

Deliberate anaesthesia gas scavenging system check, a need for averting disasters

Sir,

This is with reference to an article by Arun *et al.*,^[1] titled “Scavenging system—see the unseen to avoid disaster”

published in the Indian Journal of Anaesthesia. Errors are not an uncommon feature associated with the scavenging system.^[1,2] System errors can lead to adverse perioperative outcomes. Adverse outcomes reflect the perioperative quality of care.^[3] It is the timely intervention and knowledge which can limit them. We report a case of sustained increase in the peak airway pressure and positive end-expiratory pressure (PEEP) in the breathing system during the preliminary machine check before the beginning of the case and its troubleshooting.

A 42-year-old lady weighing 55 kg, a known case of carcinoma breast, was listed for breast conservation surgery. On the day of surgery, the operation theatre (OT) was provided with the newly installed advanced anaesthesia work station, Penlon Prima 320 (Abingdon science park, OX14 3NB, UK). During the machine check, while on ventilatory mode, the peak airway pressures reached 34 cm H₂O and the PEEP generated was around 12 cmH₂O. The ventilator was then put on manual mode with minimal flow, and the adjustable pressure-limiting (APL) valve was opened completely. This resulted in an inflated reservoir bag which could not be compressed. There was minimal egress of gases with the opened APL valve. Detailed machine check was initiated and obstruction due to ventilator tubings or sticky valves was ruled out. Further inspection revealed that there was a bag containing the face mask with tubing and other accessories that hung above the yoke assembly and obstructed the opening of the anaesthesia gas scavenging system (AGSS) port [Figure 1a]. The APL valve being in the expiratory limb of the circuit with its opening through the AGSS port was nearly occluded by the bag hung on the yoke assembly. This explains the inflated reservoir bag despite an opened APL valve. Once the bag was removed from the scavenging port, the positive pressure built up in the circuit was released and the airway pressures normalised [Figure 1b].

Scavenging of waste anaesthesia gases including nitrous oxide and volatiles has been emphasised as these gases have the potential of affecting the environment by depleting the ozone layer. This creates an occupational hazard to the health care professionals working in the OT and in the post-anaesthesia care unit.^[4,5] The scavenging system consists of a gas collecting assembly, transfer mechanism, scavenging interface which can be open or closed, and disposal assembly which can be of two types—active and passive. Numerous reports exist where AGSS has been implicated in various disasters due to misconnection, compression of the transfer tubings, positive pressure and the negative pressure build up in the system.^[1,2] Arun *et al.*^[1] have presented a case where the scavenging interface was bypassed with the tubing being erroneously connected directly to the AGSS port, which resulted in the negative pressure in the entire system. However, in our case, the obstruction occurred at the AGSS port by the overhanging bag which impeded the egress of gases and resulted in the positive pressure buildup upstream.



Figure 1: (a) Bag hanging on the yoke assembly blocking the anaesthesia gas scavenging system (AGSS) port, (b) AGSS port after the bag was removed

Indeed, as brought out by Arun *et al.*, a majority of the OT staff were lacking knowledge of the AGSS and hence compromising on the pre-anaesthesia machine check. Nevertheless, corrective actions were taken, and all different types and makes of anaesthesia machines in the OTs as well as in the remote locations were checked. The operating room assistants and anaesthesiologists handling the machines were briefed about the necessity of robust pre-anaesthesia machine check including scavenging system to avert such disasters. This means that the formulation of performance indicators for pre-anaesthesia machine check and its periodic assessment as a part of perioperative quality standard development will pave the way for improved patient safety and outcomes.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that his name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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REFERENCES

1. Arun BG, Mittimanj K, Ajesh KA, Chandrashekar S. Scavenging system – See the unseen to avert the disaster. *Indian J Anaesth* 2021;65:424-5.
2. Vinayagam S, Dhanger S, Thomas D, Venkatesh Babu TA. Scavenging tubing compression: A rare cause for anaesthesia ventilator malfunction. *Indian J Anaesth* 2018;62:239-40.
3. Bajwa SJ, Mehdiratta L. Adopting newer strategies of perioperative quality improvement: The bandwagon moves on.... *Indian J Anaesth* 2021;65:639-43.
4. Varughese S, Ahmed R. Environmental and occupational considerations of anesthesia: A narrative review and update. *Anesth Analg* 2021;133:826-35.
5. Deng HB, Li FX, Cai YH, Xu SY. Waste anesthetic gas exposure and strategies for solution. *J Anesth* 2018;32:269-82.

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