Common gas outlet error leading to severe hypoxia and general anesthesia during cesarean section under spinal anesthesia

Sir,

Supplemental oxygen during emergency cesarean section is administered to increase maternal and fetal oxygenation.[1] Commonly this is achieved by disconnecting the standard anesthetic circuit from the anesthetic machine. Critical incidents such as inadequate preoxygenation, desaturation and even death have occurred due to using this common gas outlet (CGO) for supplemental oxygen delivery.[2,3]

A 22-year-old, 37 weeks primigravida was scheduled for emergency cesarean section for short stature with cephalopelvic disproportion. Vitals were normal with regular pulse rate, 80/min, blood pressure 130/85 mmHg and Mallampatti Class II airway. 2.2 ml of 0.5% bupivacaine with 60 μg of buprenorphine was administered through 25G Quincke spinal needle (Becton Dickensen, SA, Madrid, Spain). Patient was turned to the supine position and supplemental oxygen administered by nasal prongs. As the patient complained of some pain on incision and level of analgesia was inconsistent at T10-T12, ketamine 20 mg intravenous and O_2/N_2O mixture was administered by the Bain system connected to the CGO. Within seconds, Oxygen saturation by pulse oximeter (SpO_2) fell to 40%, then to 20% despite changing to 100% O_2 and visible reservoir bag movements. 80 mg propofol and 100 mg suxamethonium were administered, cricoid pressure applied and trachea intubated with a 7.5 mm endotracheal tube. However, SpO_2 did not rise immediately and the bag was underinflated. Examination of the CGO revealed that the switch was pointing toward the closed circuit position. On changing CGO switch to the open position, oxygenation and SpO_2 improved rapidly. Cesarean section continued with mother and baby making uneventful recovery.

In India, many hospitals still use anesthetic machines than work stations with auxiliary oxygen flowmeter. Anesthesiologists simply turn the lever of the CGO of these machines to the closed side and connect nasal prongs to the closed circuit port [Figure 1]. In our case, the machine was checked before start of the case and when the patient complained of pain, Bains system was connected to CGO to administer oxygen and N_2O. However, the anesthesiologist forgot to turn the CGO switch to the open position [Figure 2] and this resulted in severe hypoxia. Some authors recommend the proximal end of the breathing circuit be connected to the distal end of the same circuit, so that whenever general anesthesia is to be administered this serves as a remainder.[2] This may solve the issue of disconnection, but will not rectify the error of failure to turn the switch to the open position. About 40% of consultants and 18% of maternity units in the UK reported critical incidents with the use of the CGO as a source of supplemental oxygen.[3] In a study of 83,154 anaesthetics, the most common equipment problem was leakage from or misconnection of the breathing system and in 25% human error was involved.[4] Another contributory factor could be existence of different types of anaesthetic machines within the same institute. Standardization of anesthetic machines throughout an institution should be considered.[5]

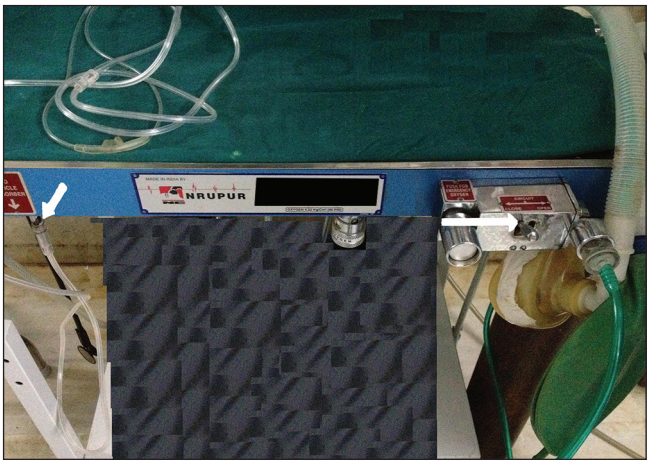

Figure 1: Administration of supplemental oxygen via nasal prongs through port (left arrow) intended for closed circuit. Note the position of common gas outlet switch to closed circuit side (right arrow)

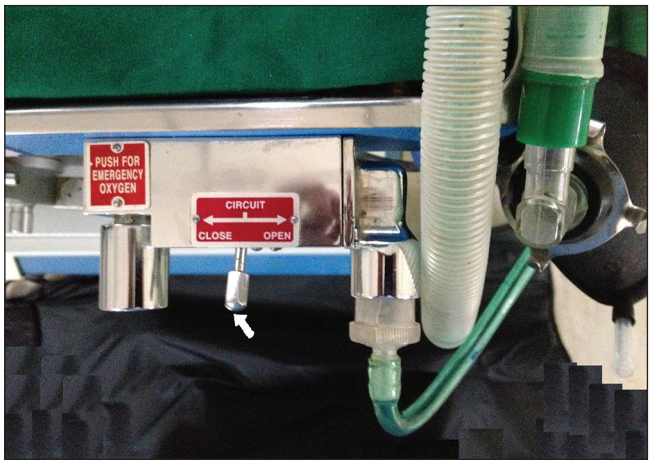

Figure 2: The dangerous arrangement of Bains system connected to common gas outlet with switch turned to closed circuit . This caused severe hypoxia in the reported case

Figure 3: Suggested simple solution for supplemental oxygen delivery in existing machines. Nasal prongs are connected to the common gas outlet (CGO) via a 22 mm connector. If a closed circuit is being used, this arrangement is still useful as the nasal oxygen delivery is through the open port of CGO via separate nasal prongs. If the closed circuit is not used regularly the CGO switch can be fixed temporarily in open position

To conclude, new anesthesia machine purchases must focus on presence of auxiliary oxygen flowmeters. For older machines, we suggest a simple practical solution where a nasal prongs attached to a 22 mm connector is kept ready for connection to CGO [Figure 3]. Where work stations with auxiliary oxygen flowmeters are not commonly available, it is important that mandatory standards are set to provide auxiliary oxygen port in newer anaesthetic machines.

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References

1. Van de Velde M. Emergency caesarean delivery: Is supplementary maternal oxygen necessary? Br J Anaesth 2009;102:1-2.
2. Edsell ME, Erasmus PD. Use of the common gas outlet for supplementary oxygen during Caesarean section. Anaesthesia 2005;60:1152-3.
3. Stone AG, Howell PR. Use of the common gas outlet for the administration of supplemental oxygen during caesarean section under regional anaesthesia. Anaesthesia 2002;57:690-2.
4. Fasting S, Gisvold SE. Equipment problems during anaesthesia: Are they a quality problem? Br J Anaesth 2002;89:825-31.
5. Standards, Guidelines and Statements for Patient Care in Anesthesiology. Manual for Anesthesia Department organization and Management American Society of Anesthesiologists; 2010. Park Ridge Illinios Available from: file:///C:/Documents%20and%20Settings/HP/My%20Documents/Downloads/ASA%20Publications%20Anesthesia%20Machine%20Obsolescence%2020041.pdf [Last cited on 2014 Dec 11].

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