

CORRESPONDENCE



Appropriate positioning of the NAVA catheter

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Dear Editor,

We read with great interest the case report by van Kerckhoven and Kant which reports inappropriate NAVA catheter placement complicated by a hydropneumothorax [1]. In this case report, NAVA catheter (Maquet Critical Care, Solna, Sweden) placement was evaluated by (1) adequate EAdi signal on dedicated positioning window of the ventilator, (2) air bubbling confirmed by auscultation just below xiphoid, and (3) no decrease in expiratory volume or endtidal CO₂ upon suctioning of the catheter. This led the authors to conclude that the catheter was in a correct position.

It is important to note that the authors have not reported all criteria to confirm appropriate positioning of the NAVA catheter. As acknowledged by the authors, the dedicated positioning tool on the ventilator visualizes the EAdi signal by highlighting its electrical activity. Diaphragm activity in the two central ECG leads during *inspiration* suggest appropriate positioning of the catheter [2]. However, additional criteria should be considered to verify adequate positioning in the esophagus. In the presence of sinus rhythm, P-wave amplitude decreases from upper to lower ECG leads and will be absent in

the most distal (bottom) lead of the positioning window (Fig. 1) [2]. This is easy to understand because of the proximity of the right atrium next to the cranial located electrode of the catheter and the remote position—from the right atrium—of the caudal electrode. Similarly, the amplitude of the QRS complex will decrease from the upper to lower leads displayed (Fig. 1). The manufacturer recommends a specific formula for calculating catheter positioning; this was not reported in their paper. The authors report air bubbling just below the xiphoid confirmed by auscultation. However, this is an unreliable method since bubbling will be present when the catheter is placed in the pleural fluid, as demonstrated in this case [3]. Therefore, one should not rely on this auscultatory method for the evaluation of the correct position of any naso-gastric tube.

Adequate positioning of the nasogastric tube is extremely important to prevent serious complications. The NAVA catheter has additional tools to confirm adequate positioning of which in our opinion the authors did not take full advantage. Chest X-ray is considered as the golden standard, and therefore should be used in cases of any doubt concerning correct catheter positioning.

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Fig. 1 Positioning tool with the electrical activity of the diaphragm (EAdi). Diaphragm activity in the two central ECG leads during inspiration—highlighted in *blue*—suggest the appropriate position. Further, P-wave amplitude decreases (*red arrows*) in the two upper leads and is absent in the two distal leads, and QRS complex decreases from the upper to the lower leads (*green arrows*)

Compliance with ethical standards

Conflicts of interest

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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