

device in a clinical practice in the described manner. The authors suggest that the stethoscope is outdated. We believe that their technique (especially if larger studies demonstrate similar sensitivity and specificity) needs consideration for adoption, but faulting a device merely because of its age is fallacious. Lewis³ called this “chronological snobbery,” the assumption that newer must be better. We would be wise to remember that the development of a new technique does not require the elimination of an older one. The more conscientious anesthesiologist will recognize the advantage of having both tools available.

Competing Interests

The authors declare no competing interests.

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References

1. Ramsingh D, Frank E, Haughton R, Schilling J, Gimenez KM, Banh E, Rinehart J, Cannesson M: Auscultation *versus* point-of-care ultrasound to determine endotracheal *versus* bronchial intubation: A diagnostic accuracy study. *ANESTHESIOLOGY* 2016; 124:1012–20
2. Kristensen MS: Ultrasonography in the management of the airway. *Acta Anaesthesiol Scand* 2011; 55:1155–73
3. Lewis CS: *Surprised by Joy*. Orlando, Florida, Harcourt Books, 1955, p 207

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Detection of Inadvertent Endobronchial Intubation

To the Editor:

I read with interest the article by Ramsingh *et al.*¹ regarding point-of-care ultrasound verification of endotracheal tube (ETT) insertion depth. Numerous tests had been previously utilized to prevent and/or detect inadvertent endobronchial (main stem) intubation.² Each one of these tests has its own advantages and limitations. Undoubtedly, the use of point-of-care ultrasonography is a welcome addition, but it should not be forgotten that like any other confirmatory test, it has its own limitations. For example, deflation and reinflation of the ETT cuff to detect tracheal widening may not be safe when there is a high risk of aspiration as in trauma or obstetric patients. Applying cricoid pressure in rapid sequence induction situations may limit the area of transducer movement or distort the image. Ultrasound verification cannot be used when there is a neck collar in place unless the collar is released. Furthermore, the lung pleural sliding sign can be absent in patients with pleurisy, pneumothorax, pneumonia, or pulmonary consolidation³ in spite of correct ETT position (false positive) and artifacts may mimic pleural sliding after pneumonectomy even with main stem intubation⁴

(false negative). Since the displacement of a properly positioned ETT may occur with changes in the head, neck, and body positions,⁵ it has been recommended to periodically check the ETT position both intraoperatively and in ventilated patients in the critical care setting. The use of ultrasound may be difficult or impossible for intraoperative periodic assessment during surgery on the anterior or posterior neck, as well as during esophageal, thoracic, and trauma surgery where the surgical field may extend from the neck down. In all of these situations, other tests may be needed to verify proper positioning of the ETT. For early detection and correction of inadvertent endobronchial intubation, it is prudent to understand the limitations of ultrasound verification and to combine multiple confirmatory tests.

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The author declares no competing interests.

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References

1. Ramsingh D, Frank E, Haughton R, Schilling J, Gimenez KM, Banh E, Rinehart J, Cannesson M: Auscultation *versus* point-of-care ultrasound to determine endotracheal *versus* bronchial intubation: A diagnostic accuracy study. *ANESTHESIOLOGY* 2016; 124:1012–20
2. Salem MR, Baraka AS. Confirmation of endotracheal intubation, Benumof and Hagberg's Airway Management. 3rd edition. Edited by Hagberg CA. Philadelphia, Saunders Elsevier, 2013, pp 657–82
3. Sim SS, Lien WC, Chou HC, Chong KM, Liu SH, Wang CH, Chen SY, Hsu CY, Yen ZS, Chang WT, Huang CH, Ma MH, Chen SC: Ultrasonographic lung sliding sign in confirming proper endotracheal intubation during emergency intubation. *Resuscitation* 2012; 83:307–12
4. Cavaliere F, Zamparelli R, Soave MP, Gargaruti R, Scapigliati A, De Paulis S: Ultrasound artifacts mimicking pleural sliding after pneumonectomy. *J Clin Anesth* 2014; 26:131–5
5. Yap SJ, Morris RW, Pybus DA: Alterations in endotracheal tube position during general anaesthesia. *Anaesth Intensive Care* 1994; 22:586–8

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The Value of the Stethoscope in the Era of Ultrasound

To the Editor:

I read with interest the editorial by Isono *et al.*¹ I appreciate their assessment of the value of ultrasound detecting endobronchial intubation but disagree when they state that “perhaps the stethoscope is closer to a costume piece than ever before” or that “the findings of Ramsingh *et al.* further undermine the perioperative role of the stethoscope (except perhaps as a fomite).” It is unfortunate that many anesthesiologists fail to carry a stethoscope or neglect to use a stethoscope preoperatively where it provides a wealth of information about the circulatory system, the heart, and the lungs. Auscultation of

the carotids provides a window into the state of the arterial system. It is rare to have atherosclerosis limited just to the carotids. Cardiac murmurs, especially aortic stenosis, are easily detected by auscultating the heart. Preoperative auscultation of the lungs prevents one from wondering if that wheeze or rhonchi started intraoperatively. While the ultrasound appears to be more diagnostic of endobronchial intubation, it is premature to dismiss the use of the stethoscope.

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The author declares no competing interests.

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Reference

1. Isono S, Sandberg WS, Jiang Y: Do you believe what you see or what you hear? Ultrasound *versus* stethoscope for perioperative clinicians. *ANESTHESIOLOGY* 2016; 124:989–91

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In Reply:

We thank you for your interest in reading the article by Ramsingh *et al.*¹ and our accompanying editorial² and appreciate the concerns raised in the letters that auscultation may not have been optimally performed, that the cost of using ultrasound to differentiate tracheal *versus* bronchial intubation might not have been properly appreciated (Dr. Levy), or that the editorial dismisses the stethoscope as a useless thing of the past (Dr. Jablons).

In their article, Ramsingh *et al.*¹ stated: “Since auscultation for breath sounds is regarded as a basic skill, all attending anesthesiologists, with more than 4-yr posttraining, were allowed to perform the auscultation examination.” We assumed that auscultation would be optimally performed, but we also contacted Dr. Ramsingh and obtained more detailed information about their auscultation technique. Dr. Ramsingh responded: “Manual ventilation was initiated with target volumes of approximately 8 to 10 ml/kg ideal body weight, auscultation was performed bilaterally in each axilla at the mid-axillary line (approximately at the level of the fifth rib space).” This description of the auscultation technique represents a reasonable practice and may exceed the quality of true clinical practice. In this regard, we think that the comparison is reasonable: a new technique *versus* a routine clinical practice. In addition, there are several other studies demonstrating low sensitivity and specificity of auscultation for differentiating tracheal *versus* bronchial intubation, and the values Ramsingh *et al.*¹ reported in their study are comparable with those reported by other investigators.^{3–5} Nevertheless, we do agree with you that the sensitivity and/or specificity of auscultation might improve if it was executed in combination with other clinical assessments as you suggested. However, the sensitivity and specificity of

auscultation unlikely approach the sensitivity (93%) and specificity (96%) obtained with ultrasound alone.¹

Regarding the cost of using ultrasonography to assess the appropriate endotracheal tube cuff location, portable ultrasound devices are already widely available in the perioperative setting. For the purposes of financial analysis, it is reasonable to posit that new devices are not purchased specifically for only assessing the endotracheal tube cuff position, so the incremental cost of additional uses of existing equipment is the appropriate analysis. Because the probe is used for skin (not mucosa) contact only, the level of cleaning and sterilization requirement is much less rigid than that of cleaning and sterilization for a device such as a fiberoptic bronchoscope. We could not find any quote of the cost to wipe down the probe, screen, and keyboard of the ultrasound device with a sanitizing wipe. However, the cost estimate for one wipe and 3 to 5 min of a technician’s time is surely minimal.

The key message of our editorial is to emphasize that unquestioning reliance on the auscultation technique is not supported by scientific observation and to point out the value of exploring better techniques for common tasks (such as the ultrasound technique for endotracheal tube positioning). Innovation should always remain in our interests as we strive to improve the safety and reliability of anesthesiology. We are not recommending abandoning the stethoscope and do agree with its usefulness for a variety of clinical situations when properly used (including proper cleaning between patients to avoid transmission of disease). However, we must appreciate the low sensitivity and specificity of auscultation, even in the hands of experienced clinicians. We agree that the well-trained clinician needs to use all of his or her senses, including common sense, to provide optimal care for their patients.

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The authors declare no competing interests.

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References

1. Ramsingh D, Frank E, Haughton R, Schilling J, Gimenez KM, Banh E, Rinehart J, Cannesson M: Auscultation *versus* point-of-care ultrasound to determine endotracheal *versus* bronchial intubation: A diagnostic accuracy study. *ANESTHESIOLOGY* 2016; 124:1012–20
2. Isono S, Sandberg WS, Jiang Y: Do you believe what you see or what you hear? Ultrasound *versus* stethoscope for perioperative clinicians. *ANESTHESIOLOGY* 2016; 124:989–91
3. Brunel W, Coleman DL, Schwartz DE, Peper E, Cohen NH: Assessment of routine chest roentgenograms and the physical examination to confirm endotracheal tube position. *Chest* 1989; 96:1043–5
4. Sitzwohl C, Langheinrich A, Schober A, Krafft P, Sessler DI, Herkner H, Gonano C, Weinstabl C, Kettner SC: Endobronchial