

CORRESPONDENCE

**Henna and pulse oximetry**

**Sarah Lopez Lazo**, Consultant Professor, Yemen

*Dear Sir,*

I would like to share my experience from working in the Republic of Yemen. Several factors are reported as interfering with the pulse oximetry reading. In Yemen, females use Lawsonia Inermis (henna) dye on their hands and feet as ornamental decoration. This dye cannot be removed but fades with time. An example is shown in Figure 1.

Presence of this dye can cause interference with the pulse oximetry reading (Figure 2), which gives a good waveform, an accurate pulse rate, but an arterial oxygen saturation reading of 0. This interferes greatly with our monitoring of female patients and we report our experience for the benefit of other anaesthetists practicing in his setting.



**Figure 2.** (A) Pulse oximeter applied to a patient with henna



**Figure 1**



(B) Pulse oximetry display

CORRESPONDENCE

**Damaged Dräger vaporizer interlock pin: potential for a fatal anaesthetic incident**

**Christie N Mato, Maxwell Tobin**, University of Port Harcourt Teaching Hospital, Nigeria

Dear Editor,

We wish to report the potential for a fatal intraoperative incident related to a damaged Dräger vaporizer interlocking pin.

In 2006, the University of Port Harcourt Teaching Hospital, Port Harcourt, Nigeria, became one of the beneficiaries of the Federal Government upgrade of eight tertiary health facilities in Nigeria. Through VAMED Engineering, the hospital received five Dräger Fabius 2000 series anaesthetic machines. The Dräger Fabius 2000 is an anaesthetic machine with safety features such as the Diameter - index Safety System (DISS), low oxygen pressure alarm and the vaporizer interlock safety system.

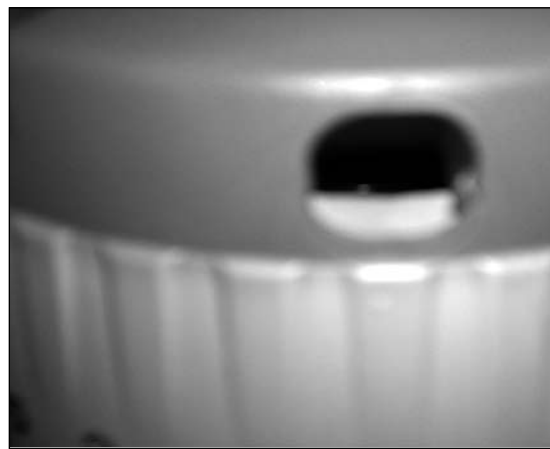
The anaesthetic machines supplied to our hospital have the halothane and isoflurane vaporizers in series with an interlocking bar in between (Figure 1). This interlocking bar prevents the two vaporizers being used at the same time. There are two holes with 'nibs' on the control dial of each vaporizer. The nib in the hole prevents the locking bar from sliding into the hole unless the vaporizer is first turned off. Thus, to change from halothane to isoflurane, the halothane vaporizer must be turned off before the locking bar can slide into the hole and lock it to allow the isoflurane vaporizer control to be turned on for use. If the halothane vaporizer is still in use and the sliding bar is released so isoflurane can be used, the nib in the hole will prevent the sliding bar from engaging the hole in the halothane vaporizer (because the latter has not been turned off).



**Figure 1.** Note the interlocking bar between the vaporizers, that are in series

If the nib is missing, damaged or broken, then there is no nib in the hole (Figure 2) and there is nothing to prevent the sliding bar from engaging the hole in the halothane vaporizer. Thus, halothane is at 5% (not turned off), the sliding bar is engaged and the isoflurane vaporiser is also on (Figure 3), with the consequence that the patient receives a mixture of halothane and isoflurane. Unrecognized, this is capable of causing a fatal incident intra-operatively.

We discovered this during a machine check in our theatre, and propose the following mechanism for the damage to the vaporizer. The positioning of the Dräger anaesthetic machine in this particular theatre is unique in our hospital, in that it is positioned on



**Figure 2.** Halothane vaporizer with nib missing



**Figure 3.** The isoflurane nib is visible and the halothane vaporizer is locked at the 5% position with isoflurane being delivered at 1%

the left of the operating table (Figure 4), that is on the left of a right-handed anaesthetist. In trying to turn off the vaporizer, a right-handed anaesthetist (who is used to the machine being on his right) may have used his left hand to inadvertently turn the dial anticlockwise instead of clockwise. Excessive force may have broken the plastic nib.



**Figure 4.** Anaesthetic machine on the left of the operating table, requiring a right-handed anaesthetist to use his left hand to turn the vaporizer dial

If a thorough machine check has not been conducted, a right-handed anaesthetist may use his left hand to ‘turn off’ the faulty vaporizer but in an anticlockwise direction, but unknowingly, the vaporizer will be at 5%, and the sliding bar will engage at the 5% position because there is no nib. Isoflurane will be turned on, but the patient will also be receiving halothane at 5%.

Two similar incidents of damaged nibs have been reported,<sup>1,2</sup> both concerning the Dräger anaesthetic machine, one with isoflurane and sevoflurane,<sup>1</sup> the other with isoflurane and desflurane.<sup>2</sup> This is the first report involving a halothane vaporizer, the high potency of this agent making the potential for harm from this fault of greater significance.

The damaged nib has been reported to manufacturers through their representative VAMED Engineering. We report this to alert other beneficiaries of the Dräger anaesthetic machine, and remind anaesthetists of the importance of mandatorily carrying out a machine check prior to administering each anaesthetic. Ideally right-handed anaesthetists should have their machines positioned on their right, and avoid using excessive force to turn the dial.

#### References

1. Webb c, Ringrose D, Stone A. Faulty interlock on Drager vaporisers. *Anaesthesia* 2005; **60**: 628 – 9.
2. Jagannathan VK, Nortcliffe SA. Potentially fatal vaporizer incident. *Eur J Anaesth* 2008; **25**: 165-6.