41 NEURAXIAL CARDIOVASCULAR ACCIDENTAL DRUG ADMINISTRATION ERRORS REVIEW

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Background and Aims Neuraxial drug administration errors are catastrophic.^{1,2,3} Inadvertent neuraxial administration of cardiovascular (CV) drugs has not been reviewed previously.

Methods Medline and Google Scholar were searched through December 2020 using terms such as 'epidural drug error',

with 'spinal', 'intrathecal', or 'neuraxial'. Error reports analysed were limited to those of CV drugs administered via epidural (ED) or intrathecal (IT) route.

Results 28 case reports/case series describing administration of 10 drugs in 34 patients were identified. Digoxin (9), ephedrine (6), and metaraminol (5) were involved in 20 of the 34 patients (table 1).

Except dopamine (1 patient of 3), phenylephrine, and mexiletine (the patient received infusion after bolus) all administrations were in the form of bolus (table 1).

Abstract 41 Table 1 Drug, route, dose administered and clinical features and management

Drug	N, NR	Dose Administered	Clinical consequences and management	Comment
Digoxin	8 IT 1 LE	0.25-0.5 mg 0.25 mg	Prolonged duration of paraplegia, encephalopathy, seizures. Management for some cases included specific measures such as Digibind, haemodialysis, steroids, ICU care. The pregnant women (4 of 5) developed residual neurological problems following IT digoxin requiring rehabilitation. LE: digoxin was associated with meningitis and status epilepticus.	Onset of paraplegia often delayed for more than an hour. Therapeutic serum digoxin levels reported in 2 patients. Radiological findings reported consistent with ischaemia, demyelination or myelitis in the spinal cord and diffuse cortical injuries.
Dobutamine	1 TE 1 IT	25 mg 10 mg	Hypertensive crisis (208/120), tachycardia. Normal postoperative sensory and motor function, ECG, and serum troponin levels.	The TE was used after realization of the error.
Dopamine	1 TE 2 IT	5 µg/kg/min (for 20 mins) 80 mg both IT patients	Hypertensive crises (208/120) and supraventricular tachycardia following TE. Epidural dopamine also caused abdominal pain, nausea, and vomiting. IT caused moderate hypertension, and sensory block to T10.	Rapid offset of symptoms and signs following TE discontinuation.
Ephedrine	6 LE	15-50 mg	Dose-dependent mild to moderate tachycardia and mild to severe hypertension. Some patients developed occipital headache. Epidural normal saline given as a bolus for 'dilution'.	Among the 4 errors during labour analgesia, no adverse effects reported for baby. Epidural used for CS after the errors for 2 patients.
Epinephrine	1 CE 1 IT	300 µg 10 µg	CE - immediate increased heart rate, BP, stroke volume, contractility and decreased SVR. IT - no effect	CE - Infant
Labetalol	1 LE 3 IT	15 mg 15-26mg	LE did not cause clinical effect. IT caused variable response: no effects, antihypertensive, or hypertensive.	One error via IT catheter. LE error during test dose.
Metaraminol	1 TE 4 LE	7 mg Unknown doses	Mild (following LE) to severe (TE) hypertension (232/113) a 30 minutes after error.	In one case, TE bolus near end of procedure. Haemodynamic changes in recovery room.
Mexiletine	1 TE	Unknown. Infusion over several hours.	Hypotension for several hours.	On the ward, epidural infusion disconnected during cardiac arrest. Mexiletine bolus followed by infusion started via TE instead of via central line.
Norepinephrine	1 IT	4 mg	Caesarean section. Severe headache, chest pain, agitation, increased blood pressure.	Incorrect vial drawn up. GA started.
Phenylephrine	1 TE	10.2 mg (infusion over 12 hours)	Moderate hypertension (160/80). Epidural normal saline infusion used for 'dilution'.	Incorrect bag hung to pump.

N- number of cases, NR - Neuraxial route, IT - intrathecal, TE, LE, CE- Thoracic, Lumbar, caudal epidural, respectively.

Abstract 41 Table 2 Human factors (<https://www.hfacs.com/hfacs-framework.html>) contributing to the neuraxial cardiovascular drug

Organisational influences	Purchase of look-alike ampoules, syringes, and vials. Cardiovascular and local anaesthetic syringes in one anaesthesia tray. Cardiovascular medications and local anaesthetics stored together. Failure to make change after previous errors resulting in same hospital having >1 error and of same cause. Staff scheduling with resident on every other night 24 hour calls for several consecutive cycles; midwife looking after three patients during night; and anesthesiologist having worked 19 hours at time of error.
Supervisory factors	One resident involved in two errors. Nurse breaking and holding wrong ampoule for anaesthetist to withdraw, junior resident broke the ampoule and held for anaesthetist to withdraw, junior anaesthesia resident broke ampoule and left on anaesthesia workstation and then scrubbed for procedure and asked other personnel to assist. First year resident using spinal catheter. Untrained staff bypassed hospital policy for second nurse to confirm correct medication for ED infusion. Infusion of wrong high-risk cardiovascular drug via epidural catheter for many hours.
Preconditions for unsafe acts	High-risk medication vial which was bought for another patient left over on anaesthesia trolley. Fixing the epidural and IV lines nearby over the chest.
Unsafe acts	Skill based errors (all), incorrect visual perception, exceptional policy violation.

IT Digoxin caused long lasting paraplegia in 5 patients. IT or ED vasopressors or inotropes caused reversible haemodynamic changes of variable duration.

Primary causes included ampoule errors (mostly for digoxin and labetalol), syringe swaps (in cases of ephedrine, epinephrine and metaraminol) and ED-IV line confusion (for phenylephrine and mexiletine infusions). NRFit could have prevented 14 (of 34) errors.

Table 2 lists the human factor contributing to the errors.

Conclusions Bar coding of both ampoules and syringes would have prevented several errors. In the absence of barcode reader or human double checking, NRFit devices could have prevented 14 misconnection (syringe or IV infusion lines) mistakes. Correction of deficiencies (e.g., high risk CV drug ampoules and syringes location, substandard supervision of anaesthesia residents/assistants) identified using HFACS are also fundamental. Management following neuraxial CV drugs is supportive.

42 PREPARING INTRATHECAL OPIOID INJECTATE, A 'TIP' FOR SUCCESS

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Background and Aims The technique of drawing up opioids for spinal anaesthesia can lead to error. We identified stages in the process which could be overlooked by the anaesthetist causing inadvertent overdosing or underdosing of opioids. This error is usually made by inclusion of residual fluid in the tip of the syringe, due to withdrawing the opioid in the 1 ml syringe (figure 1a) rather than injecting (figure 1b). The tip contains 0.05–0.07 mls, of greatest significance when dealing with small and concentrated amounts of opioid. We aimed to survey the department to identify the proportion of anaesthetists that were using a technique leading to inadvertent error.

Methods We identified fifty-seven anaesthetists in the department and surveyed their process of drawing up drugs for intrathecal injection. The main focus of the survey was the technique used to transfer the opioid into the spinal syringe injectate including the use of the filter needle.

Results Data was captured from 47/57 anaesthetists, the majority consultants. 40% of the department were administering a dose error of spinal fentanyl. 35% of the department were administering a dose error of spinal morphine and diamorphine. The filter needle was used inappropriately in 14% of cases.

Abstract 42 Figure 1

Conclusions Precision is essential in regional anaesthesia when using small and concentrated amounts of opioid in the injectate, therefore the inclusion of the amount in the tip can lead to significant dose error. We presented the results and re-educated the department in our clinical governance meeting.

43 GENERAL OR REGIONAL ANAESTHESIA FOR MICROVASCULAR FLAP SURGERY: COMPARISON OF SURGICAL COMPLICATION RATE AND DURATION OF HOSPITALIZATION

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Background and Aims Microvascular flap surgery is an effective method for difficult reconstructions and major defects.[1] There is an ongoing debate about the preferred method of anaesthesia for flap success.[2] We aim to evaluate the differences in the rate of microvascular flap surgery complications and duration of hospitalization between patients receiving regional anaesthesia (RA) and general anaesthesia (GA).

Methods This retrospective cohort study includes 54 adult patients undergoing elective microvascular flap surgery. The study was approved by the Ethics Committee of Riga Stradins University. The method of anaesthesia was chosen according to individual surgical necessity. Patients were divided into two groups – RA group (N=25) and GA group (N=29). Postoperative outcome data on surgical flap complications, duration of intensive care stay, and total duration of hospitalization was obtained.

Results RA and GA groups had no statistically significant differences in the rate of flap failure, infection, hematoma, or any other type of flap complication. GA group had a mean intensive care stay duration of 2.33 days (CI95% 0.62–5.25). RA group had a significantly lower mean intensive care stay duration of 0.26 days (0.06–0.57; $p=0.002$). GA group had a mean hospitalization duration of 24.4 days (14.42–34.31). RA group had a comparatively lower mean hospitalization duration of 14.25 days (9.55–19.01; $p=0.032$).

Conclusions The rate of surgical complications in microvascular flap surgery is equal for both RA and GA. Patients who receive GA have a longer mean intensive care stay and duration of hospitalization. In contrast to previous assertions, a meticulously administered regional anaesthesia might be preferred when surgically feasible.

44 RETROLAMINAR PARAVERTEBRAL CATHETERS FOR RIB PLATING SURGERY – A CASE SERIES

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Background and Aims The ultrasound-guided retrolaminar technique to paravertebral blockade (RLB) is safe, easy and minimally invasive for use in mastectomies¹, analgesia for rib fractures², and analgesia post thoracic surgery³ with reduced risks of pneumothorax and structural injury and reduced spread of injectate. Though literature described higher volume boluses followed by infusions, we present our experience with in-plane ultrasound-guided RLB catheter using moderate volume boluses twice daily (BD) for rib fixations.

Methods Five cases of ultrasound-guided retrolaminar paravertebral block catheter were observed between May 2019 and March 2020 in our institution who sustained multiple rib fractures and underwent surgical fixation. Details of the patients are presented in tables 1–2.

Results Patients' satisfaction is high – low pain scores shows that the degree of analgesia is more than adequate, with bolus