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An Effective Low-cost Scavenging System

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Current data strongly support the possibility that chronic exposure to trace levels of anesthetic gases may constitute a health hazard for operating room personnel.¹ As a first step in reducing exposure, capturing or scavenging of excess anesthetic gases from an anesthetic circuit, extracorporeal oxygenator, or ventilator, is of major importance. Currently available scavenging systems are expensive and, in some cases, they function inefficiently.

We describe a simple scavenging system that has been proven to be effective in reducing trace anesthetic levels in our operating rooms. Its cost is low, and it is disposable.

The following materials were utilized (see fig. 1):

- 1 Trach® "T" tube adapter
- 2 150-cm plastic breathing hose
- 1 conical piece from Medicut® package
- 1 plastic gallon jug
- vinyl cement

The breathing hose fits directly onto the pop-off valve, and is connected to the T piece. The large end of the tapered Medicut package is attached as illustrated, the tapered tip being cut off before connection to the suction tubing. The second breathing tube is attached to the T piece as shown; it serves as a vacuum relief port through which room air is sucked into the plastic gallon jug, which serves as a reservoir. This tube is attached to the side of the jug base by preparing a round hole slightly smaller than the tube, making several small radial cuts, and sealing the tube in place with vinyl cement.

Room air trace-gas samples obtained during anesthesia with the device in use were consistently below the National Institute of Occupational Safety and Health² target levels of 25 ppm N₂O and 0.5 ppm for halogenated agents. To test the system's effectiveness, time weighted average (TWA) samples were obtained during the administration of anesthesia in an operating room ventilated with 20 per cent fresh air per cycle. Background N₂O levels were less than 1 ppm, and leakage from the low-pressure portion of the system

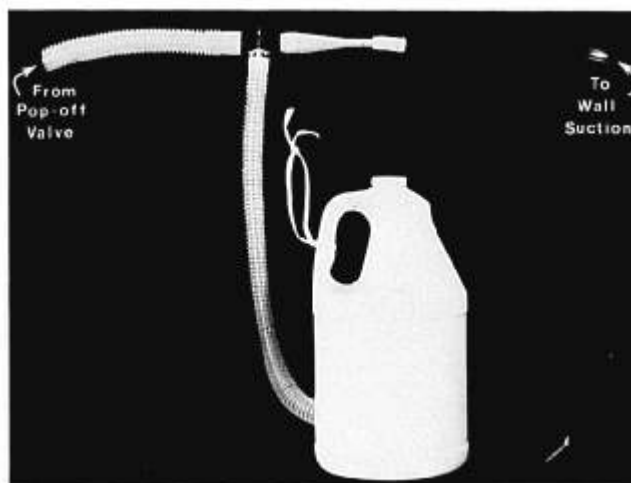


FIG. 1. An effective low-cost scavenging system.

was less than 200 ml/min at 40 cm H₂O circuit pressure.³ Samples were obtained 18 inches from the anesthesiologist's nose. Ten sampling periods ranged from 0.9 to 1.8 hours in duration. Average N₂O level was 16 ppm, with a range of 4 ppm to 24 ppm.

Occlusion of any of the three 22-mm lines from the pop-off valve to the wall suction, the T piece, or the reservoir jug could produce abnormal circuit pressures. This device should be set up so that the reservoir bag and T piece are as close to the pop-off valve as possible and positioned to minimize the possibility of occlusion by kinking or pressure.

Scavenging alone cannot adequately reduce trace gas levels. Other factors, such as equipment anti-leak maintenance, technique alteration, and trace-gas monitoring, are mandatory in any room-air clean-up program.

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