Supplementary materials

Supplementary material associated with this article can be found in the online version at doi:10.1053/j.jvca.2019.10.026.

References

1 Donauer M, Schneider J, Jander N, et al. Perioperative changes of right ventricular function in cardiac surgical patients assessed by myocardial deformation analysis and three-dimensional echocardiography. J Cardiothorac Vasc Anesth, in press.
2 Jasaityte R, Dandel M, Lehmkuhl H, et al. Prediction of short-term outcomes in patients with idiopathic dilated cardiomyopathy referred for transplantation using standard echocardiography and strain imaging. Transplant Proc 2009;41(1):277–80.
3 Dandel M, Potapov E, Krabatsch T, et al. Load dependency of right ventricular performance is a major factor to be considered in decision making prior to ventricular assist device implantation. Circulation 2013;128:S14–23.
4 Dandel M, Knosalla C, Kemper D, et al. Assessment of right ventricular adaptability to loading conditions can improve the timing of listing to transplantation in patients with pulmonary arterial hypertension. J Heart Lung Transplant 2015;34:319–28.
5 Vonk-Noordegraaf A, Haddad F, Chin KM, et al. Right heart adaptation to pulmonary hypertension. J Am Coll Cardiol 2013;62(25 Suppl D):D22–32.
6 Dandel M, Hetzer R. Evaluation of the right ventricle by echocardiography: Particularities and major challenges. Expert Rev Cardiovasc Ther 2018; 16:259–75.

Michael Dandel, MD, PhD[1,*,†]
Roland Hetzer, MD, PhD[†,‡]
[*]*German Centre for Heart and Circulatory Research (DZHK), Partner Site, Berlin, Germany*
[†]*Deutsches Herzzentrum, Berlin, Germany*
[‡]*Cardio Centrum Berlin, Berlin, Germany*

https://doi.org/10.1053/j.jvca.2019.10.026

Visual Evoked Potentials Should Be Considered to Prevent Blindness During Cardiac Surgery

To the Editor:

Thank you for publishing a review article on the important topic of perioperative visual loss in cardiac surgery.[1] Raphael et al. did an excellent job describing the epidemiology, clinical manifestations, and treatment of perioperative visual loss in cardiac surgery. The review also includes a brief section on possible approaches to prevention.

The authors describe the use of visual evoked potentials (VEPs) in an animal model and the possible value of VEPs during cardiac surgery in humans; however, they do not recommend the use of VEPs during human cardiac surgery because of "...need for minimal inhalational anesthetic agent, technical issues in dark adaptation of the retina, and unknown sensitivity or specificity to detect ischemic optic neuropathy." They cite a 33-year-old reference as the basis for this position.[2]

In recent years, newer techniques and devices have been developed specifically to provide VEP monitoring in the surgical environment. Independent studies have shown that VEPs can be elicited reliably during spine surgery using these devices.[3,4] VEPs are highly sensitive to optic nerve pathology, including ischemia. VEP monitoring poses essentially no known additional patient risk with a low financial cost. Although the precise role for VEP monitoring during cardiac surgery remains to be established, these technical advancements address the previously mentioned shortcomings, and this author believes that VEP monitoring may be considered for use during cardiac surgery.

DOI of original article: http://dx.doi.org/10.1053/j.jvca.2018.11.035.

Conflict of Interest

Dr. Anschel has invented technique and devices for eliciting intraoperative visual evoked potentials.

References

1 Raphael J, Moss HE, Roth S. Perioperative visual loss in cardiac surgery. J Cardiothorac Vasc Anesth 2019;33:1420–9.
2 Sebel PS, Ingram DA, Flynn PJ, et al. Evoked potentials during isoflurane anaesthesia. Br J Anaesth 1986;58:580–5.
3 Uribe AA, Mendel E, Peters ZA, et al. Comparison of visual evoked potential monitoring during spine surgeries under total intravenous anesthesia versus balanced general anesthesia. Clin Neurophysiol 2017;128:2006–13.
4 Soffin EM, Emerson RG, Cheng J, et al. A pilot study to record visual evoked potential during prone spine surgery using the SightSaver photic visual stimulator. J Clin Monit Comput 2018;32:889–95.

David J. Anschel, MD[*,†,1]
[*]*St. Charles Hospital, Port Jefferson, NY*
[†]*School of Medicine, New York University, Port Jefferson, NY*

[1]D.J. Anschel has invented technique and devices for eliciting intraoperative visual evoked potentials.

https://doi.org/10.1053/j.jvca.2019.10.007

Ultrasound-Guided Internal Jugular Catheter Insertion in Prone Position

To the Editor:

OBTAINING vascular access is a vital component of patient care both in anesthesia and intensive care practice. Ultrasound-assisted vascular access can provide a safer and more efficient means of obtaining both peripheral and central venous access by reducing complications.[1-3]

Several techniques have been used for the catheterization of the internal jugular vein (IJV). These include the oblique, central, anterior, and posterior approaches.[4]

In this technical note, the authors' purpose is to describe the use of the oblique view for the direct visualization of the IJV and carotid artery (CA) during placement of an ultrasound-guided IJV catheter in 2 patients receiving anesthesia in the prone position.

Two male patients with no significant medical history (ages 66 and 71 with a body mass index of 34 kg/m^2 and 25 kg/m^2, respectively) underwent lumbar spine and spinal sacrum surgery. Induction of general anesthesia was uneventful, and they were placed in the prone position. However, during surgery the patients became hemodynamically unstable as a result of

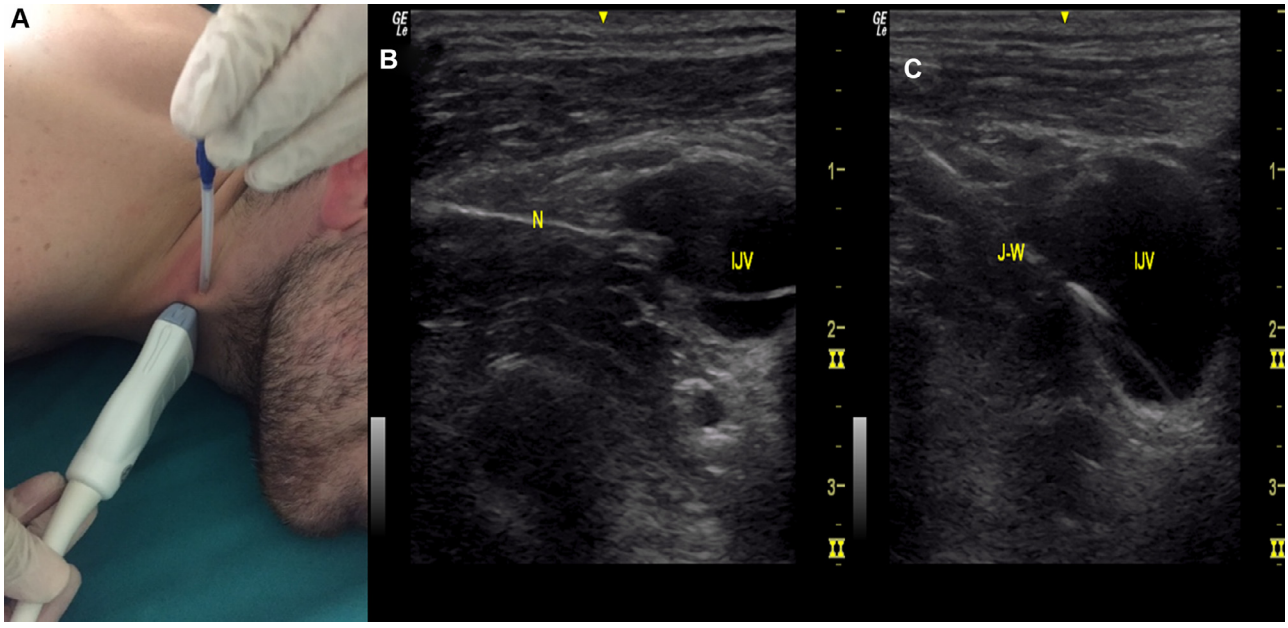

Fig 1. (A) The lateral-medial oblique approach for ultrasound-guided internal jugular vein cannulation (mannequin). (B) Short-axis view (internal jugular vein), in-plane technique (needle). (C) The J-tip guide wire within the internal jugular vein. IJV, internal jugular vein; J-W, J-tip guide wire; N, needle.

brisk bleeding. Although each patient had a 16- or 18-gauge intravenous peripheral catheter, we determined that placement of a central line was required for the provision of blood products and the need for infusion of vasoactive drugs.

While in the prone position, the patients were prepped and draped in sterile fashion and placed in a slight Trendelenburg position. The ultrasound transducer was placed at the anterior cervical triangle where both the IJV and CA were visualized in the short-axis view. The anterior cervical triangle had to be exposed in order to allow for proper transducer placement. Therefore, in each case, the patient's head was turned laterally. The probe was rotated approximately 10 to 20 degrees clockwise thereby allowing for an oblique view. In this position, the IJV was visualized in the short-axis view (hypoechoic round to oval structure) and at the same time permitting visualization of an elongated, or expanded, view of the vein from a medial-lateral perspective. With the IJV visualized at the center of the screen, the needle was inserted laterally to the transducer at the posterior cervical triangle (Fig 1, A). The needle was directed medially to the anterior cervical triangle by using the long-axis technique (Fig 1, B). Once the needle tip was confirmed within the IJV lumen, the J-tip guide wire was inserted. The correct position was established by visualization of the J-tip guide wire in the long axis within the IJV lumen (short-axis view) and its direction toward the innominate vein (Fig 1, C) (Video 1).

We decided to cannulate the IJV with this technique for 2 reasons. First, the IJV was visualized in the short-axis view with the ultrasound probe placed at the anterior cervical triangle with a medial-to-lateral orientation, by allowing for enough space for the needle to be placed laterally to the ultrasound transducer. With a cephalad-to-caudad probe orientation, the mandible may have obstructed both proper needle placement and the required maneuvers in the anterior cervical region. We limited the challenges of maintaining the ultrasound beam, vessel, and needle in the same plane by using this approach. Second, by inserting the needle through the in-plane approach, we very precisely targeted the IJV. This approach also allowed for the ultrasound transducer to be rotated slightly caudal thereby facilitating the direction of the needle, and subsequently of the J-tip guide wire, toward the innominate vein. Caution and vigilance must be exercised because the CA is frequently situated medial to the IJV. Hence, a forced needle advancement without a clear visualization of the needle tip within the IJV lumen may entail certain risks to the CA.

In summary, the oblique view combines the superiority of the short-axis view by allowing for clear visualization of the IJV while allowing for continuous real-time visualization of the long axis of the needle. The authors are suggesting use of this novel approach to ultrasound-guided IJV cannulation because it provides unobstructed access to the IJV in patients lying in the prone position. Moreover, anesthesiologists also are encouraged to advance their procedural skills to ensure high competency in difficult cases that mandate urgent intervention and high precision.

Conflict of Interest

The authors declare no conflicts of interest to disclose.

Supplementary materials

Supplementary material associated with this article can be found in the online version at doi:10.1053/j.jvca.2019.10.008.

References

1 Troianos CA, Hartman GS, Glas KE, et al. Special articles: Guidelines for performing ultrasound guided vascular cannulation: Recommendations of the American Society of Echocardiography and the Society of Cardiovascular Anesthesiologists. Anesth Analg 2012;114:46–72.

2 Saranteas T, Koliantzaki I. Unusual position of J-guide wire during ultrasound-guided subclavian vein catheterization. Br J Anaesth 2016;117:833–4.
3 Fragou M, Gravvanis A, Dimitriou V, et al. Real-time ultrasound-guided subclavian vein cannulation versus the landmark method in critical care patients: A prospective randomized study. Crit Care Med 2011;39:1607–12.
4 Phelan M, Hagerty D. The oblique view: An alternative approach for ultrasound-guided central line placement. J Emerg Med 2009;37:403–8.

Dimitrios Anagnostopoulos, MD*
Theodosios Saranteas, MD*
Thomas Papadimos, MD†
Andreas Kostroglou, MD*
Penelope Kouki, MD*
*Second Department of Anesthesiology, Athens University Medical School, Athens, Greece
†Department of Anesthesiology, Wexner Medical Center, Ohio State University, Columbus, OH

https://doi.org/10.1053/j.jvca.2019.10.008

Aberrant Band in the Right Atrium Simulating Central Venous Catheter—A Rare Echocardiographic Pitfall

To the Editor:

The authors present a new echocardiographic pitfall of an aberrant band in the right atrium that mimicked a central venous catheter on intraoperative transesophageal echocardiography (TEE) examination.

A 9-year-old boy diagnosed with a double outlet right ventricle, subaortic ventricular septal defect, and pulmonary stenosis was scheduled for intracardiac repair. We found an unusual chordlike structure in the right atrium on the midesophageal 4-chamber TEE view (Fig 1, Video 1). We initially believed that the structure was the central venous catheter crossing the superior vena caval–right atrial junction and entering the right atrium. However, the thickness (4.4 mm) and echogenicity of the structure were more than what would be expected for a typical 5.5 Fr central venous catheter (Fig 2). Examination of the right atrium in the midesophageal aortic valve short-axis view showed the long axis of the band (see Fig 2; Video 2). A still image in this view gave an impression of cor triatriatum dexter, in which the right atrium is divided into 2 chambers by a membrane. TEE imaging in other planes showed the presence of a chord in the right atrium rather than a membrane, which ruled out the possibility of cor triatriatum. Injection of agitated saline disclosed the location of the central venous catheter in the superior vena cava. When the right atrium was opened for the intracardiac repair, a thick fibromuscular band measuring 5.5 cm long and 5 mm wide was seen extending from the superior wall of the right atrium to the lower end of inter atrial septum. Because the band was not causing the child to experience any hemodynamic or conduction disturbances, it was considered as a normal variant and was not resected.

Eustachian valve, Chiari's network, crista terminalis, and tenia sagittalis are commonly reported echocardiographic pitfalls in the right atrium that may be confused as a thrombus or

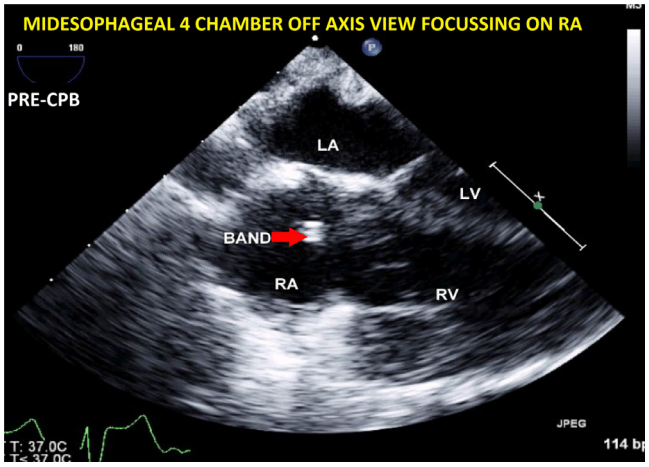

Fig 1. Pre-cardiopulmonary bypass transesophageal echocardiographic examination in the midesophageal 4-chamber off-axis view focusing on the right atrium shows an aberrant band in the right atrium *(red arrow)*. CPB, cardiopulmonary bypass; LA, left atrium; LV, left ventricle; RA, right atrium; RV, right ventricle.

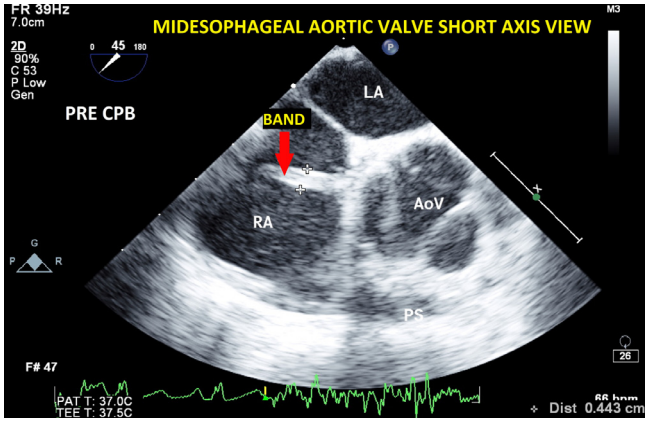

Fig 2. Pre-cardiopulmonary bypass transesophageal echocardiographic examination in the midesophageal aortic valve short-axis view showing the long axis of the band in the right atrium *(red arrow)* with a thickness of about 4.4 mm. AoV, aortic valve; CPB, cardiopulmonary bypass; LA, left atrium; PS, pulmonary stenosis.

mass.[1,2] To the best of our knowledge, the presence of aberrant bands in the right atrium have not been reported in the literature. This structure can be misjudged on the intraoperative TEE as a right atrial–placed central venous catheter tip because of its linear course, thickness, and location.

Supplementary materials

Supplementary material associated with this article can be found in the online version at doi:10.1053/j.jvca.2019.10.042.

References

1 Lori BH, Solomon A, Linda SL. Imaging artifacts and pitfalls. In: Robert MS, Solomon A, Stanton KS, editors. Comprehensive textbook of perioperative transesophageal echocardiography, 2, Philadelphia: Lippincott Williams & Wilkins; 2011. p. 42–51.
2 Ameya JB, Sina T, Daniel V. Bands, chords, tendons, and membranes in the heart: An imaging overview. Curr Probl Diagn Radiol 2016;45:380–91.