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Caudal anesthesia with sedation versus general anesthesia with local infiltration during pediatric cardiac catheterization: effect on perioperative hemodynamics and postoperative analgesia

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Introduction: Children undergoing cardiac catheterization are usually in need for perioperative analgesia.

Aim and objective: We studied the effects of local infiltration of bupivacaine at the groin in generally anesthetized children as against caudal bupivacaine combined with dexmedetomidine– ketamine sedation on intraoperative and postoperative hemodynamics and duration of postoperative analgesia in pediatric patients undergoing cardiac catheterization.

Materials and methods: A total of 40 patients (1-7 years) were randomly assigned into one of the two groups: one group (group GI) received general anesthesia (GA) together with local infiltration using 5 ml bupivacaine 0.25% at the beginning and at the end of the procedure and the other group (group SC) received sedation by ketamine at 3 mg/kg followed by infusion at a rate of 1 mg/kg/h to maintain sedation with caudal administration of a mixture of bupivacaine 0.25% at 3 mg/kg with dexmedetomidine 0.5 mcg/kg both diluted in normal saline to a volume of 1.2 ml/kg. Hemodynamic variables (blood pressure (BP) and heart rate (HR)) were evaluated at T1 (baseline, after induction), T2 (10 min after local infiltration/caudal administration), T3 (at time of puncture for vascular access), T4 (10 min after emergence), T5 (1 h after the procedure), and T6 (4 h after the procedure). Pain was evaluated 10 min after emergence (P1), after 1 h in the ICU (P2), after 4 h in the ICU (P3), and after 8 h (P4) by the FLACC (Face, Leg, Activity, Crying, Consolability) score. Side effects were observed for 12 h.

Results: The severity of pain was much less in the SC group than in the GI group. FLACC pain score was evaluated at P1 (10 min after emergence), P2 (1 h after procedure), P3 (4 h after procedure), and P4 (8 h after procedure) and it was found that pain is much less in the SC group than in the GI group during the first 4 h after the procedure with significant difference between the two groups ($P < 0.05$). There was a more stable hemodynamic profile for the SC group than for the GI group. The mean arterial pressure (MAP) and HR decreased from the baseline in both groups and they decreased more significantly in the SC group than in the GI group. In addition, the decrease in MAP and HR continued for a longer duration in the SC group than in the GI group. We observed a slightly prolonged analgesia with less need for supplemental analgesics in the SC group than in the GI group.

Keywords: bupivacaine, dexmedetomidine, pain, pediatric cardiac catheterization

Impact of Clinical Pharmacist Educational Intervention on the Potential Drug-Drug Interactions in Surgical Intensive Care Unit

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Objective: Drug-drug interactions (DDIs) represent a significant problem in the prescribing of medications and, as more drugs are released onto the market, the potential number of interactions increases. However, many theoretical drug interactions are not clinically relevant as they do not result in a clinically significant adverse outcome. Intensive care unit (ICU) patients are particularly at high risk of DDIs. In Middle East there is no sufficient data about the incidence of drug interactions. The study was done to study the impact of clinical pharmacist educational intervention on the pattern and frequency of potential (DDIs) in surgical ICU.

Materials and methods: A three phases study was done, phase (1) (pre-intervention phase) was a retrospective cohort study of the frequency of potential DDIs in 500 prescriptions of patients in surgical ICU using Lexi-Interact interaction database. Phase (2) (intervention phase) involved the implementation of DDIs reducing measures by using educational methods of awareness to physicians. Phase 3 (post-intervention phase) was a prospective study of the frequency of potential DDIs in the 500 prescription collected after intervention phase (phase 2) to measure the impact of those DDIs reducing measures.

Results: Altogether 191 patients during pre-intervention and 198 during post-intervention were studied. A total of 2228 potential DDIs were identified during phase 1 and 2139 potential DDIs were identified during phase 3. There is a positive correlation between number of drugs and number of interactions per prescription in both phases, in pre-intervention phase $r = 0.77$ and in post-intervention phase $r = 0.78$., both are significant at 0.05 level (2-tailed). In both phases most of the potential DDIs encountered were of 'Moderate' severity (89%) of the potential DDIs during the pre-intervention phase and 91.5% during the post-intervention phase were of risk rating C according to Lexi-Interact interaction database. There is no statistical difference between mean number of PDDIs in pre-intervention and post- intervention phases ($P = 0.859$) at 0.05 level (2-tailed). There is no statistical difference in percent of PDDIs in the different degrees of severity between pre-intervention and post-intervention phase ($Z = -1.4$, $P = 0.153$) at 0.05 level. The most common potential DDIs observed were between potassium chloride and tinzaparin (5.6%) followed by phenytoin-omeprazole (2.9%), and KCl-enoxaparin (2.7%) (pre-intervention phase) and potassium chloride and enoxaparin (4.5%) followed by capoten-nitroderm (2.7%), and capoten-enoxaparin (2.6%) (post-intervention phase).

Conclusion: The present study demonstrated the leading role of clinical pharmacist in the detection of potential DDIs. In our study a relatively high frequency of occurrence of DDIs among patients in surgical ICU. However, most of them were of minor-to-moderate clinical significance, where monitoring of the patient was adequate to prevent harmful consequences. We identified major and contraindicated potential drug-drug interactions occurring in surgical ICU patients. Implementation of a computerized drug-drug interaction surveillance system, based on interaction severity, could use the data described in this study as a foundation to develop a knowledge base.

Keywords: clinical pharmacist, ICU, drug interactions

Reduced incidence of methicillin-resistant Staphylococcus aureus ventilator-associated pneumonia in trauma patients: A new insight into the efficacy of ventilator care bundle

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Introduction: There has been a dramatic recent increase in the incidence of ventilator-associated pneumonia caused by methicillin-resistant Staphylococcus aureus. We investigated the effect of implementation of a ventilator care bundle on the incidence of ventilator-associated pneumonia in a cohort of trauma patients.

Materials and Methods: A ventilator care bundle was implemented after a 7-month baseline period. Ventilator-associated pneumonia rates, rates of methicillin-resistant Staphylococcus aureus acquisition, rates of vancomycin administration, intensive care unit lengths of stay, and durations of mechanical ventilation were prospectively recorded for 10 months.

Results: Use of a ventilator care bundle was associated with a reduced incidence of ventilator-associated pneumonia from 42 cases per 1000 ventilator days (95% confidence interval: 17–83) in the pre-intervention group to 19 (95% confidence interval: 11–34) cases per 1000 ventilator days in the post-intervention group ($P = 0.04$). The rate of methicillin-resistant S. aureus acquisition was significantly different in the pre-intervention group (27%) and the post-intervention group (3.9%) ($P < 0.001$). Relative to the pre-intervention period, there was a significant reduction in the duration of mechanical ventilation ($P = 0.03$) and length of intensive care unit stay during the post-intervention period ($P = 0.015$).

Conclusion: The incidence of methicillin-resistant S. aureus-ventilator-associated pneumonia in trauma patients could be reduced by implementation of a ventilator care bundle.

Impact of immediate versus delayed tracheal extubation on length of ICU stay of cardiac surgical patients

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Introduction: Early tracheal extubation after cardiac surgery has proven to be safe, cost-effective, and improves resource utilization. It has become feasible due to improvement in perioperative anesthetic management, advanced surgical techniques, myocardial protection and tepid cardiopulmonary bypass techniques.

Ultra-fast track anesthesia (UFTA) aims at immediate extubation of cardiac surgical patients at the end of the operation. In the current study, we compared the effect of performing ultra-fast track anesthesia versus continued postoperative mechanical ventilation on the length of ICU stay.

Materials and Methods: Fifty two elective adult patients were randomly allocated into UFTA and conventional groups by computer-generated random numbers. Redo operations, pre-operative intubation, uncontrolled diabetes, shock/LVEF <45%, PASP >55 mm Hg, creatinine clearance <50 ml min-1, haemodynamic instability, or those with concerns of postoperative bleeding were excluded. Pre- and intra-operative management was similar and Logistic EuroSCORE II was calculated for all. Intra-operatively, haemodynamic parameters, urine output, SPO2, arterial blood gas analysis (ABG), 5-lead ECG, operative- bypass- and cross clamp time, and opioid consumption were collected. Postoperatively, patients were compared during their ICU stay (Table 1). Data were analysed by χ^2/Fischer exact, unpaired student's *t*-test, univariate two-group repeated measures ANOVA with post hoc Dunnett's test, and Mann-Whitney *U* tests as appropriate. $P < 0.05$ was considered significant.

Results: Patients were comparable regarding their peri-operative characteristics and EuroSCORE. The ICU LOS was shorter in the UFTA group [57.4 (18.6) vs. 95 (33.6) h. $P < 0.001$], without increasing postoperative renal, respiratory complications rate or reopening rate.

Conclusion: UFTA seems to decrease ICU LOS without increasing the rate of post-operative complications

Keywords: cardiac surgery, ultra-fast track anesthesia, immediate extubation, ICU stay

Table 1 ICU stay characteristic and complications

Variables	UFTA	Conventional	*P* value
Extubation time(h) mean(SD)	0.23 (1.18)	12.94 (5.03)	<0.001
ICU stay(h), mean(SD)	57.42 (18.62)	95.04 (33.58)	<0.001
VAS, mean(SD)	3.86 (0.67)	3.83 (0.37)	0.832
ICU morphine(mg) mean(SD)	4.19 (1.94)	5.08 (0.74)	0.035
Vomiting	6 (23.1%)	0	0.023
Ischaemia	2 (7.7%)	13 (50%)	0.002