

Intraoperative Pulmonary Barotrauma during Ophthalmologic Surgery. Case Report

(Rev Bras Anesthesiol, 2008;58:63-68)

Dear Editor,

We would like to make a few pertinent comments regarding the article *Intraoperative Barotrauma During Ophthalmologic Surgery. Case Report*, by Affonso Henrique Zugliani et al.

In our service we have available, for some time now, a few Conquest 3000 HB mechanical ventilators similar to the one mentioned in this report, which are used daily in our anesthesias and, therefore, we are familiarized with its performance.

When justifying the pulmonary barotrauma, the authors attributed it to the kinking of the connecting tube between the ventilator and the anesthetic circuit as the cause of the accident (Figure 3). However, we disagree with their conclusion. The angulation of the tube prevents the volume in the bellows, which would be the inspiratory volume, to be ejected into the circuit, causing it to escape through the safety pressure limiting valve that is close to the connection with the ventilator, as can be seen in figure 3. This escape mechanism produces a characteristic sound.

If the volume cannot be ejected into the lungs of the patient, it cannot be responsible for the barotrauma.

In our opinion, the most likely explanation would be the closure of the pop-off valve, located above the respiratory bag, preventing elimination of the excess of fresh gases, which continue to enter into the respiratory circuit and, therefore, preventing their elimination into the environment which, as time went by, caused the barotrauma.

In the diagram (Figure 4), we noticed a series of errors that are not in agreement with the proper assembly of the device. The following statement "The reservoir bag is excluded from the circuit in controlled ventilation" is not completely correct. If the selector key is placed in the Controlled Ventilation position, the reservoir bag is in fact excluded from the circuit, but only during the inspiratory phase, since it prevents the volume ejected by the bellows to be deviated into the bag. This does not happen during expiration because the connection

between the reservoir bag and the bellows that aspirates, when it descends, its contents along with fresh gases and the anesthetic agent that continue to enter the system and, therefore, feeding it.

As mentioned before, kinking of the tube prevents the volume ejected by the bellows to enter the system but does not prevent, as stated by the authors, the elimination of excess gas through the pop-off valve, which should always be opened to allow the elimination of excess gas to prevent excessive pressure in the circuit.

Sincerely,

Dr. Guilherme F. F. Reis

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Reply

Dear Dr. Guilherme,

First, I would like to thank you the attention given to our paper and for your comments. The diagram, as you pointed out, presents erroneously an inversion of the ins- and expiratory signaling of the device. In the report, it was not mentioned that this accident occurred after interrupting mechanical ventilation, but while maintaining the patient connected to the circuit to resume spontaneous ventilation. Under those conditions, what happened can be easily demonstrated by obstructing the inspiratory gas tube, as illustrated in the report. When it happens, the flow of fresh gas will be directed to the patient, the manometer of the ventilator does not show increased pressure in the system, and the reservoir bag is not filled; consequently, elimination through the pop-off valve does not occur. Changing the tube by a tracheal-type tube, which was done by the manufacturer, prevented the reoccurrence of this problem. It is important to mention that the original configuration of the device was not changed by my colleagues, and all of them were familiar with the device at the time of this accident.

Dr. Affonso H. Zugliani, TSA