

# Uncommon leaks revealed by low flow anaesthesia

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Low flow techniques provide a long duration of reliable anaesthesia at minimal cost. The use of low flows requires a leak free circuit and anaesthetic machine. Should leaks occur during low flow anaesthesia, these will be immediately obvious and rapidly rectified.

Anaesthetic machines have been made increasingly safe with many modern machines incorporating a leak test as a standard on initiation. The Selectatec™ vapouriser control for multiple vapourisers has evolved from a system that allowed vapouriser activation without delivering agent to the system, to the current system of interlocking pins that only allow activation of a single vapouriser that will reliably deliver agent to the system. These interlocking pins may, however, hinder the firm seating of the vapouriser on the backbar. This has occurred on three separate occasions at Addington Hospital over the past three months. The characteristic features of these events were as follows:

1. A vapouriser was changed during the course of a list after the machine check had been performed.
2. During initiation of volatile anaesthesia, the measured concentration of agent in the circle system was substantially less than that dialled in on the vapouriser, despite flows in excess of 5 l/min.
3. Upon reduction of flows a substantial leak (>2l/min) was noted.
4. The leak from the vapouriser was only recognised after checking the endotracheal tube, Y-piece, tubing and absorber.
5. Awareness was prevented by incremental boluses of intravenous hypnotic

Anaesthesia circuits in use in Europe, the USA and Australasia are increasingly becoming single use items. This is increasingly the case in South African private hospitals. Many government hospitals, however, due to cost constraints, make use of reusable circuits that are cleaned and sterilised between uses. After multiple uses, plastics may become brittle and prone to cracking. This may occur especially if tubing is stretched or deformed to facilitate surgical access. Even a small hole may result in a substantial loss of gas from the circle system, especially if positive pressure ventilation is applied. Loss of gas in the inspiratory limb may pose a particular risk of awareness as fresh gas added to the system is preferentially lost. Should gas loss be noted and no leak detected from the endotracheal tube or Y-piece, a hand should be placed loosely around the circuit tubing and run gently along the length of the tubing. This will allow any escaping gas to be readily detected. This test has been used on two separate occasions in the last three months at Addington hospital and has resulted in a change in the type of circuit tubing used.

A comprehensive machine check at the start of a list may reveal no leak (1). However continued vigilance is required throughout the conduct of a low flow anaesthetic to detect leaks that may occur at any time

## Reference

1. Tokumine J et al. A comparison between the low-flow leak test and oxygen flush leak test. *J Anesth* 2000; 14:191-3.