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Letter to the Editor

Experiencing 'Swiss Cheese' model: close calls in anaesthesia; a personal recollection

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To the Editor,

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Introduction

Critical incidents in health care are potentially fatal, nevertheless preventable. Even in the absence of fatalities, the resultant morbidity leads to various degrees of harm to the patient, increased health-care related costs and even legislation [1,2]. This brief report presents the author's own experience on anaesthesia related critical incidents.

Case 1

A 34–year-old, ASA 1 male was scheduled for an open reduction and internal fixation of a humeral shaft fracture under general anaesthesia. Airway assessment at the preoperative visit was normal. The venous cannula (which had been inserted in the ward) was found to be nonfunctional on the day of the surgery. Attempts at blind peripheral venous cannulation were unsuccessful, thus an ultrasound guided peripheral cannulation was done. He was induced with intravenous fentanyl, propofol and intravenous atracurium following preoxygenation. When intubation was attempted at 3 minutes, vocal cords were still in a non-paralyzed state. Ventilatory breaths were continued until adequate paralysis of the cords. Following a few ventilatory breaths, the peripheral oxygen saturation started to drop. A quick inspection of pipeline oxygen pressures, gas supply tubing, capnography trace and auscultation found all to be normal. The peripheral oxygen saturation dropped to 50% with bradycardia of 40 beats per minute. Intravenous atropine was injected to which a delayed response was noticed. Patient's trachea was intubated, and ventilation was recommenced. It was noticed that until this point, medical air had been used instead of oxygen for preoxygenation and after. His oxygen saturation gradually improved. Further examination revealed a swelling

around the new cannula which was replaced with an external jugular venous cannula. The administered muscle relaxant and atropine was probably extravasated. The knob for the oxygen flowmeter was located at the extreme right of the flowmeter panel and the knob for medical air on the left compared to rest of the anaesthetic machines. The end tidal oxygen concentration measurement and display was not available in the anaesthetic workstation, thus ineffective preoxygenation was not detected. After stabilization of the patient, the surgery was completed. Patient was extubated and sent to ward. Oedema at the cannula site had subsided on discharge.

Case 2

A 78-year-old female with a history of ischaemic heart disease who had undergone hysterectomy for an endometrial carcinoma was scheduled for a refashioning of colostomy. The colostomy had been created following a bowel injury and peritonitis subsequent to the hysterectomy. During the preoperative assessment the patient refused general anaesthesia thus subarachnoid anaesthesia (SA) was chosen as the mode of anaesthesia. SA was provided on the next day. Half-way through the surgery, the consultant anaesthetist noticed that the patient was on subcutaneous enoxaparin, which had been administered 4 hours prior to the recent SA. Immediate cardiology and haematology opinions suggested reversal of enoxaparin with intravenous protamine sulfate (1mg/kg). Her haemodynamics were stable and she was transferred to the intensive care unit at the end of the surgery. SA completely wore off without residual effects. She was transferred to the ward and discharged home 2 days later. A review revealed that the patient had been transferred from another center where she was on a morning dose of enoxaparin. It had been continued unchanged even though administering morning doses of prophylactic enoxaparin is not the routine practice in our institution. We have formulated a separate document (record sheet) to record the preoperative assessment. As the bed head ticket, including the drug chart of the patient, was not available during the preoperative assessment, the anaesthetist who did the preoperative assessment had not detected the 'morning dose enoxaparin' and subsequently not documented it in the record sheet. The surgical team had also failed to detect and omit the morning enoxaparin dose. The patient had been received by a different anaesthetist on the day of the surgery, who had gone through the preoperative record sheet only prior to anaesthesia, ultimately ending up administering SA.

Lessons learnt

Following both incidents, in-depth analysis, possible management protocols and possible bad outcomes were discussed with the anaesthetic team. Full check of anaesthetic work stations before each theatre list (as suggested by the Association of Anaesthetists of Great Britain and Ireland "Checklist of anaesthetic equipment 2012" [3] preoperative confirmation of function of existing venous cannula and documentation of probability of difficult cannulation (similar to difficult airway or difficult SA), review of ward drug charts and clinic records at the preoperative visit and proper handing over of patients were identified as priorities in preventing further mishaps.

In case 2, inputs from haematology and cardiology teams were helpful in the management. Even though protamine sulfate was used to reverse the effects of enoxaparin, it should be borne in mind that the former is capable only of partial reversal of low molecular weight heparin [4].

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