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核心綜述：醫師操作的超聲檢查：急性監護醫學上常規使用的時代已經到來
Core Review: Physician-Performed Ultrasound: The Time Has Come for Routine Use in Acute Care Medicine
The use of ultrasound in the acute care specialties of anesthesiology, intensive care, emergency medicine, and surgery has evolved from discrete, office-based echocardiographic examinations to the real-time or point-of-care clinical assessment and interventions. “Goal-focused” transthoracic echocardiography is a limited scope (as compared with comprehensive examination) echocardiographic examination, performed by the treating clinician in acute care medical practice, and is aimed at addressing specific clinical concerns. In the future, the practice of surface ultrasound will be integrated into the everyday clinical practice as ultrasound-assisted examination and ultrasound-guided procedures. This evolution should start at the medical student level and be reinforced throughout specialist training. The key to making ultrasound available to every physician is through education programs designed to facilitate uptake, rather than to prevent access to this technology and education by specialist craft groups. There is evidence that diagnosis is improved with ultrasound examination, yet data showing change in management and improvement in patient outcome are few and an important area for future research.
The suitability of ambulatory surgery for a patient with obstructive sleep apnea (OSA) remains controversial because of concerns of increased perioperative complications including postdischarge death. Therefore, a Society for Ambulatory Anesthesia task force on practice guidelines developed a consensus statement for the selection of patients with OSA scheduled for ambulatory surgery. A systematic review of the literature was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. Although the studies evaluating perioperative outcome in OSA patients undergoing ambulatory surgery are sparse and of limited quality, they do provide useful information that can guide clinical practice. Patients with a known diagnosis of OSA and optimized comorbid medical conditions can be considered for ambulatory surgery, if they are able to use a continuous positive airway pressure device in the postoperative period. Patients with a presumed diagnosis of OSA, based on screening tools such as the STOP–Bang questionnaire, and with optimized comorbid conditions, can be considered for ambulatory surgery, if postoperative pain can be managed predominantly with nonopioid analgesic techniques. On the other hand, OSA patients with nonoptimized
Comorbid medical conditions may not be good candidates for ambulatory surgery. What other guidelines are available on this topic? The American Society of Anesthesiologists (ASA) practice guidelines for management of surgical patients with OSA published in 2006. Why was this guideline developed? The ASA guidelines are outdated because several recent studies provide new information such as validated screening tools for clinical diagnosis of OSA and safety of ambulatory laparoscopic bariatric surgery in OSA patients. Therefore, an update on the selection of patients with OSA undergoing ambulatory surgery is warranted.

How does this guideline differ from existing guidelines? Unlike the ASA guidelines, this consensus statement recommends the use of the STOP–Bang criteria for preoperative OSA screening and considers patients’ comorbid conditions in the patient selection process. Also, current literature does not support the ASA recommendations that upper abdominal procedures are not appropriate for ambulatory surgery.

Why does this guideline differ from existing guidelines? This consensus statement differs from existing ASA guidelines because of the availability of new evidence.

Graphical User Interface Simplifies Infusion Pump Programming and Enhances the Ability to Detect Pump-Related Faults
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Anesth Analg November 2012 115:1087-1097

Background: Drug administration errors are frequent and are often associated with the misuse of IV infusion pumps. One source of these errors may be the infusion pump’s user interface.
METHODS: We used failure modes-and-effects analyses to identify programming errors and to guide the design of a new syringe pump user interface. We designed the new user interface to clearly show the pump’s operating state simultaneously in more than 1 monitoring location. We evaluated anesthesia residents in laboratory and simulated environments on programming accuracy and error detection between the new user interface and the user interface of a commercially available infusion pump.

RESULTS: With the new user interface, we observed the number of programming errors reduced by 81%, the number of keystrokes per task reduced from 9.2 ± 5.0 to 7.5 ± 5.5 (mean ± SD), the time required per task reduced from 18.1 ± 14.1 seconds to 10.9 ± 9.5 seconds and significantly less perceived workload. Residents detected 38 of 70 (54%) of the events with the new user interface and 37 of 70 (53%) with the existing user interface, despite no experience with the new user interface and extensive experience with the existing interface.

CONCLUSIONS: The number of programming errors and workload were reduced partly because it took less time and fewer keystrokes to program the pump when using the new user interface. Despite minimal training, residents quickly identified preexisting infusion pump problems with the new user interface. Intuitive and easy-to-program infusion pump interfaces may reduce drug administration errors and infusion pump-related adverse events.
BACKGROUND: Device-related bloodstream infections are associated with a significant increase in patient morbidity and mortality in multiple health care settings. Recently, intraoperative bacterial contamination of conventional open-lumen 3-way stopcock sets has been shown to be associated with increased patient mortality. Intraoperative use of disinfectable, needleless closed catheter devices (DNCCs) may reduce the risk of bacterial injection as compared to conventional open-lumen devices due to an intrinsic barrier to bacterial entry associated with valve design and/or the capacity for surface disinfection. However, the relative benefit of DNCC valve design (intrinsic barrier capacity) as compared to surface disinfection in attenuation of bacterial injection in the clinical environment is untested and entirely unknown. The primary aim of the current study was to investigate the relative efficacy of a novel disinfectable stopcock, the Ultraport zero, with and without disinfection in attenuating intraoperative injection of potential bacterial pathogens as compared to a conventional open-lumen stopcock intravascular device. The secondary aims were to identify risk factors for bacterial injection and to estimate the quantity of bacterial organisms injected during catheter handling.

METHODS: Four hundred sixty-eight operating room environments were randomized by a computer generated list to 1 of 3 device-injection schemes: (1) injection of the Ultraport zero stopcock with hub disinfection before injection, (2) injection of the Ultraport zero stopcock without prior hub disinfection, and (3) injection of the conventional open-lumen stopcock closed with sterile caps according to usual practice. After induction of general anesthesia, the primary anesthesia provider caring for patients in each operating room environment was asked to perform a series of 5 injections of sterile saline through the assigned device into an ex vivo catheter system. The primary outcome was the incidence of bacterial contamination of the injected fluid column (effluent). Risk factors for effluent contamination were identified in univariate analysis, and a controlled laboratory experiment was used to generate an estimate of the bacterial load injected for contaminated effluent samples.

RESULTS: The incidence of effluent bacterial contamination was 0% (0/152) for the Ultraport zero stopcock with hub disinfection before injection, 4% (7/162) for the Ultraport zero stopcock without hub disinfection before injection, and 3.2% (5/154) for the conventional open-lumen stopcock. The Ultraport zero stopcock with hub disinfection before injection was associated with a significant reduction in the risk of bacterial injection as compared to the conventional open-
lumen stopcock (RR = 8.15 × 10^{-8}, 95% CI, 3.39 × 10^{-8} to 1.96 × 10^{-7}, P = <0.001), with an absolute risk reduction of 3.2% (95% CI, 0.5% to 7.4%). Provider glove use was a risk factor for effluent contamination (RR = 10.48, 95% CI, 3.16 to 34.80, P < 0.001). The estimated quantity of bacteria injected reached a clinically significant threshold of 50,000 colony-forming units per each injection series.

CONCLUSIONS: The Ultraport zero stopcock with hub disinfection before injection was associated with a significant reduction in the risk of inadvertent bacterial injection as compared to the conventional open-lumen stopcock. Future studies should examine strategies designed to facilitate health care provider DNCC hub disinfection and proper device handling.

Background:
Many drugs used for anesthesia and analgesia in children are administered “off-label.” We undertook an audit of drugs commonly used for pediatric anesthesia to determine which drugs have United States Food and Drug Administration (FDA) labeling for pediatric use, which drugs are age-restricted, and which have no labeling for pediatric use.
METHODS: We identified drugs administered during anesthesia to pediatric patients from the operating room pharmacy. FDA approval and indications were determined by using the Thomson Micromedex® online database. Drugs without FDA approval for pediatric use were further examined for strength of evidence and strength of recommendation for their listed indications in the database. We then examined the rate of off-label drug administration to patients younger than the age of 18 years between July 1, 2010, and August 31, 2011.

RESULTS: One hundred six drugs were identified. Thirty-six (34%) were not FDA-labeled for use in any pediatric age group, 40 (38%) were FDA-labeled for use in all pediatric age groups, and 30 (28%) were FDA-labeled for use in only specific age groups. Drugs were administered off-label in 73.4% of cases. Of those not labeled for any pediatric age group, some were among the most commonly used drugs in pediatric anesthesia, including neostigmine, hydromorphone, and dopamine.

CONCLUSIONS: Many drugs used for children during anesthesia continue to lack FDA labeling for pediatric use. Off-label use of these drugs is an accepted practice that is considered superior to the alternative of withholding needed medications. Studies are still needed to determine the safety and efficacy of drugs that lack FDA labeling for this vulnerable patient population.

動畫可緩解兒童麻醉誘導期焦慮
Cartoon Distraction Alleviates Anxiety in Children During Induction of Anesthesia
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背景: 本研究通過讓 3~7 歲的小兒在手術室麻醉誘導前看一部動畫片和玩喜愛的玩具,來觀察這種做法是否能有效緩解術前焦慮。
方法: 本實驗入選 130 名 3~7 歲 ASA1~2 級的小兒。隨機分為 3 組:第 1 組(對照組),第 2 組(玩具組),第 3 組(動畫組)。第 2 組的兒童被要求帶著他們最喜歡的玩具並玩耍直到麻醉誘導前。第 3 組的兒童在麻醉誘導前可觀看他們選的動畫片。在術前晚上,在麻醉準備室,以及麻醉誘導前通過改良的耶魯術前焦慮量表(mYPAS)和由父母記錄的焦慮視覺評分量表對孩子們的術前焦慮程度進行評分。
結果: 在麻醉準備室內,第 2 組的 mYPAS 和父母記錄的焦慮視覺評分都明顯比 1 組和 2 組的低 (mYPAS: P = 0.007; 父母記錄的焦慮視覺評分: P = 0.02)。在手術室內,第 3 組的這兩個評分在三組中是最低的。第 3 組分別有 3 個和 5 個小兒,在手術室內的這兩個焦慮評分要高於麻醉前準備室的。但是第 1 組中分別有 32 個和 34 個的兒童數;第 2 組中分別有 25 個和 32 個的兒童兩項焦慮評分是高於的(P < 0.001),第 1 組,第 2 組和第 3 組在
BACKGROUND: We performed this study to determine the beneficial effects of viewing an animated cartoon and playing with a favorite toy on preoperative anxiety in children aged 3 to 7 years in the operating room before anesthesia induction.

METHODS: One hundred thirty children aged 3 to 7 years with ASA physical status I or II were enrolled. Subjects were randomly assigned to 1 of 3 groups: group 1 (control), group 2 (toy), and group 3 (animated cartoon). The children in group 2 were asked to bring their favorite toy and were allowed to play with it until anesthesia induction. The children in group 3 watched their selected animated cartoon until anesthesia induction. Children’s preoperative anxiety was determined by the modified Yale Preoperative Anxiety Scale (mYPAS) and parent-recorded anxiety Visual Analog Scale (VAS) the night before surgery, in the preanesthetic holding room, and just before anesthesia induction.

RESULTS: In the preanesthetic holding room, the group 2 mYPAS and parent-recorded anxiety VAS scores were significantly lower than those of groups 1 and 3 (mYPAS: \( P = 0.007 \); parent-recorded anxiety VAS: \( P = 0.02 \)). In the operating room, the children in group 3 had the lowest mYPAS and parent-recorded anxiety VAS scores among the 3 groups (mYPAS: \( P < 0.001 \); parent-recorded anxiety VAS: \( P < 0.001 \)). In group 3, the mYPAS and parent-recorded anxiety VAS scores of only 3 and 5 children were increased in the operating room compared with their scores in the preanesthetic holding room, whereas the anxiety scores of 32 and 34 children in group 1 and 2 and 3 children in group 2 had increased (\( P < 0.001 \)). The number of children whose scores indicated no anxiety (mYPAS score <30) in the operating room was 3 (7%), 9 (23%), and 18 (43%) in groups 1, 2, and 3, respectively (\( P < 0.001 \)).

CONCLUSIONS: Allowing the viewing of animated cartoons by pediatric surgical patients is a very effective method to alleviate preoperative anxiety. Our study suggests that this intervention is an inexpensive, easy to administer, and comprehensive method for anxiety reduction in the pediatric surgical population.
BACKGROUND: We performed a descriptive study of operating room (OR) case scheduling within 1 week of the day of surgery.

METHODS: The data used were from the case scheduling and transaction audit tables of a hospital’s anesthesia and OR information management systems. Each change to a scheduled case in the OR information system was captured in an audit table, including the date and time when the change was made. The timestamps allowed reconstruction of the elective OR schedule for each date of surgery at preceding dates (e.g., 2 workdays ahead). The sample size was $n=17$ consecutive 4-week periods. The allocated OR time, for each combination of service and day of the week, was the number of hours that minimized the inefficiency of use of OR time, a weighted combination of the hours of underutilized OR time and the more expensive hours of overutilized OR time. Data are reported as mean ±SE.

RESULTS: (1) The percentage of OR date combinations with at least 1 add-on case was 24.1% ± 0.3%. The most recent addition of a case to an OR occurred 1 working day before surgery for 22.3% ± 0.4% of OR date combinations. At least half (51.5% ± 0.5%) of ORs had its last case scheduled or changed within 2 working days of surgery. In addition, when allocated OR time was filled and the service scheduled additional case(s), the median time ahead when each such case was scheduled was 2.2 ± 0.2 workdays. Thus, managers can productively focus on the day of surgery starting 2 working days before surgery. (2) Once allocated time was full, the ratio of the net additional cases scheduled to the total number performed was 1.2% ± 0.6%. However, 11.1% ± 1.7% of the total were additional cases. Thus, schedulers should rely on the allocated time to be predictive of the actual (net) workload that will occur in the future, on the day of surgery. (3) For service and day combinations for which 2 working days ahead the scheduled hours exceeded the allocated hours, there was no significant net increase in minutes of cases scheduled ($P = 0.79$), unlike when the scheduled hours were less than allocated ($P < 0.0001$). Thus, additional hours of cases scheduled within the same number of workdays are heterogeneous both within and among services based on the prior hours of cases scheduled.

CONCLUSIONS: Planning anesthesia assignments, ORs to target, etc., can be done productively starting 2 working days ahead of surgery. There are so many changes to the OR schedule those last 2 workdays that anesthesia groups should be engaged with the scheduling
办公室期间。The primary predictor of additional net hours of cases to be scheduled is the difference between the allocated (i.e., forecasted) OR time and the hours scheduled so far. (Anesth Analg 2012;115:95)

關於新型雙氯芬酸注射劑與酮咯酸或安慰劑在腹部或盆腔手術後急性中重度疼痛中作用比較的一項多中心，雙盲，隨機，多劑量研究
A Novel Injectable Formulation of Diclofenac Compared with Intravenous Ketorolac or Placebo for Acute Moderate-to-Severe Pain After Abdominal or Pelvic Surgery: A Multicenter, Double-Blind, Randomized, Multiple-Dose Study
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背景：歐洲及其他國使用雙氯芬酸注射劑的歷史悠久，常規用法是在 30~120min 內靜脈滴注或一次性肌肉注射 75mg 雙氯芬酸。而新型的注射劑 Dyloject®將雙氯芬酸鈉溶解於羟丙基β-環糊精（HPβCD），以便於小劑量靜脈注射或肌肉注射。這項多中心、多劑量、多日、隨機、雙盲的研究分為 3 個平行組，調查低劑量的 Dyloject®以小劑量注射是否能有效減輕腹部或盆腔手術術後的急性疼痛。

方法：術後 6 小時內出現中重度疼痛的成人患者（定義：視覺類比量表（VAS）[0~100mm] 50mm）按 1:1:1:1 隨機分組，分別接受 Dyloject®（18.75 或 37.5mg）靜脈注射；酮咯酸 30mg 靜脈注射，或安慰劑。所有治療組的病人每 6 小時接受一次靜脈注射直至出院，至少觀察病人 48 小時，但最長至 5 天。可以隨時靜脈注射嗎啡來進行解救鎮痛，3 小時內總量不超過 7.5mg。主要有效指標是實驗藥物給予後 48 小時內疼痛強度差異之和（SPID）。

結果：331 名患者接受了大於等於一次劑量的藥物研究。在第一個 48 小時內，與安慰劑相比，兩種劑量組 Dyloject®和酮咯酸都明顯減輕了術後疼痛的程度（P<0.05），也使需要嗎啡解救鎮痛的病人數銳減。兩種劑量組的 Dyloject®和酮咯酸與安慰劑相比明顯減少丁嗎啡的需要劑量（P<0.0001），在使用 Dyloject®18.75mg 劑劑組和酮咯酸組中，嗎啡解救鎮痛的時間間隔也得到顯著延長。所有的治療相關的副作用發生率為 20.2%。Dyloject®劑量組均無治療相關嚴重副作用，酮咯酸組則有 1 例。

結論：對於腹部或盆腔手術術後出現急性中重度疼痛的患者，在接受劑量為 18.75 mg 和 37.5 mg 的 Dyloject®治療後，與安慰劑組相比有明顯的鎮痛作用。同時 Dyloject®和酮咯酸都明顯減少了患者對阿片類藥物的需要量。

（諸琳婕 譯 陳傑 校）

BACKGROUND: Injectable formulations of diclofenac have long been available in Europe and other countries. These formulations use a default dose of 75 mg of diclofenac delivered IV over 30 to 120 minutes or as an IM injection. A novel formulation of injectable diclofenac sodium, Dyloject®, is solubilized with hydroxypropyl β-cyclodextrin (HPβCD) so that it can be given IV
or IM in a small volume bolus. In this multicenter, multiple-dose, multiple-day, randomized, double-blind, parallel-group phase 3 study, we investigated whether lower doses of HPβCD diclofenac delivered as a small volume bolus would be effective for the management of acute pain after abdominal or pelvic surgery.

METHODS: Adults with moderate and severe pain, defined as ≥50 mm on a 0 to 100 mm visual analog scale, within 6 hours after surgery were randomly assigned (1:1:1:1 ratio) to receive HPβCD diclofenac, 18.75 mg or 37.5 mg; ketorolac tromethamine 30 mg; or placebo. Patients in all treatment arms received a bolus IV injection every 6 hours until discharged. They were observed for at least 48 h, and for up to 5 days. Rescue IV morphine was available any time, up to a total of 7.5 mg over a 3-hour period. The primary efficacy measure was the sum of pain intensity differences from 0 to 48 hours after study drug initiation.

RESULTS: Three hundred thirty-one patients received ≥1 dose of study drug. Over the first 48 hours, both IV HPβCD diclofenac doses, as well as ketorolac, produced significant reductions in pain intensity over placebo (all P < 0.05), as well as significant reductions in the need for rescue morphine administration. Both doses of HPβCD diclofenac, as well as ketorolac, significantly reduced rescue morphine dosages, as compared to placebo (P < 0.0001), and time to rescue morphine administration was significantly increased by treatment with 18.75 mg diclofenac and ketorolac. The overall incidence of treatment-related adverse events was 20.2%. No treatment-related serious adverse events were reported in either diclofenac dose group, whereas only 1 was reported in the ketorolac group.

CONCLUSIONS: For patients with acute moderate and severe pain after abdominal or pelvic surgery, repeated 18.75 mg and 37.5 mg doses of HPβCD diclofenac provided significant analgesic efficacy, as compared to placebo. Significant analgesic efficacy was also provided by the active comparator ketorolac. Both HPβCD diclofenac and ketorolac significantly reduced the need for opioids.
BACKGROUND: Bupivacaine (BVC) and ropivacaine (RVC) are local anesthetics widely used in surgical procedures. In previous studies, inclusion complexes of BVC or RVC in hydroxypropyl-β-cyclodextrin (HP-β-CD) increased differential nervous blockade, compared to the plain anesthetic solutions. In this study we evaluated the local neural and muscular toxicity of these new formulations containing 0.5% BVC or RVC complexed with HP-β-CD (BVC<sub>HP-β-CD</sub> and RVC<sub>HP-β-CD</sub>).

METHODS: Schwann cell viability was assessed by determination of mitochondrial dehydrogenase activity, and histopathological evaluation of the rat sciatic nerve was used to identify local neurotoxic effects (48 hours and 7 days after the treatments). Evaluations of serum creatine kinase levels and the histopathology of rat gastrocnemius muscle (48 hours after treatment) were also performed.

RESULTS: Schwann cell toxicity evaluations revealed no significant differences between complexed and plain local anesthetic formulations. However, use of the complexed local anesthetics reduced serum creatine kinase levels 5.5-fold, relative to the plain formulations. The differences were significant at \( P < 0.05 \) (BVC) and \( P < 0.01 \) (RVC). The histopathological muscle evaluation showed that differences between groups treated with local anesthetics (BVC or RVC) and their respective complexed formulations (BVC<sub>HP-β-CD</sub> or RVC<sub>HP-β-CD</sub>) were significant \( (P < 0.05) \).

CONCLUSIONS: We concluded that the new formulations presented a lower myotoxicity and a similar cytotoxic effect when compared to plain local anesthetic solutions.
BACKGROUND: The clinical utility of focused transthoracic echocardiography (TTE) is increasingly recognized in perioperative medicine. However its use is limited among anesthesiologists because of a lack of training. The most efficient training methods have not been determined. We hypothesized that simulation-based TTE training would be more effective than traditional lecture-based methods for teaching basic TTE skills to the anesthesiology residents.

METHODS: In this prospective randomized study, 61 anesthesiology residents (in anesthesia clinical training years 1 to 3) were randomized to either control (n = 30) or simulation groups (n = 31) for TTE training. A standardized pretest was administered before TTE training sessions of 45 minutes each. The first training session used a lecture-based video didactic in the control group or a TTE simulator in the simulation group. Comprehension in both groups was then assessed using a written posttest and by performing a TTE examination on a volunteer subject. TTE examinations were graded on the ability to acquire the correct image, image quality, anatomy identification, and time required to attain proper imaging by 2 blinded experts. A second training session incorporating "hands-on" training with a volunteer subject was conducted in a subset of 21 residents (n = 11 control, n = 10 simulation). The simulation group included additional simulator training. After the second session, another posttest on a volunteer subject was administered.
RESULTS: Pretest scores revealed similar preintervention knowledge among residents (56.0% ± 11.9% vs 59.3% ± 11.0%, P = 0.25; control versus simulator group, respectively). The simulation group scored higher on all criteria after the first training session: written posttest (57.9% ± 8.8% vs 68.2% ± 10.1%; P < 0.001), volunteer subject posttest image quality scores (0 to 25 scale) (6.4 ± 3.5 vs 12.4 ± 4.2; P = 0.003), anatomy identification scores (0 to 25 scale) (8.3 ± 6.6 vs 17.8 ± 6.6; P = 0.003), and percentage correct views (50 ± 19 vs 78 ± 21; P < 0.001). After the second session, all scores were again improved in the simulation group: volunteer subject posttest image quality scores (9.6 ± 3.3 vs 15.6 ± 2.8; P = 0.002), anatomy identification scores: (17.6 ± 3.8 vs 22.8 2.4; P = 0.003), and percentage correct views (80 ± 16 vs 96 ± 8; P = 0.007).

DISCUSSION: This prospective randomized study demonstrated that anesthesiology residents trained with simulation acquired better skills in TTE image acquisition and anatomy identification on volunteer subjects. The educational benefit of simulation persisted even with introduction of hands-on instruction with volunteer subjects in both groups. The impact of these short-term educational approaches on longer-term retention and actual clinical application warrants further investigation.
A single metered dose of aerosolized fentanyl during a single inspiration. The aerosol is of high purity (≥98%) at a particle size (1 to 3.5 microns) shown to be best for pulmonary absorption.

**METHODS:** We conducted the study in healthy volunteers in 2 stages. In the crossover stage, 10 subjects received IV fentanyl 25 µg and inhaled fentanyl 25 µg on separate occasions. The dose escalation stage was a multidose, randomized, double-blind, placebo-controlled, single-period dose escalation study of inhaled fentanyl (50 to 300 µg). Serial blood sampling was performed over an 8-hour period after drug administration to determine the pharmacokinetic profile, and serial pupillometry was performed as a measure of pharmacodynamic effect.

**RESULTS:** In the crossover stage the pharmacokinetic profiles of the inhaled and IV fentanyl showed similar peak arterial concentrations and areas under the curve. The time to maximum concentration was slightly shorter for the inhaled than IV fentanyl, 20.5 and 31.5 seconds, respectively. In the dose escalation stage the administration of repeated doses resulted in predictable, dose-dependent serum concentrations.

**CONCLUSIONS:** This study has demonstrated that the pharmacokinetic profile of single doses of inhaled fentanyl is comparable to IV administration.

在模擬麻醉誘導時發言與更好的團隊績效有關: 一項觀測性研究
Speaking up is related to better team performance in simulated anesthesia inductions: an observational study.
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背景: 在這項研究中，我們的目標是測試在麻醉中發言，即，質疑，糾正或闡明當前程式和技術團隊績效的關係。假設 1: 隊伍成員更高水準的發言與更高水準的技術團隊績效有關。假設 2: 隊伍成員將發言，闡明自己的程式或一個啓動程式的變化。假設 3: 在團隊合作的早期階段更高水準的發言將和以後的階段更高水準的發言有關。

方法: 這種前瞻性觀察研究涉及 2 人專案麻醉團隊在一個大型教學醫院中模擬全麻誘導中小的非常規事件(如，心動過緩)。受試者註冊麻醉護士和居民。每組由一個護士和一個居民組成。記錄同步視頻和重要參數。在 12 個不同的類別中，兩個訓練有素的觀察員忽略了假設編碼和進一步的團隊溝通和協調的行爲。在團隊各自的類別中，所有的團隊測量被量化為占總時間的百分比。兩位經驗豐富的工作人員使用一個 Delphi 驗證評級檢查表，在麻醉醫師不知情的情況下評估團隊的技術績效。採用線性回歸與居民和護理水準的發言，對假設 1 和假設 3 使用兩個單獨的預測變數進行了測試。假設 2 使用滯後序列分析 Z 值變化，在有條件和無條件轉換中觀察值有顯著不同。

結果: 共有 31 個護士和 31 居民參與。技術團隊的績效可以通過預測護士的發言 (R(2)= 0.18, P = 0.017), 而不是居民的 (R(2)= 0.19, P = 0.053); 這個結果支持護士的假設 1。支援假設 2，通過提供資訊 (Z = 18.08, P < 0.001) 進行澄清，居民對發言有反應，通過啓動程式上改變給指令 (Z = 4.74, P < 0.001) 和團隊成員監控 (Z = 3, P = 0.0013)。同樣，護士與澄清的過程，
BACKGROUND: Our goal in this study was to test the relationship between speaking up—i.e., questioning, correcting, or clarifying a current procedure—and technical team performance in anesthesia. Hypothesis 1: team members’ higher levels of speaking up are related to higher levels of technical team performance. Hypothesis 2: team members will react to speaking up by either clarifying their procedure or initiating a procedural change. Hypothesis 3: higher levels of speaking up during an earlier phase of teamwork will be related to higher levels of speaking up during a later phase.

METHODS: This prospective observational study involved 2-person ad hoc anesthesia teams performing simulated inductions of general anesthesia with minor nonroutine events (e.g., bradycardia) in a large teaching hospital. Subjects were registered anesthesia nurses and residents. Each team consisted of 1 nurse and 1 resident. Synchronized video and vital parameter recordings were obtained. Two trained observers blinded to the hypotheses coded speaking up and further team communication and coordination behavior on the basis of 12 distinct categories. All teamwork measures were quantified as percentage of total time spent on the respective teamwork category. Two experienced staff anesthesiologists blinded to the hypotheses evaluated technical team performance using a Delphi-validated rating checklist. Hypotheses 1 and 3 were tested using linear regression with residents’ and nurses’ levels of speaking up as 2 separate predictor variables. Hypothesis 2 was analyzed using lag sequential analysis, resulting in Z values representing the extent to which the observed value for a conditional transition significantly differs from its unconditional value.

RESULTS: Thirty-one nurses and 31 residents participated. Technical team performance could be predicted by the level of speaking up from nurses (R(2) = 0.18, P = 0.017) but not from residents (R(2) = 0.19, P = 0.053); this result supports Hypothesis 1 for nurses. Supporting Hypothesis 2, residents reacted to speaking up with clarifying the procedure by providing information (Z = 18.08, P < 0.001), initiating procedural change by giving instructions (Z = 4.74, P < 0.001) and team member monitoring (Z = 3, P = 0.0013). Likewise, nurses reacted with clarifying the procedure by providing or evaluating information (Z = 16.09, P < 0.001; Z = 3.72, P < 0.001) and initiating procedural change by providing assistance (Z = 0.57, P = 0.0013). Indicating a trend for Hypothesis 3, nurses’ level of speaking up before intubation predicted their level of speaking up during intubation (R(2) = 0.15, P = 0.034), although this did not reach the Bonferroni-corrected significance level of P = 0.025. No respective relationship was found for residents (R(2) = 0.15, P = 0.096).

CONCLUSIONS: This study provides empirical evidence and shows mechanisms for the positive relationship between speaking-up behavior and technical team performance.

類比案例顯示心肺復蘇在產科急救危機中的不足：來自以色列麻醉醫師
Deficits in the provision of cardiopulmonary resuscitation during simulated obstetric crises: results from the Israeli Board of Anesthesiologists.
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Background: Cardiac arrest in the parturient is often fatal, but appropriate resuscitation in this special situation may save the lives of the mother and/or unborn baby. Concern has arisen as to application of recommended techniques for resuscitation in the obstetric patient. The Israel Board of Anesthesiology has incorporated simulation assessment into accreditation examinations. The candidates represent a unique national cohort in which we were able to assess competence in the simulated scenario of cardiorespiratory arrest in the parturient.

Methods: A simulated scenario of preeclampsia with magnesium toxicity leading to cardiac arrest in a pregnant patient was performed by 25 senior anesthesiology residents. A unique two-stage simulation examination consisting of high-fidelity simulation followed immediately by oral debriefing was conducted. The assessment was scored using a predetermined checklist of key actions and answers to clarifying questions. Simulation performance was compared to debriefing performance.

Results: During the board examination, resuscitation not specific to the pregnant patient was performed well (commencing chest compressions, bag-mask ventilation, cardiac defibrillation); however actions specific to the parturient were performed poorly. Left uterine displacement, cricoid pressure during bag-mask ventilation, and instructing preparations to be made for perimortem cesarean delivery within 5 minutes were performed by 68%, 48%, and 40% of candidates respectively (lower 99% confidence limit 42%, 25%, and 19%, respectively). Cricoid pressure during bag-mask ventilation was performed by 48% (25%) but described in debriefing by 80% of candidates (53%) (P = 0.08), and time setting for perimortem cesarean delivery was performed by 40% (29%) but described by 80% (53%) (P = 0.05) of examinees.
CONCLUSIONS Senior anesthesiology residents have poor knowledge of resuscitation of the pregnant patient. The results suggest 2-stage simulation including an oral component may reveal disparities in knowledge not assessed by simulation alone, but definitive conclusions require further study.
overall use of these medications. We describe use of analgesics, anesthetics, and sedatives in pediatric inpatients by result of conducting a statistical analysis of medication data from >800,000 pediatric hospitalizations in the United States. The purpose was to provide national estimates for the percentage of hospitalized children receiving specific analgesics, anesthetics, and sedatives and their use by age group.

**Methods:** Data from the Premier Database, the largest hospital-based, service-level comparative database in the country, were used. We identified all uses of a given medication, selected the first use for each child, and calculated the prevalence of use of specific medications among hospitalized children in 2008 as the number of hospitalizations in which the drug was used per 100 hospitalizations. Dose and number of doses were not considered in these analyses.

**Results:** The dataset contained records for 877,201 hospitalizations of children younger than 18 years of age at the time of admission. Thirty-three medications and an additional 11 combinations were administered in this population, including nonsteroidal antiinflammatory drugs, local and regional anesthetics, opioids, benzodiazepines, sedative-hypnotics, barbiturates, and others. The 10 most frequently administered analgesic, anesthetic, or sedative medications used in this population were acetaminophen (14.7%), lidocaine (11.0%), fentanyl (6.6%), ibuprofen (6.3%), morphine (6.2%), midazolam (4.5%), propofol (4.1%), lidocaine/prilocaine (2.5%), hydrocodone/acetaminophen (2.1%), and acetaminophen/codeine (2.0%). Use changed with age, and the direction of change (increases and decreases) and the type of change (linear, u-shaped, or other) appeared to be specific to each drug.

**Conclusions:** A variety of drug classes and individual medications were used to manage pain and sedation in hospitalized children. The variation in patterns of use reflects the heterogeneity of the dataset, comprising a wide range of ages and conditions in which analgesia, anesthesia, and sedation might be required. It was not possible to assess whether use of a specific medication was clinically appropriate, except to note use of medications in age subgroups without pediatric labeling.
Appropriate balance between excitatory and inhibitory neural activity patterns is of utmost importance in the maintenance of neuronal homeostasis. General anesthetic–induced pharmacological interference with this equilibrium results not only in a temporary loss of consciousness but can also initiate long-term changes in brain function. Although these alterations were initially considered deleterious, recent observations suggest that at least under some specific conditions, they may eventually improve neural function. The goal of this review is to provide insights into the mechanisms underlying these dual effects. Basic science issues on the important role of critical periods during neural circuitry assembly will be discussed to better understand how even brief exposures to general anesthetics could initiate context-dependent lasting changes in neuronal structure and function. Recent series of observations suggesting a developmental stage–dependent impact of these drugs on synaptogenesis will then be summarized together with currently known molecular mechanisms underlying these effects. Particular emphasis will be placed on how anesthetic drugs modulate neural plasticity in the adult brain and how this may improve neural function under some pathological states. The ensemble of these new observations strongly suggests that general anesthetics should not merely be considered toxic drugs but rather acknowledged as robust, context-dependent modulators of neural plasticity.

背景：創傷治療面臨多項挑戰，包括麻醉科以外的醫生認爲創傷治療增加醫療責任的風險。我們利用美國麻醉醫學協會終審投訴專案資料庫和全國住院患者抽樣來比較創傷麻醉治療的索賠率和全國創傷手術的資料。我們也通過美國麻醉醫學協會終審投訴專案資料庫來評估創傷麻醉醫療事故索賠和非創傷手術麻醉索賠的損害和責任的特徵。


結果：本研究期間共 6215 例手術麻醉索賠中，創傷手術引起的索賠占 6%。從 1990 年至 2001 年期間，住院創傷手術索賠率一直低於非創傷手術的索賠率，根據年度調整的比率比與創傷手術與非創傷手術索賠比例的比率為 0.62（95%置信區間，0.53 0.72； P <
BACKGROUND: Trauma care has many challenges, including the perception by nonanesthesia physicians of increased medical malpractice liability. We used the American Society of Anesthesiologists' Closed Claims Project database and the National Inpatient Sample (NIS) to compare the rate of claims for trauma anesthesia care to national trauma surgery data. We also used the American Society of Anesthesiologists' Closed Claims Project database to evaluate injury and liability profiles of trauma anesthesia malpractice claims compared to nontrauma surgical anesthesia claims.

METHODS: Surgical anesthesia claims for injuries that occurred between 1980 and 2005 in the American Society of Anesthesiologists' Closed Claims Project database of 8954 claims were included in this analysis. Trauma was defined using cause of injury criteria in state trauma registries, including out-of-hospital falls. To estimate national trauma anesthesia rates, we used injury codes in NIS reports to define trauma discharges and NIS discharges with surgical procedure codes for the denominator. The year-adjusted odds ratio and P value comparing the national trauma anesthesiainjury rates and American Society of Anesthesiologists' Closed Claims Project inpatient claim rates in the 1990 to 2001 time period were calculated by a multivariate logistic regression of the injury/trauma outcome on year and the NIS/Closed Claims Project indicator. Payments in claim resolution between trauma claims and nontrauma surgical anesthesia claims were compared by χ(2) analysis, Fisher exact test for proportions, and Kolmogorov-Smirnov test for payment amounts.

RESULTS: Trauma claims represented 6% of the total 6215 surgical anesthesia claims in the study period. The inpatient trauma claims rates were consistently lower than the NIS injury rates for 1990 to 2001. The year-adjusted odds ratio comparing the trauma claims rates to the NIS injury rates was 0.62 (95% confidence interval [CI], 0.53 to 0.72; P < 0.001, likelihood ratio test). Trauma claims and nontrauma surgical anesthesia claims did not differ in appropriateness of care, whether or not a payment was made to the plaintiff, or size of payments.

CONCLUSION: Despite reported perceptions that trauma care involves a high risk of medical liability, there was no apparent increased risk of liability among inpatients presenting for trauma anesthesia care. The proportion in malpractice claims in trauma anesthesia care was not increased compared to nontraumatic surgical anesthesia care. With respect to medicolegal liability, these results support participation of anesthesia providers in multidisciplinary trauma care and organized systems.

Different roles of peripheral mitogen-activated protein kinases in carrageenan-induced arthritic pain and arthritis in rats.
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BACKGROUND: Accumulating evidence suggests that extracellular signal-regulated protein kinase (ERK), p38, and c-Jun N-terminal kinase (JNK) might be involved in hypersensitivity of various pain models. However, there is a lack of direct evidence for actual involvement of peripheral ERK, p38, and JNK in induction and maintenance of arthritic pain and the development of arthritis.

METHODS: We evaluated the effects of preemptive and therapeutic intra-articular administration of selective inhibitors of p38 (SB203580) and JNK (SP600125), and indirect inhibition of ERK with a blocker (PD98059) of the kinase that activates ERK (i.e., MEK, the mitogen-activated protein kinase [MAPK]/ERK kinase), on arthritic pain-related behavior such as reduction of weight load and the inflammatory responses such as neutrophil infiltration into the synovium and knee joint diameter in rats. In addition, arthritis-induced phosphorylation of ERK, p38, and JNK in synovium of knee joint was examined.

RESULTS: Pretreatments with PD98059, SB203580, and SP600125 prevented the reduction of weight load induced by the carrageenan injected into the knee joint cavity, but their effects showed different time course patterns. Therapeutic administration of PD98059 and SB203580 partially reversed carrageenan-induced reduction of weight load, and their effects showed a similar time course pattern. However, therapeutic administration of SP600125 had no effect on the reduction of weight load. Hematoxylin and eosin staining revealed that carrageenan-induced
neutrophil infiltration into the synovium was inhibited by pretreatment with SB203580 or SP600125, but not PD98059. Western blot measurements showed distinct expression of phosphorylated ERK, p38, and JNK in the synovium at different time points after carrageenan injection.

CONCLUSION: These results suggest that ERK, p38, and JNK signaling pathways at the peripheral level may play different roles in arthritic pain and arthritis of the knee joint.
BACKGROUND: Bilateral breast augmentation is an increasingly popular day-case procedure. Local infiltration with sedation is routinely used for its ease of application compared with the more complex and potentially riskier paravertebral blockade (PVB). We hypothesized that ropivacaine injected by experienced anesthesia providers into the paravertebral space as a PVB was more effective than ropivacaine injected by the operating surgeon (plastic surgeon) directly into the zone of surgical dissection.

METHODS: Forty female patients who were ASA physical status I or II and undergoing bilateral subpectoral cosmetic breast augmentation were recruited for participation in a prospective, randomized, single-blind study. Patients were randomized to 1 of 2 groups: ropivacaine via PVB, or surgical infiltration of ropivacaine. In both groups, the surgeon was asked to infiltrate the appropriate area with either saline (PVB group) or ropivacaine (local infiltration group). Both groups were sedated with propofol, titrated to effect. The plastic surgeon was blinded to the solution injected. Data collected included demographic characteristics, intraoperative cooperation scores, recovery room postoperative nausea and vomiting, analgesia use, and visual analog scale pain scores. All patients were asked to complete a preoperative anxiety and quality of recovery questionnaire and to record their pain scores and analgesia requirements on discharge. The outcome measures were (i) intraoperative patient cooperation as assessed by the plastic surgeon, (ii) propofol requirement, (iii) postoperative pain, and (iv) quality of recovery.

RESULTS: Forty patients completed the study. PVB improved intraoperative cooperation (significance of difference $P < 0.001$, WMWodds = 6.69 with 95% 1-sided confidence interval CI $\geq 2.85$), reduced propofol requirement (significance of difference $P = 0.005$, WMWodds = 0.35, CI $< 0.69$), and reduced postoperative pain (significance of difference $P = 0.007$, WMWodds = 0.38, CI $< 0.73$). No patients developed PVB-related complications. Only patients in the local infiltration group required analgesia (30%, significance of difference $P = 0.01$).

CONCLUSION: In a limited number of patients, we found that for bilateral breast augmentation performed on the same day, ropivacaine PVB was superior to ropivacaine injected by the operating surgeon. The benefits of PVB still need to be weighed against its potential risks, especially in the office setting.

(余亦南 譯 馬皓琳 李士通 校)
0.35, CI <0.69), and decreased average postoperative pain in the home environment (significance of difference \( P = 0.007, \text{WMWodds} = 0.38, \text{CI} <0.73\)). There were no PVB complications. Only patients from the surgical infiltration group required rescue analgesics (30%, significance of difference = 0.01).

CONCLUSIONS: In a limited number of patients, we found that PVB is superior to direct surgical infiltration of ropivacaine for bilateral breast augmentation in same-day surgery. These advantages need to be balanced against the potential risks of PVB, especially in an office setting.

The Effect of Perioperative Intravenous Lidoedaine and Ketamine on Recovery After Abdominal Hysterectomy

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BACKGROUND: Perioperative ketamine infusion reduces postoperative pain; perioperative lidocaine infusion reduces postoperative narcotic consumption, speeds recovery of intestinal function, improves postoperative fatigue, and shortens hospital stay. However, it is unknown whether perioperative IV lidocaine and/or ketamine enhances acute functional recovery. We therefore tested the primary hypothesis that perioperative IV lidocaine and/or ketamine in patients undergoing open abdominal hysterectomy improves rehabilitation as measured by a 6-minute walk distance (6-MWD) on the second postoperative morning.
METHODS: Women having open hysterectomy were anesthetized with sevoflurane, followed by patient-controlled morphine. Patients were factorially randomized to one of the following groups: (1) lidocaine and placebo, (2) placebo and ketamine, (3) placebo and placebo, or (4) lidocaine and ketamine. Lidocaine was given as a bolus (1.5 mg/kg), followed by lidocaine infusion of 2 mg/kg/h for the first 2 hours, and then 1.2 mg/kg/h for 24 postoperative hours. Ketamine was given as a bolus (0.35 mg/kg), followed by ketamine infusion of 0.2 mg/kg/h for the first 2 hours, and then 0.12 mg/kg/h for 24 postoperative hours. The primary double-blind outcome was 6-MWD on the second postoperative morning; secondary outcomes included pain scores, opioid consumption, postoperative nausea and vomiting, and fatigue score.

RESULTS: The study was stopped after a planned interim analysis of 64 patients showed that lidocaine crossed the preplanned futility boundary, with mean ± SD of 202 ± 66 m versus 202 ± 73 m for lidocaine versus placebo, respectively, and mean difference (interim adjusted 97.5% confidence interval) of 0.93 m (−52, 54) (P = 0.96); the ketamine effect also crossed the futility boundary, with mean ± SD of 193 ± 77 m versus 210 ± 61 m for ketamine versus placebo, respectively, and mean difference (interim adjusted 97.5% confidence interval) of −11 m (−65, 44) (P = 0.54). No interaction between the 2 intervention effects was observed (P = 0.96). Neither intervention significantly influenced any of the secondary outcomes.

CONCLUSION: Our results do not support use of lidocaine or ketamine for improving 6-MWD on the second postoperative day after open hysterectomy.

The Association of Maternal Race and Ethnicity and the Risk of Postpartum Hemorrhage
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背景：在美國，產科預後與患者種族有很大相關性，但是我們對於產後出血(PPH)的風險與種族差異的關係知之甚少。我們探討了因子宮收縮乏力導致的產後出血與種族差異的相關性，並連續對可能的相關因素進行了調整。

方法：本文分析樣本基於2005至2008年間全國住院病人。我們計算出了宮縮乏力病的輸血及子宮切除的概率。我們建立了多變數邏輯回歸分析模型，通過連續添加潛在相關因素來計算這些意外事件在不同種族組別孕婦中發生的優勢。

結果：雖然對潛在的相關因素（依白種人作為參考，西班牙裔調整後比值比：1.21, 99%可信區間[1.18, 1.25]；亞太島民裔為1.31 [1.25, 1.38]）做出了調整，但是相對於白種人，西班牙裔種族和亞太島民裔種族在宮縮乏力性產後出血的發生概率上有明顯的統計學增長。在宮縮乏力性產後出血導致的輸血和子宮切除方面也有類的結果。
BACKGROUND: There are profound racial and ethnic disparities in obstetric outcomes in the United States, but little is known about disparities in risk of postpartum hemorrhage (PPH). We explored the association of race and ethnicity on the risk of PPH due to uterine atony with sequential adjustment for possible mediating factors.

METHODS: This analysis was based on the Nationwide Inpatient Sample, from between 2005 and 2008. The frequencies of atonic PPH and atonic PPH resulting in transfusion or hysterectomy were estimated. We developed multivariable logistic regression models to estimate the odds of these outcomes in maternal racial/ethnic groups by sequentially adding potential mediators.

RESULTS: Hispanic ethnicity and Asian/Pacific Islander race were associated with a statistically significant increased odds of atonic PPH in comparison with Caucasians, despite adjustment for potential mediators (adjusted odds ratio [OR] for Hispanics: 1.21, 99% confidence interval [1.18, 1.25]; for Asians/Pacific Islanders: 1.31 [1.25, 1.38], with Caucasians as reference). Similar results were observed for these racial/ethnic groups for atonic PPH resulting in transfusion or hysterectomy.

CONCLUSION: Hispanic ethnicity and Asian/Pacific Islander race are significant risk factors for atonic PPH independent of measured potential mediators; biological differences may play a role.
Streamed Video Clips to Reduce Anxiety in Children During Inhaled Induction of Anesthesia

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BACKGROUND: Anesthesia induction in children is frequently achieved by inhalation of nitrous oxide and sevoflurane. Pediatric anesthesiologists commonly use distraction techniques such as humor or nonprocedural talk to reduce anxiety and facilitate a smooth transition at this critical phase. There is a large body of successful distraction research that explores the use of video and television distraction methods for minor medical and dental procedures, but little research on the use of this method for ambulatory surgery. In this randomized control trial study we examined whether video distraction is effective in reducing the anxiety of children undergoing inhaled induction before ambulatory surgery.

METHODS: Children (control = 47, video = 42) between 2 and 10 years old undergoing ambulatory surgery were randomly assigned to a video distraction or control group. In the video distraction group a video clip of the child’s preference was played during induction, and the control group received traditional distraction methods during induction. The modified Yale Preoperative Anxiety Scale was used to assess the children’s anxiety before and during the process of receiving inhalation anesthetics.
RESULTS: All subjects were similar in their age and anxiety scores before entering the operating rooms. Children in the video distraction group were significantly less anxious at induction and showed a significantly smaller change in anxiety from holding to induction than did children in the control group.

CONCLUSIONS: Playing video clips during the inhaled induction of children undergoing ambulatory surgery is an effective method of reducing anxiety. Therefore, pediatric anesthesiologists may consider using video distraction as a useful, valid, alternative strategy for achieving a smooth transition to the anesthetized state.

BACKGROUND: Loss of information occurs frequently during handover and affects the continuity of care. Improving handovers is therefore a key patient safety goal. After surgery, the patient is transferred to the postanesthesia care unit (PACU), and handover to the nurse includes both handover of monitoring equipment (connecting electrocardiogram, calibrating arterial lines, infusion pumps, etc.) and patient/procedure-specific information. Multitasking is likely to
increase the risk of information loss during handover. It is unknown to what extent the transfer of equipment and information occurs simultaneously or sequentially in daily practice.

**METHODS:** A nationwide questionnaire on the subject of patient handover was returned by 494 health care practitioners concerned with handovers from operating room (OR) to PACU. In addition, 101 handovers from the OR to the PACU were videotaped in 2 academic hospitals (n = 20), 3 teaching hospitals (n = 43) and 1 community hospital (n = 38). The occurrence of simultaneous or sequential transfer of equipment and information was recorded by two independent observers.

**RESULTS:** Simultaneous handover of equipment and information was the preference for a minority of respondents to the national survey (11%, 95% confidence interval, 8% to 14%). Self-reported simultaneous handover was 43% (39% to 47%). In the videotaped handovers, simultaneous handover was used for 65% (56% to 74%), which was even higher in the academic centers. The simultaneous handovers were no more than 0.2 minute faster than sequential handovers (P = 0.38).

**CONCLUSIONS:** In most videotaped handovers from OR to the PACU, there was simultaneous transfer of equipment and information. Although most health care providers are unaware of it, this form of multitasking during patient handover in the PACU is common. Future studies should evaluate whether this multitasking also leads to loss of critical patient information and reduced patient safety.

開放性結腸手術中局部吹入溫暖濕潤的 CO₂會增加開放性創傷和核心溫度：一個隨機臨床試驗

**Local Insufflation of Warm Humidified CO₂ Increases Open Wound and Core Temperature During Open Colon Surgery: A Randomized Clinical Trial**

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**背景:** 開放性手術傷口暴露在寒冷乾燥的周圍空氣中會導致熱量以輻射、對流和蒸發的形式散失。同樣, 全身麻醉和椎管內麻醉也會降低患者的核心溫度。儘管有常規的預防措施, 但術中輕度低體溫仍然是常見的並且是導致術後發病率和死亡率的原因之一。我們假設局部吹入溫暖的足夠濕潤的 CO₂會使開放性手術創傷和核心溫度都增加。

**方法:** 83名行開放性結腸手術的病人平均的、平行的隨機接受標準保溫措施（包括充氣式保溫法、溫暖液體法和四肢頭部隔絕法），或者額外在層流（10L/min）中通過氣體擴散方式向局部傷口吹入溫暖（37°C）濕潤（100%相對濕度）的 CO₂。用熱敏紅外攝像機和鼓膜溫度計跟蹤記錄傷口表面和核心的溫度。

**結果:** 與對照組 29.6°C 相比較，溫暖濕潤 CO₂組術中傷口區域平均溫度是 31.3°C (P < 0.001, 95% 可信區間[CI], 1.2°C 至 2.3°C)。同樣的，相對於對照組 28.5°C，術中傷口邊緣平均溫度是 30.1°C (P < 0.001，95% CI, 0.2°C 至 0.7°C)。手術開始前的平均核心溫度溫暖濕潤 CO₂組 36.7°C ± 0.5°C 與對照組的 36.6°C ± 0.5°C 相近（95% CI，0.4 至
到手術結束時，兩組有顯著差異，溫溼濕潤 CO\textsubscript{2} 組是 36.9 ± 0.5°C 比對照組的 36.3 ± 0.5°C (P < 0.001, 95% CI, 0.38°C 至 0.82°C)。此外，溫溼濕潤 CO\textsubscript{2} 組 40 名病人中只有 8 名病人的核心溫度<36.5°C (20%，95% CI, 7 至 33%)。然而，在對照組 39 名病人中有 24 名是這樣的情況（兩組之間的差異百分比為 42%，95% CI, 22% 至 61%，P < 0.001）。以<36.0°C 爲分界點，在手術結束時相對於對照組 7 名病人（18%，95% CI, 5% 至 31%，P = 0.005）低體溫，溫溼濕潤 CO\textsubscript{2} 組沒有病人低體溫（兩組之間的差異百分比為 18%，95% CI, 6% 至 30%，P = 0.005）。溫溼濕潤 CO\textsubscript{2} 組手術時間的中位數（第 25/75 百分位）是 181.5（147.5/288）分鐘，對照組 217（149/288）分鐘（P = 0.312）。兩組間的临床變數沒有顯著差異。

結論：在開放性手術傷口吹入溫溼的足夠溼潤的 CO\textsubscript{2} 可增加手術創傷和核心的溫度，並有助於維持正常體溫。

（唐 賢 譯 馬皓琳 李士通 校）

BACKGROUND: The open surgical wound is exposed to cold and dry ambient air resulting in heat loss through radiation, evaporation, and convection. Also, general and neuraxial anesthesia decrease the patient’s core temperature. Despite routine preventive measures mild intraoperative hypothermia is still common and contributes to postoperative morbidity and mortality. We hypothesized that local insufflation of warm fully humidified CO\textsubscript{2} would increase both the open surgical wound and core temperature.

METHODS: Eighty-three patients undergoing open colon surgery were equally and parallelly randomized to either standard warming measures including forced-air warming, warm fluids, and insulation of limbs and head, or to additional local wound insufflation of warm (37°C) humidified (100% relative humidity) CO\textsubscript{2} at a laminar flow (10 L/min) via a gas diffuser. Wound surface and core temperatures were followed with a heat-sensitive infrared camera and a tympanic thermometer.

RESULTS: The mean wound area temperature during surgery was 31.3°C in the warm humidified CO\textsubscript{2} group compared with 29.6°C in the control group (P < 0.001, 95% confidence interval [CI], 1.2°C to 2.3°C). Also, the mean wound edge temperature during surgery was 30.1°C compared with 28.5°C in the control group (P < 0.001, 95% CI, 0.2°C to 0.7°C). Mean core temperature before start of surgery was similar with 36.7°C ± 0.5°C in the warm humidified CO\textsubscript{2} group versus 36.6°C ± 0.5°C in the control group (95% CI, 0.4 ± 0.1°C). At end of surgery, the 2 groups differed significantly with 36.9 ± 0.5°C in the warm humidified CO\textsubscript{2} group versus 36.3 ± 0.5°C in the control group (P < 0.001, 95% CI, 0.38°C to 0.82°C). Moreover, only 8 patients of 40 in the warm humidified CO\textsubscript{2} group had a core temperature <36.5°C (20%, 95% CI, 7 to 33%), whereas in the control group this was the case in 24 of 39 (62%, 95% CI, 46% to 78%, P = 0.001) patients (difference of the percentages between the groups 42%, 95% CI, 22% to 61%, P < 0.001). With a cutoff at <36.0°C none of the patients in the warm humidified CO\textsubscript{2} group compared with 7 patients (18%, 95% CI, 5% to 31%, P = 0.005) in the control group was hypothermic at end of surgery (difference of the percentages between the groups 18%, 95% CI, 6% to 30%, P = 0.005). The median (25th/75th percentile) operating time was 181.5 (147.5/288) minutes in the warm humidified CO\textsubscript{2} group versus 217 (149/288) minutes in the control group (P = 0.312). Clinical variables did not show any significant differences between the groups.

CONCLUSIONS: Insufflation of warm fully humidified CO\textsubscript{2} in an open surgical wound cavity increases surgical wound and core temperatures and helps to maintain normothermia.
Ginkgo biloba Extract Attenuates Hyperalgesia in a Rat Model of Vincristine-Induced Peripheral Neuropathy

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BACKGROUND: Chemotherapy-induced peripheral neuropathy is a common, dose-limiting side effect of cancer chemotherapeutic drugs. Hyperalgesia is a common component of neuropathic pain. Ginkgo biloba extract (GBE) is an oriental herbal medicine that has various pharmacological actions. In this study, we evaluated the effects of oral GBE on hyperalgesia in a rat model of vincristine-induced neuropathy.

METHODS: Male Sprague-Dawley rats (200–250 g) were injected intraperitoneally with vincristine or saline (0.1 mg/kg/d) using a 5-day-on, 2-day-off schedule over 12 days. All the behavioral tests for mechanical, cold, and heat hyperalgesia were conducted before the daily injection during the course of vincristine treatment. Rats that developed hyperalgesia 14 days after vincristine injection were randomly assigned into 4 groups. Distilled water and GBE (50, 100, and 150 mg/kg) were administered, respectively, to the individual groups. We examined the hyperalgesia at preadministration and at 15, 30, 60, 90, 120, 150, and 180 minutes after oral drug administration.

RESULTS: Saline injection did not have any significant effect on mechanical, cold, and heat hyperalgesia. Vincristine injection produced mechanical and cold hyperalgesia. For the GBE groups, the paw withdrawal threshold to mechanical stimuli was significantly increased and
withdrawal frequency to cold stimuli was significantly reduced versus the control group dose-dependently ($P < 0.05$).

**CONCLUSIONS:** This study demonstrates that oral administration of GBE is associated with a dose-dependent antihyperalgesic effect on mechanical and cold stimuli in a rat model of vincristine-induced neuropathy.

**胸椎旁阻滯相關解剖結構的體三維超聲成像**

**Volumetric Three-Dimensional Ultrasound Imaging of the Anatomy Relevant for Thoracic Paravertebral Block**

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**BACKGROUND:** While ultrasound imaging of the thoracic paravertebral space in 2-dimensional (D) mode allows examination of the paravertebral anatomy in the transverse or sagittal axis, volumetric 3D ultrasound imaging provides multiplanar images in several orthogonal (perpendicular) planes and may provide additional anatomical information. In this imaging study we assessed the feasibility of 3D ultrasound imaging of the anatomical area relevant to the thoracic paravertebral block.

**METHODS:** Four healthy young adult volunteers were recruited. With the volunteer in the sitting position, the C7 spinous process and the spinous processes of the T1 to 5 vertebra were identified. All images were obtained using a Philips iU22 ultrasound system with a high-frequency 3D 4D volume linear array transducer (13 to 5 MHz). A 3D volumetric scan of the right thoracic paravertebral region was performed with the sagittal plane as the data acquisition plane.

**RESULTS:** With 3D multiplanar scanning, the sagittal, transverse, and coronal views of the paravertebral anatomy were simultaneously visualized in all subjects. Unlike 2D images, the
articulation between the neck of the rib and the transverse process was well delineated in the sagittal and coronal images of the multiplanar scans. The rendered 3D volume allowed an in-depth view of the paravertebral anatomy from all sides (i.e., top, bottom, front, back, left, and right).

**CONCLUSIONS:** Volumetric 3D ultrasound imaging of the thoracic paravertebral space is feasible and provides more detailed spatial anatomical information than 2D ultrasound imaging.