nodes and masses, puncturing the medial and lateral wall of the aorta; the risk of this maneuver was high, however, and the procedure did not gain wide clinical application.

In this article, Liberman and colleagues[1] presented the results of biopsies of station 6 lymph nodes performed without traversing the aorta: the needle is passed through the esophageal wall and introduced for 6 to 8 cm toward the para-aortic location, avoiding the aorta and great vessels to reach the nodes that are not visualized when passing the needle into the mediastinum (see the original article for details).

Liberman and colleagues[1] must be congratulated for their skill, dexterity, and boldness in ideating and realizing this procedure. The results are very persuasive, with reported 100% success in reaching and obtaining cytologic material from the station 6 lymph node with no complications in 21 patients.

We believe, however, that it is appropriate to say a few words of caution and to direct the reader's attention to two points. First, the procedure appears very complicated and dangerous, and the excellent results reported by Liberman and colleagues[1] are probably due to a high volume of endoscopic and endobronchial ultrasonographic activity at their center. We must also consider that the indications are very rare (12 cases performed out of 274 combined endobronchial and endoscopic ultrasonographic procedures at their center[1]), and the learning curve in a medium-activity center could be very long. Second, are these results widely reproducible? Biopsy of station 6 lymph nodes can also be obtained by single-port video-assisted thoracoscopy. In that case, the specimen is wider (it can undergo all histologic and immunohistochemical studies required), and the procedure is technically easier and can be performed by every thoracic surgeon with a 1- or 2-day hospital stays. Moreover, the risks (both for the patient's great vessels and for the surgeon's own coronary arteries) associated with passing a needle out in the mediastinum close to great vessels without direct control but only a mental image is avoided.

We conclude by congratulating Liberman and colleagues[1] for the procedure proposed and the results reported. We have some doubts, however, about the reproducibility of their technique and its true advantage relative to easier and safer ways to reach para-aortic lymph nodes, such as a single-port video-assisted thoracoscopy.

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Reply to the Editor:

I thank Baisi and colleagues for their comments regarding our technique for the biopsy of station 6 lymph nodes by using endoscopic ultrasound without traversing the aorta. I would like to respond to the points they brought forward.

First, their point is well taken regarding the complexity of the procedure and the difficulty in reproducing these results in lower-volume centers. Such a concern, however, is not specific to this procedure, as it is well established that high-volume centers typically have superior outcomes to lower-volume centers, especially when it comes to complex procedures. Furthermore, multiple fellows, visiting surgeons, and trainees in our center have been trained in this procedure and are currently using it in their present places of work around the world. I would add that there are many complex procedures that can be construed to be "dangerous" (such as minimally invasive esophagectomy, carinal resection, and lung transplantation) are being performed by thoracic surgeons around the world. In fact, putting a 22-gauge needle through the esophagus to pierce a lymph node that sits on the lateral arch of the aorta is far less "dangerous" than many procedures that we perform on a daily basis.

Second, although I agree that biopsy of station 6 lymph nodes can be obtained by single-port thoracoscopy (or anterior mediastinoscopy), I disagree with the point that these are equivalent procedures to that described in the article. Although these procedures are safe and simple, the endoscopic ultrasound technique described is performed as an outpatient procedure and can be done under local anesthesia and sedation in an endoscopy suite, therefore avoiding general anesthesia, an operating room, and any hospitalization whatsoever. In today's climate of cost-effectiveness in medicine, I believe that a 20- to 30-minute outpatient procedure is far

superior to an operation requiring a 2-day hospitalization from a socioeconomic standpoint.

Another advantage to this technique is that it can be performed as part of a complete echo-endoscopic mediastinal staging procedure (endobronchial ultrasound + endoscopic ultrasound), which can now allow for the evaluation and biopsy of all mediastinal lymph node stations during a single outpatient endoscopic procedure. Single-port thoracoscopy cannot provide complete mediastinal staging, therefore necessitating additional procedures in cases requiring it.

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CARDIAC CYCLE EFFICIENCY DURING COUNTERPULSATION

To the Editor:

We read with great interest the recent article by Onorati and colleagues,[1] whose findings are in accordance with our own data obtained in an animal model arranged to investigate the effects of intra-aortic balloon pump (IABP)/heart volume ratio modification.[2] We congratulate them for having addressed such a controversial topic and for shedding additional light on the IABP weaning method. Indeed, this publication underlines the superiority of progressive volume variation relative to the traditional rate reduction method as a procedure for IABP weaning, as we hypothesized on the basis of the negative effects of reducing the IABP/heart volume ratio, in terms of both hemodynamic performance and metabolic response.

Onorati and colleagues[1] used the cardiac cycle efficiency (CCE), derived from the arterial pressure waveform, as their measure of hemodynamic performance. The CCE expresses the ability of the cardiovascular system to maintain homeostasis at different energetic levels resulting from simultaneous interactions among pump function (both mechanical and electrical contributions), the arterial system, venous return, and the pulmonary circulation.[3]

We noticed, however, that patients in both groups had high CCEs. The value of the CCE is always less than 1, because part of energy is lost during heart work and cannot be totally recovered (an increase in entropy). This ''efficiency''—unlike the purely mechanical performance, which is always between 0 and 1—can also have in vivo negative values, and this represents a compensatory mechanism to activate the support for the body's compartments that are not working properly.[3]

Such high CCE values in the article of Onorati and colleagues[1] might be attributable to underdamping or resonance artifacts that frequently affect blood pressure measurements in operating rooms and intensive care units and cause severe overestimation of systolic blood pressure and incorrect estimation of hemodynamic parameters when the pulse contour method is used.[4] It is well known that patients undergoing cardiovascular surgery are at high risk of artifacts caused by underdamping because of high vascular stiffness, advanced age, and other conditions.[4] In addition, the dynamic impedance is strongly influenced by the balloon in patients with IABPs, and as a result artifacts are very common, affecting the diastolic peak. In our opinion, great attention must therefore be paid to the accuracy of the pressure signals received during IABP weaning procedures.

It is also important to consider that the damping coefficients of standard transducer systems have been manufactured with the aim of obtaining the highest level of detail available from the arterial wave signal while maintaining the risk of underdamping as low as possible for the whole patient population, and not a specific group of patients. Extra damping must therefore be introduced to minimize the distorting effects of the measurement system's tendency to resonate. Nonetheless, the damping coefficient obtained is frequently insufficient, and resonance artifacts may affect the morphology and amplitude of the recorded pressure wave. Under these conditions, a dedicated transducer manufactured for limiting resonant effect is an useful device, although interpretation of the resulting waveform does require some experience.[5]

We would appreciate comments from Onorati and colleagues[1] regarding whether this issue was addressed and how they proceeded to limit these underdamping artifacts.

We are grateful to Onorati and colleagues[1] for sharing their experience and knowledge in this excellent study. An elucidation and comment of the point discussed here would be helpful for a better understanding of the nuances of IABP pathophysiology and management in these patients.

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