Differentiating Inspiratory and Expiratory Valve Malfunctions

To the Editor:
We appreciate Dr. Kodali’s recent review of capnography outside the operating room environment.

Two small yet important details would benefit from further clarification. Figure 2C is purported to display the malfunction of an inspiratory valve in an anesthesia breathing circuit. Unlike a stuck, open expiratory valve, an inspiratory valve that remains open during expiration shows the end-tidal carbon dioxide baseline returning to zero.

The best way to understand this is to consider taking the circle system breathing circuit and removing the inspiratory valve entirely from the circuit. During expiration, one half of the exhaled carbon dioxide-rich gas will “exhale” into the inspiratory limb of the breathing circuit. With the next inspiration, the resistance to the flow of expiratory gases in each limb of the circle system breathing circuit and removing the inspiratory valve entirely from the circuit. During inspiration, one half of the exhaled carbon dioxide-rich gas will “exhale” into the inspiratory limb of the breathing circuit. With the next inspiration, the quantity of expiratory gases entering the inspiratory limb is dependent on the resistance to the flow of expiratory gases in each limb of the circuit. The resistance in turn is dependent on the design of the valves, extent of malfunction of the inspiratory valve, presence of inspired carbon dioxide absorbent.

The second point is that in figure 3 A–D, the apparent presence of inspired carbon dioxide is an abnormal finding, and suggests that in this sedation case, there is evidence of rebreathing in the microenvironment around the face, which may occur as a result of draping. The normal inspired carbon dioxide during sedation is expected to be zero.

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Reference
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