

by the sampling machine will show an oxygen concentration of 21%.

In this incident the sampling tube damage in the operating theatre was not detected by visual inspection. We believe that atmospheric oxygen reached the anaesthetic gas analyser unit through the break in the gas sampling tube. The gold standard check that a breathing circuit is not blocked is by the use of capnography to demonstrate that expired air can pass retrogradely into the circuit [3] but this test can only be performed in an awake patient before induction of anaesthesia. We believe that direct measurement of exhaled breath through the gas sampling tube would have detected the faulty gas sampling tube.

There is no substitute for regular inspection and proper check of anaesthetic machine and its components. We believe that routine check of sampling tubes in the operating theatre should include visual inspection as well as the direct measurement of

exhaled breath and accept a rare theoretical risk of contamination.

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## Failure of back-up oxygen supply despite a full oxygen cylinder

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### EDITOR:

Recently we had an incident, which has important implications for the checking of anaesthetic machines. A pre-use check of a Dräger Cato anaesthetic machine (Dräger Medical UK Ltd, Hertfordshire, UK) revealed that on disconnecting the oxygen pipeline, the oxygen failure alarm was working. The oxygen cylinder was then opened and the pressure gauge registered that it was full. However, on opening the oxygen flow-meter (rotameter) there was no flow of oxygen. Changing the cylinder made no difference, as the pressure gauge registered full but no flow of oxygen occurred, and so an alternative machine that was fully functional was used.

Investigation of the fault in our anaesthetic workshop concluded that a one-way valve between the cylinder and anaesthetic machine was sticking. Following its replacement, the machine was fully functional. The manufacturer's Technical Support Manager (Dräger Medical UK Ltd) was informed by letter. He replied to the effect that there had been

no previous reports of this fault and that the valve design had changed.

The purpose of the one-way (check) valve is to prevent retrograde leak, and it is a feature of most, if not all, modern anaesthetic machines.

The commonly used guideline for checking anaesthetic machines is *Checking Anaesthetic Equipment*, 3rd edition (2004) by the Association of Anaesthetists of Great Britain and Ireland. For checking medical gas supplies this advocates a 'tug test' for the pipeline and a contents check of cylinders using the pressure gauge. It also recommends a weekly disconnection of the oxygen hose to check the oxygen failure alarm and the concomitant gas shut-off device.

We point out that none of these checks will detect the problem of a sticking one-way (check) valve. Clearly, having done the pipeline disconnection for the oxygen failure alarm test, one should also check that opening the oxygen cylinder and flow-meter results in the actual flow of oxygen. We suggest that this be incorporated into the next edition of *Checking Anaesthetic Equipment*.

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