AnesthesiaFile®

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2024

Clinical and Genetic Factors Associated with Post-Operative Nausea and Vomiting After Propofol Anaesthesia.

Comparison of Mepivacaine 2% and Isobaric Bupivacaine 0.5% Spinal Anesthetics for Total Knee Arthroplasty.

Determining Residual Gastric Volume in Healthy Children Using Ultrasound.

Recent COVID-19 Infection is Associated with Increased Mortality in the Ambulatory Surgery Population.

Risk Factors for Recurrence of Post-Dural Puncture Headache Following an Epidural Blood Patch: A Retrospective Cohort Study.

Volume XX: Issue 5 / May 20XX- SAMPLE

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Anesthesiologists, Pharmacists, Certified Registered Nurse Anesthetists, and other anesthesiology professionals.

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Each issue of AnesthesiaFile® contains 30 educationally sound, original learning objectives. Refer to each issue.

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Article Abstracts

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Baettig S J, et al. Pre-operative Gastric Ultrasound in Patients at Risk of Pulmonary Aspiration: A Prospective Observational Cohort Study.

Anaesthesia. 2023; 78: 1327-1337. 38 references.

Institute of Anesthesiology and Critical Care Medicine, Klinik Hirslanden Zurich and the Medical Faculty of the University of Zurich, Zurich, Switzerland. E-mail: michael.ganter@hirslanden.ch

Abstracted by L Easley, who has nothing to disclose.

Objective:
Assess gastric content using point-of-care ultrasound in patients at potential risk of pulmonary aspiration.

Gastric point-of-care ultrasound is a simple, non-invasive, and cost-effective diagnostic tool for managing patients at risk of gastric regurgitation. The authors test the hypothesis that routine gastric ultrasound can provide key information for preoperative risk assessment and impact anesthetic management of individual patients.

Adult patients with ≥1 risk factor for pulmonary aspiration (based on pre-defined departmental standards) were included in this single-center, prospective observational study. The anesthetist responsible for perioperative care rated patient risk of pulmonary aspiration as high or low using only clinical findings and patient history. Gastric sonography was then performed immediately before induction of anesthesia. After sonography and before induction of anesthesia, the anesthetist reassessed the individual aspiration risk and was allowed to adjust the induction plan accordingly to ensure a safe procedure. Patients with solid or mixed gastric content were classified as high risk, and patients with an empty stomach or fluid content below the cut-off were classified as low risk.

A total of 2003 patients were included in the study. Reflux was the most prevalent risk factor in elective settings, while abdominal pathology, nausea/vomiting, and recent trauma were the most frequent in emergency settings. In the 1246 patients undergoing elective surgery, 61% had an empty stomach, 28% had fluid, and 9% had solid or mixed gastric content. In the 757 patients undergoing emergency surgery, 56%, 29%, and 14% had empty, fluid, or solid gastric sonographic appearances, respectively. Multivariable logistic regression with binary (high vs. low) sonographic risk classification was used to determine the factors that had a strong association with increased risk of pulmonary aspiration. These included gastrointestinal obstruction, recent trauma, opioid use, and ASA physical status 4 vs. 1.

Pre-operative gastric sonography added useful information to the peri-operative care of patients at risk of pulmonary aspiration, who were undergoing elective or emergency surgery. Routine gastric ultrasound led to adjustment in individual risk assessment. Current estimation of aspiration risk and subsequent management does not allow for individualized management planning.

Important Points:
The authors concluded, "preoperative gastric ultrasound helps to identify high- and low-risk situations in patients at risk of aspiration, adds information to peri-operative airway management and can lead to changes to patient care." Individualized care and patient safety could be improved with routine use of pre-operative gastric ultrasound.

2

Boesing C, et al. Effects of Individualised Positive End-expiratory Pressure Titration on Respiratory and Haemodynamic Parameters During the Trendelenburg Position with Pneumoperitoneum. A Randomised Crossover Physiologic Trial.

Eur J Anaesthesiol. 2023; 40: 817-825. 44 references.

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Abstracted by L Easley, who has nothing to disclose.

Objective:
Compare the short-term effects of different positive end-expiratory pressure (PEEP) strategies during Trendelenburg positioning with pneumoperitoneum.

Trendelenburg position with pneumoperitoneum during surgery impairs respiratory mechanics and dorsobasal atelectasis formation, which leads to increased lung stress. The authors determine whether individualized positive end-expiratory pressure (PEEP) titration strategies result in higher PEEP levels and end-expiratory transpulmonary pressure (P_{TP}) with favorable respiratory mechanics, gas-exchange, and hemodynamics compared with standard PEEP of 5 cmH_2O ($PEEP_5$) during the Trendelenburg position with pneumoperitoneum.

Included in this prospective, randomized crossover single-center physiologic trial were 36 patients scheduled for robot-assisted laparoscopic radical prostatectomy. Three different PEEP strategies were applied in random order in a crossover fashion: $PEEP_5$, lowest driving pressure-guided PEEP titration ($PEEP_{\Delta P}$), and esophageal pressure-guided PEEP titration ($PEEP_{Peso}$) targeting an end-expiratory P_{TP} of 0 cmH_2O. The primary endpoint was the PEEP level when set according to $PEEP_{\Delta P}$ and $PEEP_{Peso}$ strategies compared with $PEEP_5$. Secondary endpoints were respiratory mechanics, end-expiratory lung volume (EELV), gas-exchange, and hemodynamic parameters.

The study protocol was completed in all patients without hemodynamic instability occurring between the start and end of the study procedures. The set PEEP levels at $PEEP_{\Delta P}$ and $PEEP_{Peso}$ were higher compared with $PEEP_5$. End-expiratory P_{TP} was higher when using $PEEP_{Peso}$. EELV was higher and dynamic lung strain was lower with $PEEP_{Peso}$ and $PEEP_{\Delta P}$ compared with $PEEP_5$. $PEEP_{Peso}$ resulted in lower cardiac output. Oxygen delivery was higher when using $PEEP_{\Delta P}$ compared with $PEEP_{Peso}$.

$PEEP_{\Delta P}$ minimized driving pressure, inspiratory lung stress, and dynamic elastic power. $PEEP_{\Delta P}$ and $PEEP_{Peso}$ resulted in higher end-expiratory P_{TP}, lung volume, and improved oxygenation. $PEEP_5$ and $PEEP_{\Delta P}$ preserved cardiac output and oxygen delivery during surgery.

Important Points:
$PEEP_{\Delta P}$ improved the effects of the Trendelenburg position with pneumoperitoneum during surgery on end-expiratory P_{TP} and lung volume, decreased driving pressure and dynamic elastic power, and improved gas-exchange while preserving cardiac output.

3

Cai W, et al. Effects of Laryngeal Mask Ventilation on Postoperative Atelectasis in Children Undergoing Day Surgery: A Randomized Controlled Trial.

BMC Anesthesiol. 2023; 23: 1-9. 25 references.

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Abstracted by L Easley, who has nothing to disclose.

Objective:
Evaluate the effect of laryngeal mask ventilation on postoperative atelectasis in children undergoing day surgery.

Atelectasis is a common perioperative complication in children with laryngeal mask general anesthesia. The authors compare the effects of laryngeal mask mechanical ventilation vs. preserved spontaneous breathing on postoperative atelectasis in children undergoing day surgery.

Children aged 3-7 years, undergoing elective day surgery for cryptorchidism or indirect inguinal hernia with operation time <2 hours, were included in this study from April-August 2022. A total of 46 children were randomly divided into a spontaneous breathing group and a mechanical ventilation group. A standard anesthetic protocol was used for all patients, including midazolam, propofol, and sufentanil. Lung ultrasound was performed before the induction of anesthesia and again 20 minutes after the removal of the laryngeal mask. Primary outcomes were the incidence of postoperative atelectasis and the postoperative atelectasis score. Secondary outcomes were baseline data, duration of anesthesia, duration of surgery, and vital signs at 3 time points (after insertion of the laryngeal mask, 10 minutes after the start of surgery, and before the removal of the laryngeal mask). Complications, such as reflux aspiration, were recorded.

The incidence of atelectasis in the spontaneous breathing group was 91.30% and in the mechanical ventilation group was 39.13%. No statistically significant differences were seen in the vital signs of the children at any time. The end-expiratory carbon dioxide was significantly lower in the mechanical ventilation group than in the spontaneous breathing group. In the second lung ultrasound examination, the postoperative pulmonary atelectasis score was significantly lower in the mechanical ventilation group than in the spontaneous breathing group.

Postoperative atelectasis can increase intrapulmonary shunt, lead to hypoxemia, increase the risk of postoperative pneumonia in children, and affect their safety during the perioperative period. While children undergoing day surgery have a short hospital stay, atelectasis remains in the body for a long time after surgery; this increases the risk of hypoxemia and pulmonary infection. The incidence of pulmonary atelectasis found in patients undergoing laryngeal mask general anesthesia is high, indicating that more attention should be given to children undergoing day surgery.

Important Points:
The use of mechanical ventilation in patients with laryngeal mask general anesthesia can reduce the incidence and severity of postoperative atelectasis and prevent the accumulation of carbon dioxide, without encountering complications such as reflux and aspiration.

Assessment

1. **In the study by Baettig, et al., of pre-operative gastric ultrasound in patients at risk of pulmonary aspiration, what was the most prevalent risk factor in elective settings?**
    a. Abdominal pathology
    b. Nausea and vomiting
    c. Reflux
    d. Recent trauma

2. **According to Boesing, et al., what is the effect of driving pressure-guided PEEP titration ($PEEP_{\Delta P}$) on respiratory and hemodynamic parameters during the Trendelenburg position with pneumoperitoneum?**
    a. Increased driving pressure
    b. Increased dynamic elastic power
    c. Lower cardiac output
    d. Minimized inspiratory lung stress

3. **According to Cai, et al., use of mechanical ventilation in children with laryngeal mask general anesthesia:**
    a. Increased incidence of postoperative atelectasis
    b. Reduced the incidence of postoperative atelectasis
    c. Encouraged the accumulation of carbon dioxide
    d. Increased reflux and aspiration

4. **In the study by Chaturvedi, et al., about maternal outcomes, compared with residence in urban areas, rural residence was associated with:**
    a. Highest adjusted increased odds of maternal end-organ injury
    b. Lower odds of inpatient mortality
    c. More often receiving neuraxial anesthesia for vaginal birth
    d. Lower prevalence of women with substance abuse disorder

5. **What did Critchley, et al., find in the study of an obstetric airway management quality improvement project?**
    a. No change in the use of the checklist
    b. Decreased use of ramped patient positioning
    c. Increased use of videolaryngoscopy (VL)
    d. Small, insignificant increase in use of low flow nasal oxygen

6. **In the study by Cukierman, et al., oxygen delivered via nasal continuous positive airway pressure (CPAP) in obese or obstructive sleep apnea (OSA) patients undergoing colonoscopy:**
    a. Reduced the number of airway maneuvers
    b. Improved oxygenation
    c. Improved respiratory parameters
    d. Increased airway maneuver performance time

27. What was found in the study by Vanpeteghem, et al., comparing blood pressure control with phenylephrine (PE) or dobutamine (Dobu)?

a. Blood pressure was better maintained in the Dobu group.
b. Cerebral oxygen saturation (rS_cO_2) was significantly increased in both groups.
c. Cardiac index (CI) decreased in both groups.
d. Neither PE nor Dobu affected paravertebral tissue oxygen saturation.

28. What was found in the study by Vovk Racman, et al., comparing propofol (PRO) and dexmedetomidine (DEX) for sedation during transcatheter aortic valve replacement (TAVR)?

a. The PRO group required significantly more vasoactive agents.
b. The incidence of postoperative delirium (POD) was high in both the DEX and PRO groups.
c. The DEX group had more need for fentanyl for breakthrough analgesia.
d. The incidence of delayed neurocognitive recovery (DNCR) was significantly lower with DEX.

29. What was found in the study by Wu, et al., on the effect of neuromuscular block (NMB) on surgical conditions during laparoscopic surgery in neonates and small infants?

a. Time to tracheal extubation was longer in the no NMB group.
b. For neonates and small infants, moderate NMB was suggested as the best option.
c. Depth of NMB was not associated with better surgical conditions.
d. NMB was associated with an increase in adverse events during anesthesia induction and maintenance.

30. From the study by Yagani, et al., on the incidence of interstitial alveolar syndrome in preeclamptic women, which of the following is TRUE?

a. Bedside lung ultrasound (LUS) did not detect pulmonary interstitial edema.
b. Pulmonary interstitial syndrome correlated with diastolic dysfunction and high blood pressure.
c. At admission, the most frequent complaint from these preeclamptic patients was chest pain.
d. The B-line scores were significantly lower in patients with diastolic dysfunction.

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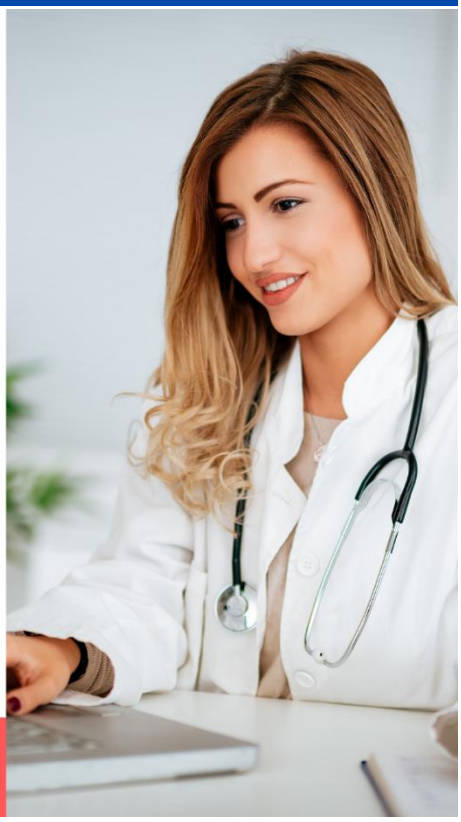

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