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Commentary: Crossing the Rubicon

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In 49 BC, Julius Caesar famously paused on the Northern bank of the river Rubicon, contemplating the severe and perhaps mortal consequences of crossing from the Roman Republic of Cisalpine Gaul into Italy with his legion. The Rubicon (from the Latin word *rubeus*) was so named for its red appearance from the muddy basin. Analogously, in this issue of the *Journal*, Molina and colleagues¹ pause on the edge of a different sort of red waterway, either the aorta or pulmonary artery, considering the risks of traversing this barrier with their 22-gauge aspiration needle to reach the other side during endobronchial ultrasound or endoscopic ultrasound diagnostic procedures.

Doppler ultrasound is commonly used to find a suitable window devoid of intervening blood vessels to aspirate a target lesion. Occasionally, a procedure may be aborted, or a lesion may remain unsampled, if a safe window is not found. One is left to wonder what is the real risk of traversing a vessel when faced with the alternative of less-adequate staging or a more-invasive procedure. Molina and his colleagues from Centre Hospitalier de l'Université de Montreal report their experience with endoscopic transvascular biopsy of intrathoracic lesions.

One hundred patients were identified from their institution who had undergone transvascular endobronchial ultrasound or endoscopic ultrasound-guided biopsies of lesions within the lung or mediastinum. Outcomes confirmed their hypothesis that these biopsies can be performed safely. The most commonly traversed vessels were the aorta and branches of the pulmonary artery. There were no immediate postprocedure complications. There was one delayed complication of a 1.4-cm aortic

Julius Caesar leading his army across the Rubicon (19th-century wood engraving; iStock.com).

CENTRAL MESSAGE

Although transvascular endoscopic ultrasound-guided tissue sampling appears feasible, it should be approached with an abundance of caution and only if results will impact clinical decision-making.

pseudoaneurysm in a patient later suspected of having tertiary cardiovascular syphilis. This pseudoaneurysm was discovered while the patient was being treated for a mortal bilateral pneumonia, with no clear causal relationship. The data suggest the relative safety of this technique.

However, the authors conclude, somewhat discordantly, that “transvascular ultrasound-guided needle biopsies are very challenging and should be performed only by experienced operators.” They further advise that these procedures be done in proximity to an operating room where thoracic surgeons are immediately available.

There may be more to the story. The authors discuss the complicated nature of the technique—challenges involving visualizing the target, predicting the needle trajectory, and performing enough transvascular passes to achieve diagnostic tissue. Although lacking a prospectively determined algorithm, the authors describe how they assess the arterial wall for calcium, aneurysm, and significant atherosclerosis (they do not specify if any procedures were aborted due to these factors). They discuss routinely reassessing the vessel wall immediately after puncture, recalling cases in which small hematomas may have formed. Patients were, per routine, observed in the recovery area for at least 2 hours and were re-evaluated by a medical team before discharge with a plain chest radiograph.

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Is this hesitancy on the part of the authors analogous to Julius Caesar's legendary pause on the riverbank? The Rubicon is in fact a very shallow and unimpressive river, just as the pulmonary artery is a low-pressure system surrounded by adjacent tissue and the aorta is a thick-walled vessel that should tolerate a 22-gauge needle. But this diminutive river carried significant political import.

Molina and colleagues coin a new term, "thoracic endoscopist." We may safely assume that this group includes thoracic surgeons as well as our nonsurgical pulmonology and gastroenterology colleagues who are increasingly participating in the evaluation of patients with lung cancer. We may consider the quality of these procedures performed by nonsurgeons to be equivalent to surgical endoscopists. The authors from Montreal have been leaders in endoscopic staging procedures and represent a surgically based group, clearly equipped to recognize and swiftly treat potential bleeding complications. We must be careful to avoid extrapolating the early retrospective results of this experienced group and assume all physicians can expect similar results. In our early collective experience with transvascular sampling, the endoscopist, surgical or nonsurgical, should approach a calcified aorta standing

in between the bronchus and level 5/6 nodes with real trepidation. Any transvascular procedure should impact clinical decision-making. Rapid, onsite cytology may help minimize the number of needle passes required to achieve a diagnosis. Given the volume of thoracic procedures being performed worldwide by nonsurgeons in endoscopy suites, we do not yet understand the true risk of transvascular sampling in average hands at the average institution. It appears feasible and should only be performed if it is the safest test to yield truly critical results.

As Caesar crossed the red river Rubicon, he proclaimed "*iacta alea est*," meaning *the die is cast*. This is where the analogy ends. We should be careful to avoid misinterpreting this study as authorization for all thoracic endoscopists, regardless of training and clinical infrastructure, to begin crossing arterial vessels from this point forward. Sound clinical judgment and acknowledgement of institutional limitations is required.

Reference

1. Molina JC, Chaudry F, Menezes V, Ferraro P, Lafontaine E, Martin J, et al. Transvascular endosonographic-guided needle biopsy of intrathoracic lesions. *J Thorac Cardiovasc Surg*. 2020;159:2057-65.