的低潮氣量通氣對於腦組織氧合作用和腦代謝有顯著改善作用。它會出現動脈氧合和腦組織氧合分離現象。在高潮氣量組中腦的氧合和腦代謝可能被更有特異性的免疫反應所破環。

（唐亮 譯 馬皓琳 李士通 校）

BACKGROUND: In study, we investigated the effects of different tidal volumes on cerebral tissue oxygenation and cerebral metabolism in a porcine model of acute lung injury (ALI). We hypothesized that mechanical ventilation with low tidal (LT) volumes improves cerebral tissue oxygenation and metabolism after experimentally induced ALI.

METHODS: After inducing experimental ALI by surfactant depletion, we studied two conditions in 10 female pigs: 1) LT volume ventilation with 6 mL/kg body weight, and 2) high tidal (HT) volume ventilation with 12 mL/kg body weight. Variables of gas exchange, hemodynamic, continuous cerebral tissue oxygen tension ($p_{ti}O_2$), cerebral microdialysis, and systemic cytokines were analyzed. After induction of ALI, data were collected at 2, 4, and 8 h. The primary end point was the change in $p_{ti}O_2$. For group comparisons, a *t*-test was used. A value of <0.05 was considered to indicate statistical significance.

RESULTS: At baseline and after induction of ALI, no differences between groups were found in $p_{ti}O_2$; however, $p_{ti}O_2$ was significantly lower in the HT group after 4 and 8 h. Pao_2 and $Paco_2$ showed no significant differences between the groups at all timepoints. Regarding cerebral microdialysis, a significantly higher level of extracellular lactate could be demonstrated after 2, 4, and 8 h in the HT group. The release of cytokines resulted in higher values for interleukin-6 and interleukin-8 in the HT group.

CONCLUSION: Protective ventilation with LT yielded a significant improvement in cerebral tissue oxygenation and metabolism compared to HT ventilation in a porcine model of ALI. There was dissociation between arterial and cerebral tissue oxygenation. Cerebral oxygenation and metabolism might have possibly been impaired by a more distinctive inflammatory response in the HT group.

氣管內吸引對小型代謝監測儀計算的氧耗量和二氧化碳生成量值以及肺力學的準確度的影響

The Effects of Endotracheal Suctioning on the Accuracy of Oxygen Consumption and Carbon Dioxide Production Measurements and Pulmonary Mechanics Calculated by a Compact Metabolic Monitor

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背景：開放性支氣管吸引術（ETS）常用於清除機械通氣病人呼吸道梗阻的分泌物。開放性 ETS 能引起肺動態順應性和呼出潮氣量迅速降低，導致呼吸側流監測不適當或不精確，因此需要延長代謝監測儀的穩定時間。我們採用小型模組的代謝監測儀(E-COVX)持續記錄無嚴重肺病理改變的機械通氣兒童的呼吸量和氣體交換量，來研究開放性 ETS 對氧耗量(VO2)和二氧化碳生成量(VCO2)測量結果的精確度、計算出的肺力學參數、呼吸商和靜息能量消耗的暫態效應。
方法：11 位接受機械通氣的敗血症或頭部損傷兒童，在具有臨床指征時給予開放性 ETS。在 28 次 ETS 實例中，標準化操作前 50 min 及後 50 min 共記錄了 2800 個肺 1-min 氣體交換測量值。
結果：吸引前後的肺力學和間接測熱法所得的整套結果之間沒有差異。氣管吸引前、吸引後 5 至 55 min 的 VO_2、VCO_2、動態氣道阻力、肺動態順應性和呼氣性每分通氣量保持穩定，且不同通氣模式之間無差異。連續的吸引前後 VO_2、VCO_2、呼吸商和靜息能量消耗的平均配對差分別爲–0.6%、–1%、 –0.1% 和–0.3%。兩組中第一測量時段與第二測量時段測量值 (1min 測量值 1–25min 一套 相比 26–50min 一套) 的比值沒有差別。
結論：無事故的開放性 ETS 對良好鎮靜病人的肺力學和間接熱測量結果沒有影響。不同通氣模式下，E-COVX 能夠儘早到吸引 5 min 後就可靠地記錄呼吸量和代謝指數。
(江繼宏 譯 馬皓琳 李士通 校）

BACKGROUND: Open endotracheal suctioning (ETS), which is performed regularly in mechanically ventilated patients to remove obstructive secretions, can cause an immediate decrease in dynamic compliance and expired tidal volume and result in inadequate or inaccurate sidestream respiratory monitoring, necessitating prolonged periods of stabilization of connected metabolic monitors. We investigated the immediate effect of open ETS on the accuracy of oxygen consumption (VO_2) and carbon dioxide production (VCO_2) measurements and calculated lung mechanics, respiratory quotient, and resting energy expenditure in mechanically ventilated

children without severe lung pathology, when using a compact modular metabolic monitor (E-COVX) continuously recording patient spirometry and gas exchange measurements.
METHODS: Open ETS was performed when clinically indicated in 11 children mechanically ventilated for sepsis or head injury. A total of 2800 pulmonary 1-min gas exchange measurements were recorded in 28 ETS instances for 50 consecutive minutes before and 50 min after the standardized procedure.
RESULTS: Pulmonary mechanics and indirect calorimetry did not differ between pre- and postsuction sets of measurements. Pre- and postsuction VO_2, VCO_2, dynamic airway resistance, dynamic compliance, and expiratory minute ventilation remained stable from 5 to 55 min after tracheal suctioning and did not differ among different ventilatory modes. Average paired differences of sequential pre- and postsuction VO_2, VCO_2, respiratory quotient, and resting energy expenditure were –0.6%, –1%, –0.1%, and –0.3%. Ratio differences between the first and the second periods of measurements (1–25 vs 26–50 sets of 1-min measurements) did not differ in the two groups.
CONCLUSIONS: Pulmonary mechanics and indirect calorimetry measurements are not influenced after uneventful open ETS in well-sedated patients. The E-COVX is able to reliably record spirometry and metabolic indices as early as 5 min after suctioning at different ventilator modes.

剖宮產全麻過程中的術中知曉

Intraoperative Awareness During General Anesthesia for Cesarean Delivery
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Anesth Analg 2009; 109:886-890

術中知曉定義爲對全麻過程中發生事件的自發回憶。不採用嚴格限制麻醉藥的方案（該方案的設計是爲了限制藥物通過胎盤屏障），可使剖宮產術中知曉發生率降低至約 0.26%。然而，由於術中知曉可能導致創傷後應激綜合症，故仍舊是一種令人討厭的併發症。評估麻醉深度對於麻醉實施者來說依舊是一個挑戰，因爲臨床體征往往不可靠且尚缺乏敏感且特異的監測。已推薦採用腦電雙頻指數監測使得 BIS 值<60 可預防術中知曉。誘導藥物產生遺忘作用的能力不同，且其催眠效果維持的時間受到藥物再分佈速度的影響。麻醉開始後，應給予揮發性吸入麻醉藥且靶濃度應該設定爲 0.7MAC（最低肺泡麻醉藥濃度），已證實該濃度可始終如一地使平均腦電雙頻指數<60。由於攝取速度快，氧化亞氮至今仍是急診剖宮產術中降低術中知曉風險的一個重要的輔助用藥。在不存在胎兒窘迫的情況下，沒有理由必須維持吸入氧濃度高於 0.33。加深麻醉深度可降低術中知曉發生率；目前並無證據提示加深麻醉可增加子宮收縮乏力或胎兒致病率的風險性。
（周雅春 譯　李士通 馬皓琳 校）
Intraoperative awareness is defined as the spontaneous recall of an event occurring during general anesthesia. A move away from rigid anesthetic protocols, which were designed to limit drug transmission across the placenta, has reduced the incidence of awareness during cesarean delivery to approximately 0.26%. Nevertheless, it remains an undesirable complication with potential for the development of posttraumatic stress disorder. Assessing depth of anesthesia remains a challenge for the anesthesia

provider as clinical signs are unreliable and there is no sensitive and specific monitor. Bispectral Index monitoring with the goal of scores <60 has been recommended to prevent awareness. Induction drugs vary in their ability to produce amnesia and the period of hypnotic effect is affected by the rate at which they are redistributed. After initiation of anesthesia, volatile anesthetics should be administered to a target of 0.7 minimum alveolar anesthetic concentration, which has been shown to consistently achieve mean Bispectral Index scores <60. Because of its rapid uptake, nitrous oxide remains an important adjunct to reduce the risk of awareness during emergency cesarean delivery. In the absence of fetal compromise, there is no rationale for an inspired oxygen concentration above 0.33. Deeper levels of anesthesia reduce the incidence of awareness; current evidence does not suggest an increased risk of tocolysis or fetal morbidity.

現代羥乙基澱粉在活體供肝移植中的安全性——與人血白蛋白對照

The Safety of Modern Hydroxyethyl Starch in Living Donor Liver Transplantation: A Comparison with Human Albumin

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背景：血管內容量補充療法是肝移植圍術期治療中的一項重要問題。有關肝移植患者使用羥乙基澱粉(HES)的安全性的資料貧乏。我們以腎功能爲特別的重點，評估了一種新型的 HES 130/0.4 在肝移植圍術期治療中的安全性。

方法：40 例行活體供肝移植的患者被前瞻、隨機地分爲兩組。ALB 組(n = 20)的患者使用 5%人血白蛋白；HES 組(n = 20)患者使用第三代 HES(6% HES 130/0.4)。膠體投藥的總量限制在 50 mL · kg^{-1} · d^{-1}。容量輸注使肺動脈閉塞壓或中心靜脈壓維持在 5～7mmHg。如果需要額外的液體，就用平衡晶體液。麻醉和外科技術都是標準化的。在麻醉誘導後、手術結束時、術後四天抽取動脈血樣本，檢測血漿肌酐值和胱蛋白酶抑制劑 C 的血漿水準。

結果：所有 40 例入選患者皆完成研究。兩組人口統計和術中變數均有可比性。術後容量（均數±標注差）在 HES 組和 ALB 組分別爲 6229 ± 1140 mL 和 4636 ± 1153 mL (P = 0.003)。ALB 組的淨蓄積體液平衡 1100 ± 900 mL 明顯大於 HES 組 3047 ± 2000 mL （P = 0.029）。血漿肌酐、肌酐清除率和胱蛋白酶抑制劑 C 水準顯示兩組無顯著性差異。兩組各有一例患者發生急性腎衰，需要腎臟替代治療。

結論：作爲替代人血白蛋白而使用的 HES 130/0.4 對肝移植術後腎臟轉歸是等效的。

(唐李雋 譯 馬皓琳 李士通 校)

BACKGROUND: Intravascular volume replacement therapy is an important issue in the perioperative management of liver transplantation. There is paucity of data on the safety of hydroxyethyl starch (HES) in patients undergoing liver transplantation. We evaluated the safety of a new HES 130/0.4 in the perioperative management of liver transplantation, with a special emphasis on renal function.

METHODS: Forty patients undergoing living donor liver transplantation were prospectively randomized into two groups. Patients in the ALB group (n = 20) received 5% human albumin. Patients in the HES group (n = 20) received third generation HES (6% HES 130/0.4). Total colloid administration was limited to 50 $mL \cdot kg^{-1} \cdot d^{-1}$. The volume was given to maintain pulmonary artery occlusion pressure or central venous pressure between 5 and 7 mm Hg. If additional fluids were required, balanced crystalloid solution was used. Anesthetic and surgical techniques were standardized. Serum creatinine and cystatin C plasma levels were measured from arterial blood samples after induction of anesthesia, at the end of surgery, and on the first 4 postoperative days.
RESULTS: All 40 enrolled patients completed the study. Demographic and intraoperative variables were comparable in both groups. Postoperatively, the mean ± sd volume was 6229 ± 1140 mL and 4636 ± 1153 mL in HES and ALB groups, respectively (P = 0.003). There was significantly larger net cumulative fluid balance in the ALB group 1100 ± 900 mL compared with the HES group 3047 ± 2000 mL, P = 0.029. Serum creatinine, creatinine clearance, and cystatin C plasma levels showed no significant differences between the two groups. One patient in each group developed acute renal failure requiring renal replacement therapy.
CONCLUSION: The use of HES 130/0.4 as an alternative to human albumin resulted in equivalent renal outcome after liver transplantation.

坐骨神經導管放置：用 Raj 路徑穿刺成功

Sciatic Nerve Catheter Placement: Success with Using the Raj Approach

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Anesth Analg 2009; 109:972-975

背景：持續區域鎮痛越來越流行，而且已經成爲很多外科疼痛的標準治療方法。各種各樣的坐骨神經導管放置徑路被提出，各有優缺點。我們的研究在於評估 Raj 徑路—坐骨結節和大轉子間連線的簡單中點，是否可以便於放置坐骨神經導管。
方法：知情同意後，選入 20 名患者用 Raj 徑路行坐骨神經導管置入。一根絕緣的 Tuohy 針在坐骨結節和大轉子間連線中點垂直於皮膚刺入。刺激坐骨神經後，一根導管通過穿刺針置入，超越穿刺針頭部 2-4cm 並固定。然後通過導管注入 30ml1.5%鹽酸甲吒卡因。局麻藥注入後 20 分鐘，用冷試驗和針刺試驗評估感覺神經阻滯，用改良的 Bromage 評分評估運動阻滯程度。記錄併發症和副反應。
結果：在所有病例中，阻滯都很容易實施而且成功。沒有觀察到明顯的副作用和併發症。
結論：利用容易辨別的骨性結構之間的簡單標誌增強坐骨神經導管的簡單性和定位，可以在臨床實踐中推薦使用。
（黃佳佳譯，馬皓琳，李士通校）
BACKGROUND: Continuous regional analgesia has increased in popularity and is becoming standard of care for many painful surgical procedures. Various approaches of sciatic catheter insertion have been proposed, each with attributes and disadvantages. We investigated whether the Raj approach that uses a simple midpoint

landmark between the ischial tuberosity and greater trochanter will facilitate sciatic catheter placement.
METHODS: After informed consent, 20 patients were recruited to receive sciatic catheter placement using the Raj approach. An insulated Tuohy needle was inserted perpendicular to skin at the midpoint of a line between the ischial tuberosity and greater trochanter. After sciatic nerve stimulation, a catheter was inserted 2–4 cm past the end of the needle and secured. The catheters were then incrementally injected with 30 mL of 1.5% mepivacaine. Twenty minutes after local anesthetic injection, sensory block was assessed using cold and pinprick tests, whereas motor block was assessed using a modified Bromage score. Complications and side effects were recorded.
RESULTS: In all instances, blocks were easy to perform and were successful. No major side effects or complications were noted.
CONCLUSION: Use of a simple landmark between easily identifiable bony structures enhances the simplicity and placement of a sciatic nerve catheter and is recommended for use in clinical practice.

膝部手術中行單側小劑量脊麻並不影響尿瀦留的發生率

Unilateral Anesthesia Does Not Affect the Incidence of Urinary Retention After Low-Dose Spinal Anesthesia for Knee Surgery

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我們對單側小劑量脊麻是否會減少術後尿瀦留發生的可能性進行了評估。40 例擇期行膝關節鏡檢查手術的病人被隨機分成兩組，每組 20 例病人，一組接受雙側，一組接受單側脊麻，用藥都爲 6mg 濃度爲 0.5%的重比重布比卡因。通過超聲檢測（膀胱掃描）來評定尿瀦留（>500mL）的發生率，隨後需要暫時導尿的病人在雙側組有 7 例，單側組有 6 例（兩組間差異不顯著）。我們得出結論，單側小劑量脊麻並不能減少尿瀦留發生的可能性，我們的結果也證明了術後監測膀胱容量的重要性和必要性。
（姜旭暉譯，馬皓琳，李士通校）

We evaluated whether unilateral low-dose spinal anesthesia may reduce the likelihood of postoperative urinary retention. Forty patients scheduled for knee arthroscopy randomly received bilateral (n = 20) or unilateral (n = 20) spinal anesthesia with 6-mg hyperbaric bupivacaine 0.5%. The incidence of urinary retention (>500 mL) assessed with an ultrasound device (Bladderscan) and subsequent temporary catherization was 7/20 patients in the bilateral versus 6/20 in the unilateral group (not significant). We concluded that unilateral low-dose spinal anesthesia does not further decrease the likelihood of urinary retention. Our results demonstrate the value and necessity of monitoring bladder volume postoperatively.