

## CASE REPORT

# Syringe swap and similar looking drug containers: A matter of serious concern

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## ABSTRACT

Medication error is a leading cause of morbidity and mortality in anesthesia and critical care unit. We present a case report of a 25 years old female patient, scheduled for emergency lower segment caesarean section (LSCS) under spinal anesthesia. Due to a syringe swap, inj. thiopentone sodium was injected inadvertently, instead of inj. ceftazidime. We had to administer general anesthesia to ventilate the patient, the patient which was otherwise unnecessary in this case. Patient was successfully extubated and shifted to postoperative anesthesia recovery room. We present a second case report of a 45 years old male patient with chronic obstructive pulmonary disease (COPD) admitted in Intensive Care Unit (ICU). This patient inadvertently received atropine instead of metronidazole and was successfully managed. These incidents highlight the importance of proper drug location, double checking of the drugs, and proper anesthesia resident education.

**Key words:** Syringe swap; Ceftazidime; Thiopentone sodium; Metronidazole; Atropine.

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## INTRODUCTION

Anesthetic drug errors occur with alarming frequency. An analysis of 'critical incidents' indicates misidentification of syringes and drug ampoules as the most common cause of preventable mishaps.<sup>1</sup> Practice of anesthesiology and intensive care requires the administration of a wide variety of highly active medications. These medications are often given in high acuity situations and may have to be given in an environment of poor visibility and multiple distractions. In one survey 30% of anesthesiologists administered wrong drug at least once during their practice.<sup>2</sup> We present two case reports describing medication errors, which were due to similar looking solutions and vials.

## CASE REPORT 1

A 25 years old female patient scheduled for emergency LSCS for pre-eclampsia and failed progress of labour. As stated by resident doctor from obstetric department, patient's blood pressure was 190/100 mmHg. General anesthesia was planned for the patient, so all general anesthetic drugs (thiopentone, succinylcholine, vecuronium) were prepared

for the patient beforehand. Patient was shifted to emergency operating room. After securing 18G IV cannula, patient was connected to baseline monitors, e.g. pulse oximetry, non invasive blood pressure and ECG. On table patient's blood pressure was found to be 140/90 mmHg without giving any antihypertensive agent, so we resorted to spinal anesthesia instead. Premedication with metoclopramide 10 mg and ranitidine 50 mg was already given in the labour room. Patient was given subarachnoid block at the level of L3-L4 space with 1.5 ml of 0.5% bupivacaine (heavy) + 25 µg (0.5 ml) of fentanyl in left lateral position. In due course patient was being infused with IV fluid (Ringer's lactate solution). Surgery was started after checking the level of sensory block. Resident doctor from obstetric department had prepared the antibiotic solution inj ceftazidime 1 g (GSK Pharmaceutical) (Figure 1-B) for giving pre-operatively and placed it on anesthesia drug tray, but unfortunately she forgot to give it to the patient. During operation she requested anaesthetist to give the antibiotic to the patient. After giving the drug, patient's oxygen saturation and blood pressure started falling and she developed apnoea. Immediately patient was given

## syringe swap and similar looking drug containers

100% oxygen through bag and mask ventilation. First it was thought to be an anaphylactic reaction to antibiotic and so patient was given inj adrenaline 1 ml (1:10000 dilution) and inj hydrocortisone 100 mg IV stat. On close scrutiny it was detected that the patient had received inj thiopentone sodium 250 mg [Neon Laboratory (Pvt) Ltd] (Figure 1-B) instead of the antibiotic. As mask ventilation could not be continued for long because of the risk of aspiration, she was given inj fentanyl 100 µg and succinylcholine 75 mg to facilitate endotracheal tube intubation. Anesthesia was maintained using 70% nitrous oxide in oxygen and a propofol infusion 100-150 µg/kg/min and intermittent fentanyl and vecuronium as required. Surgery was uneventful thereafter. At the end of the surgery the patient was extubated successfully.



Figure 1: Unlabelled syringes containing solutions of inj. thiopentone (A) and inj. ceftazidime (B)

## CASE REPORT 2

A 45 years old male COPD patient was admitted in ICU. He was scheduled to receive inj metronidazole [Pentagon Lab (Pvt) Limited] (Figure 2). Two minutes after starting this infusion patient developed tachycardia; his heart rate increased from 80 to 140 beats/min. Suddenly it was detected that the running infusion was that of atropine [Pentagon Lab (Pvt) Limited] and not that of the intended inj. metronidazole (Figure 2). This infusion was stopped immediately and the patient's heart rate was normalized within 30 min. As patient did not have any ischemic heart disease or any other cardiac pathology so he did not develop any complication that could be hazardous to the

patient. This confusion of metronidazole and atropine was because of similar appearance of both bottles.

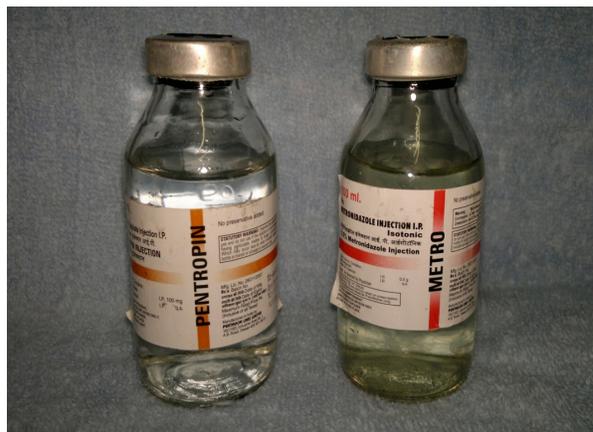


Figure 2: Look-alike bottles of inj. metronidazole and inj. atropine

## DISCUSSION

Thiopentone sodium is an inducing agent; the colour of reconstituted solution of thiopentone [2.5% Thiosol™, Neon Laboratories (Pvt) Ltd.] is yellow which closely resembles the colour of reconstituted solutions of antibiotic ceftazidime. Due to this similarity, this untoward incident had occurred. In our case due to similar colour, inj. thiopentone sodium was given instead of the antibiotic solution. It was purely an avoidable mistake done by the anesthesia resident. In this case on finding out that the wrong drug has been given we thought to do mask ventilation till the effect of thiopentone weaned off, since the patient was pregnant and prolonged mask ventilation could lead to aspiration of gastrointestinal contents, full general anesthesia was given. Another mistake done by the anesthesia resident was that he kept antibiotic solution syringe on the same anesthesia drug cart, which should not have been done and left it unlabelled. Before giving any drug to the patient, it should be carefully checked and all the syringes in the drug cart must be labelled.<sup>3</sup>

There are many uses of atropine like ophthalmic use, resuscitation, organophosphate poisoning, to control secretions etc. but out of all these indications 100 ml atropine vial is usually used for organophosphate poisoning because large doses are required in these cases. Metronidazole is used for anaerobic infections, amebiasis and giardiasis etc.<sup>4</sup> The nursing staff had given the infusion atropine in place of metronidazole because of similar look of both bottles.

Though wrong drug administration error is not a new thing, giving phenylephrine in place of metoclopramide<sup>5</sup> has already been reported. In New Zealand, dopamine and magnesium led to near disaster due to look alike preparations.<sup>6</sup> Currie et al<sup>7</sup> reported that factors which contributed significantly to such incidents were identical

preparation, inattention, haste and failure to communicate. Drug error is not usually caused by ‘bad’ practitioners but is almost inevitable result of systematic failures coupled with failure of cognitive strategies employed by anesthesiologists to reduce this risk.

The need for systematic analysis of anesthetic-related mishaps has been the subject of numerous articles in the recent literature.<sup>8-10</sup> Here we are enumerating the recommendations to reduce the risk of drug error in anesthesia, modified from recommendations given by L.S. Jensen et al.<sup>3</sup>

- (1) Label on any drug ampoule or syringe should be carefully read before a drug is drawn up or injected.
- (2) Syringes should be labeled (always or almost always).
- (3) Arrangement of drugs, position of ampoules and syringes, separation of similar or dangerous drugs should be followed carefully and constantly at workstation.
- (4) There should be double-checking of the drugs before administration.
- (5) Errors in intravenous drug administration during anesthesia should be reported and reviewed.
- (6) Pharmacist should be appointed for operation theatres.
- (7) Similar packaging and presentation of drugs should be avoided where possible.
- (8) Drugs should be presented in prefilled syringes

whenever possible.

(9) Drugs should be drawn up and labeled only by the anesthetist who will administer them.

(10) Color coding by class of drug according to agreed standard should be used.

Apart from all these recommendations, lighting inside the operating rooms should be optimal. Constant drug storage arrangements should be made, and if possible drugs should be prepared immediately before use. Therefore, in our case if the resident might had followed all these recommendations, an obviously preventable incident would have been prevented.

## CONCLUSION

Apart from similar colors of drug vial packaging and labels which is a constant danger for the anesthesiologist, similar colored solutions also can be a cause of drug mishaps. Both cases highlight the importance of maintaining vigilance during administration of all IV medications. No drugs other than anesthetic agents should be kept on the anesthesia workstation

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