

Defective heat moisture exchange filter causing 'block' in anaesthesia breathing circuit

Sir,

We describe a case where a blocked heat moisture exchange (HME) filter was missed in the pre-anaesthesia

machine check leading to a potentially life-threatening situation.

An American Society of Anaesthesiologists physical status I, female patient was scheduled for exploratory laparotomy. Anaesthesia Machine (Datex Ohmeda S/5 Avance®) with disposable anaesthesia breathing circuit from "Airway Surgicals®," was used for the case. Anaesthesia machine was checked

as per the Association of Anaesthetists of Great Britain and Ireland (AAGBI) recommendations, and standard monitoring recommended by AAGBI was attached to the patient.^[1] The patient was pre-oxygenated and administered glycopyrrolate 0.2 mg, fentanyl 100 µg and propofol 120 mg intravenously. Once the patient stopped breathing, mask ventilation was attempted which was unsuccessful even after insertion of an oral airway. The immediate concern was that this was an unanticipated difficult airway. As the patient was apnoeic and adequately relaxed under the effect of propofol, the airway was quickly secured by endotracheal intubation. The airway resistance remained high after intubation and auscultation revealed a silent chest. Considering bronchospasm as a likely cause, intravenous hydrocortisone and vecuronium were administered and the depth of anaesthesia was increased with sevoflurane. There was no change in the resistance to ventilation, but the capnography showed a trace of low amplitude. As the reservoir bag felt different, some malfunction of the anaesthesia equipment was suspected. A non-rebreathing (AMBU) bag was connected with the filter and catheter mount in the circuit, but the air entry did not improve. The catheter mount and filter were removed immediately, and the AMBU bag was directly connected to the tube and the lungs could be ventilated easily. Air entry was bilaterally equal. ET_{CO₂} trace was normal and airway pressure was also reduced. Auscultation of the chest showed clear breath sounds. It was evident that the problem was due to blocked filter which was immediately replaced. The surgery was completed and the patient made an uneventful recovery from anaesthesia.

The oxygen saturation did not drop below 96% at any point during the episode. Possibly, there was some air entry in the lungs through the blocked filter, and the actions described above were carried out swiftly with the help of other anaesthetists who were in the theatre complex.

On subsequent investigation, it was discovered that the two bag test was completed without connecting the HME filter and catheter mount.^[2] Probably, the obstruction in the breathing system would have been picked up, had the circuit been completely assembled while checking. Obstructions in the anaesthesia breathing circuits have been reported due to various foreign bodies.^[3]

We concluded that the HME filter had a manufacturing defect on the basis of elimination. The filter was dismantled and assessed. It consisted of two discs, one of green foam and another thin white papery disc. On using individual components of the filter, it was evident that the green foam of the filter was blocked. On pressing the oxygen flush, the blast could not be felt at the tube connector end. As there was no possible technique to confirm the structural defect in the foam, one possibility that can be considered is compression of the disc in the filter making them impermeable.

This report adequately delineates the importance of anticipating problems and finding prompt solutions by stepwise exclusion of apparatus failure. Anticipating trouble, innovating and learning from the experience of others are inherent in the anaesthesia community. An important learning point from this case is, in the event of 'Tight Bag' during anaesthesia, the anaesthesia circuit should be immediately replaced by the AMBU bag at the end of the endotracheal tube.^[4] This will ensure that the patient is safely oxygenated while the equipment issues are resolved.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

**Hemlata Kapoor, Aparna Date, Kirti Gujarkar,
Harshal Wagh**

Department of Anaesthesiology, Kokilaben Dhirubhai Ambani Hospital and Research Institute, Mumbai, Maharashtra, India

Address for correspondence:

Dr. Hemlata Kapoor,
Department of Anaesthesiology, Kokilaben Dhirubhai Ambani Hospital and Research Institute, Mumbai - 400 053, Maharashtra, India.
E-mail: h_sarinkapoor@hotmail.co.uk

REFERENCES

1. Association of Anaesthetists of Great Britain and Ireland (AAGBI), Hartle A, Anderson E, Bythell V, Gemmell L, Jones H, *et al.* Checking anaesthetic equipment 2012: Association of anaesthetists of Great Britain and Ireland. *Anaesthesia* 2012;67:660-8.
2. Walker JD, Smallwood H, Maloney DG. Can the 'two-bag test' detect leaks? *Anaesthesia* 2013;68:536-7.
3. Sethi AK, Mohta M, Sharma P. Breathing circuit obstruction by a foreign body. *Anaesth Intensive Care* 2004;32:139-41.
4. Parthasarathy S, Ravishankar M. Tight bag. *Indian J Anaesth* 2010;54:193-8.

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

How to cite this article: Kapoor H, Date A, Gujarkar K, Wagh H. Defective heat moisture exchange filter causing 'block' in anaesthesia breathing circuit. Indian J Anaesth 2016;60:66-8.

| Access this article online | |
|--|--|
| Quick response code | Website: www.ijaweb.org |
|  | DOI: 10.4103/0019-5049.174802 |