

Expiratory Limb Ventilation during Anesthesia Machine Failure

To the Editor:

I read with interest the case report by Seif and Olympio,¹ who described the successful use of expiratory limb ventilation during a ventilatory emergency when removal of the absorbent canister from a GE Aestiva/5 anesthesia machine (GE Healthcare, Mickleton, NJ) resulted in a large leak in the circle breathing system. The authors note that with their arrangement it is unlikely that fresh machine anesthetic gas and oxygen would flow antegrade during exhalation, rather than it would take the path of least resistance to flow retrograde and out through the leak. In the event where such a ventilatory crisis should recur, I would like to suggest an alternative arrangement for expiratory limb ventilation that allows the use of fresh gas flow from the machine (flowmeters and vaporizer) and does not require that the self-inflating manual ventilation device be connected to an oxygen source.

The GE Aestiva/5 machine incorporates an auxiliary common gas outlet (ACGO), which is used to perform the machine low-pressure system leak check or to connect other breathing circuits such as the Bain. When the green lever (fig. 1) is depressed, fresh gas from the machine is diverted (from its usual path into the circle system *via* the inspiratory limb connection port; fig. 1) to flow instead out from the ACGO (fig. 1C). In the above crisis scenario, the inspiratory limb of the circle system would be connected to the selected ACGO, delivering fresh gas and agent from the machine, and the self-inflating manual ventilation device is connected to the end of the expiratory limb of the circuit (fig. 1). Connection of the self-inflating manual ventilation device to an oxygen source is now unnecessary because oxygen is delivered in the fresh gas flow from the ACGO. Furthermore, if an inhaled anesthetic is being administered, waste gas scavenging could be achieved by placing a 30–19 mm adapter over the (30 mm diameter) exhalation port of the self-inflating manual ventilation device and connecting the 19 mm end to scavenging tubing.

The arrangement described could be used with any anesthesia machine that has an integral ACGO (*e.g.*, GE Aespire [GE Healthcare, Mickleton, NJ] some GE Aisys Carestations [GE Healthcare, Mickleton, NJ]) or a regular common gas outlet that has a 22 mm external diameter (*e.g.*, GE ADU workstation [GE Healthcare, Mickleton, NJ]). In some models of GE workstations (*e.g.*, Aisys Carestation), the inspiratory connection port of the circle system can be converted to a common gas outlet by selecting “Non Circle System” from the screen menu.

I should point out that not all anesthesia machine manufacturers offer models that have an ACGO. However, anesthesia caregivers should check if their machine(s) has (have) this feature and if they do have an ACGO, consider its possible

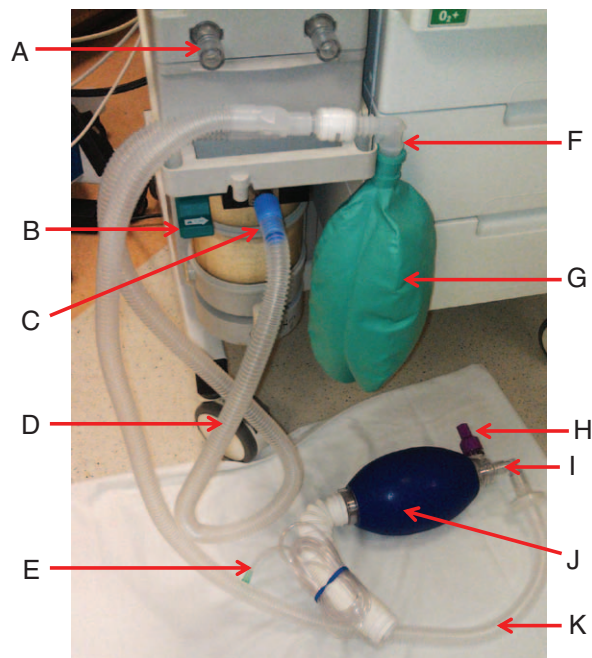


Fig. 1. Circle breathing system connected at one end to the auxiliary common gas outlet and the other end to the self-inflating manual ventilation device. (A) Inspiratory port connection for circle breathing system. (B) Lever to select auxiliary common gas outlet. (C) Inspiratory limb of circle breathing system connected to auxiliary common gas outlet. (D) Inspiratory limb of circle breathing system. (E) Oxygen delivery tubing for self-inflating manual ventilation device. (F) Elbow connecting Y-piece to patient's airway. (G) Reservoir bag to represent patient's lungs. (H) Thirty- to 19-mm waste gas scavenging system adapter. (I) Self-inflating manual ventilation device connected to the end of the expiratory limb of the circle system. (J) Self-inflating manual ventilation device. (K) Expiratory limb of circle breathing system.

use in emergency situations such as encountered by Seif and Olympio.¹ An example of such a use appears incidentally in a recent report by Kummar *et al.*,² who also experienced a large leak from the circle breathing system when the absorber canister of their GE Aisys Carestation was replaced during a craniotomy. In their case, they changed breathing system to a Bain coaxial circuit connected to the ACGO of the GE Aisys Carestation. This action excluded the leak in the circle system and enabled continued ventilation of the patient's lungs.

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References

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