

Apnoea during Spinal Anesthesia: A Medication Error

Sir,

A medication error is any error in the medication process irrespective of whether it leads to adverse consequences or not. The errors may be due to several reasons, and the incidence of each error reported varies in different studies. Even then, they represent the tip of iceberg as many are not being reported for the fear of litigation or criticism by their fellow colleagues. One of the reasons for drug error includes similar color or shape of ampoules.^[1-3] Drug errors are reported and warnings are issued now and then;^[4] even then, literature is full of case reports where error occurred at some step during the administration process whether it is prescription, transcription, preparation, or administration. Hence, the issue needs to be highlighted to re-emphasize on this topic and bring awareness, especially among budding anesthesiologists, thereby preventing them from encountering similar situations. This also adds to the list of potential drugs which are liable to be the source of error.

A 70-year-old male, weighing 50 kg, was electively posted for hernia repair. Preanesthetic evaluation was unremarkable. After attaching routine monitoring and preloading with Ringer lactate, the patient was given spinal anesthesia with 0.5% bupivacaine heavy. The sensory block level was assessed and surgical procedure was allowed to start. Injection (inj.) midazolam 1 mg was given intravenous (i.v) for sedation and oxygen by ventimask was provided at 4 L/min. Inj. diclofenac intramuscular (i.m) was given as a part of the thesis work of resident of the role of inj. diclofenac i.m as an adjunctive analgesic. After a period of few minutes of drug administration, oxygen saturation started reducing and the patient developed hypertension and bradycardia. The patient failed to respond to verbal command. He was also nonresponsive to deep pain. Chest rise associated with spontaneous breathing was also reduced. The patient was immediately ventilated manually using 100% O₂ with closed circuit. Capnogram showed very high ETCO₂. A broken ampoule of atracurium on workstation and intact inj. diclofenac revealed the whole story - accidentally inj. atracurium had been administered intramuscularly in the place of inj. diclofenac. The patient was induced with inj. propofol i.v and intubated with cuffed endotracheal tube. Anesthesia was maintained with isoflurane and the patient was reversed with inj. neostigmine and glycopyrrolate on appearance of spontaneous respiratory efforts at the conclusion of the surgery. Postoperatively, the patient had no recall of intraoperative events.

Initially, oversedation was thought for patient's nonresponsiveness. Deteriorating vital parameters and no response to deep pain directed to look for some other cause for the situation. Case reports of muscle relaxant administration in awake patient have

been associated with severe psychological sequelae.^[5] However, this patient had no recall of intraoperative events probably because of antegrade amnesia produced by inj. midazolam.

The incident happened due to recent change in drug supplied to the hospital. The problem was anticipated on receiving the drug and message circulated among residents. However, situation could not be averted as one of the atracurium ampoules accidentally got misplaced among nearly similar-looking ampoules of diclofenac. The resident attributed the error to mental fatigue after night duty and her preoccupation with other thoughts during drug administration. The similar color labels and ampoule size [Figure 1] combined with inattention due to mental fatigue as well as lapse in supervision during administration led to the incident. Fortunately, subsequent intervention averted an adverse event.

Drug errors have been implicated as the root cause of anesthetic-related events in several studies. Anesthetic mortality survey conducted in the US in the year 2003 depicted medication event (40%) as the most common cause of perioperative cardiac arrest. The frequency is 2.08/100,000 as per Japanese Anesthesiologist Society and 1100/100,000 in teaching hospitals in New Zealand.

A critical incident is defined as any event under anesthesia care that could have led (if not discovered or corrected in time) or did lead to an undesirable outcome, ranging from increased length of hospital stay to death. There is a vast variation in the frequency of such critical incidents reported from various institutions (0.28–12.1%). Reasons for such vast variation are multifactorial. It is mainly because fear of retribution leads to under-reporting of some major events, while seemingly, minor events get unreported. Besides this, lack of motivation and formal reporting system also affects the results.

Human error has been implicated as the main cause (80%) of anesthesia-related critical incidents and mortality in many studies with others factors such as equipment error and pharmacological



Figure 1: Similar-looking ampoules

factors constituting the rest. In general, the anesthetist is engaged in a number of activities during the operation as monitoring the patient and the life support, recording the vital signs, evaluating blood loss and urine output, adjusting anesthetic level and administering the medications, i.v fluids, and blood, and adjusting the operation room table. Unintentional lapse of any of these distractive simultaneous anesthesia activities can cause complication. Human errors can be due to inexperience, poor or lack of supervision, over dependency on other people, haste, carelessness, fatigues, unsafe working conditions, and failure to follow personal routine.

Several measures are recommended by various observers to reduce these preventable errors and quite few of them are being incorporated into hospital protocols. Even then, none of the centers worldwide are spared of drug errors. Although these measures have considerably reduced the incidence of adverse events, they have failed to eliminate it all together. The reason being the basic component – we humans who have to apply them and being human, we inadvertently make mistakes. The chances of error could be reduced if drugs to be administered are preferably cross-checked by two separate individuals. Barcoding technology has the potential to prevent ampoule or syringe swap. All these errors are identifiable, predictable, and repetitive. Strategies in preventing them include improved anesthesia resident education, increased supervision, forming local protocols and guidelines, and improved organization. We should accept that errors do occur and abandon the culture of blame. Instead, root cause analysis should be performed and use failure mode and effect analysis system. We also propose to incorporate traffic light rules in our practice, i.e. stay calm, stop for a while (red), and think (yellow) before administering (green) drug. Finally, the key to prevention lies in the vigilance of the anesthesiologists.

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Conflicts of interest

There are no conflicts of interest. The incident reported has no relation to authors' present place of working.

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