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To TEE or Not to TEE? That Is the Question

To the Editor:

The recent article by Fair et al[1] provides thought-provoking information about chest compression pause time with transesophageal echocardiography (TEE) versus transthoracic echocardiography (TTE) in cardiac arrest. The authors chose an elegant statistical model to address the inherent complexities of the clinical question and paucity of patients available for analysis (1.4/month). We echo their concerns about external validity because only 7 patients underwent TEE-guided resuscitation and no TTE operator details are provided.

The authors posit that the benefit of TEE is shorter compression pauses, which are associated—according to an observational study of 506 patients[2]—with improved survival. Pauses for procedures were excluded, including those for intubation. Given that intubation is required for TEE, we think that intubation-related pauses reflect a true "cost" of TEE and should therefore be included. This is particularly salient if intubation is performed solely to facilitate TEE because evidence supporting patient-oriented benefit thereof is lacking.

More important is examination of the literature linking shorter compression pauses to increased survival. Two observational trials (n=2,011 and n=2,103) found no such association.[3,4] Three large randomized controlled trials assessing various methods of reducing pause time all failed to show any survival benefit of increased chest compression fraction (ie, shorter pauses).[5-7] A meta-analysis of continuous cardiopulmonary resuscitation by manual compression devices likewise found no survival benefit.[8] Thus, we believe that the argument of shorter pause time does not provide significant justification by itself for the superiority of TEE.

TEE undoubtedly has some advantages over TTE, including increased diagnostic ability for certain conditions, and often better image quality. Given the cost of establishing and maintaining a TEE program, these potential benefits must be considered alongside potential limitations, including lack of knowledge of how often the enhanced diagnostic capabilities of TEE lead to patient-oriented benefits—if at all—and the lack of expediency of acquisition of TEE images. Although to our knowledge no studies have addressed the former question, a recent study of out-of-hospital cardiac arrest reported an average time from emergency department arrival to acquisition of TEE images of 12 minutes.[9] In our experience, TTE images are obtainable in substantially less time, even with unfavorable patient characteristics. Although image quality may occasionally be suboptimal, it is generally sufficient to guide decisionmaking, thereby tipping the balance, in our opinion, in favor of TTE (at least for unselected patients).

Although we believe that TTE is sufficient in most cases, there are likely scenarios in which the delay would not be detrimental or in which patients would benefit from the enhanced capabilities of TEE, although these have yet to be identified. Perhaps a staged approach, such as TTE followed by TEE in certain situations, will prove to be best. We recognize that the challenge of improving cardiac arrest outcomes could be one in which "the native hue of resolution is sicklied o'er with the pale cast of thought, and enterprises of great pith and moment with this regard their

currents turn awry and lose the name of action." We hope that this will not be the case with TEE.

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IMAGES IN EMERGENCY MEDICINE

(continued from p. 601)

DIAGNOSIS:

Ivory vertebra sign caused by blastic metastasis. Ivory vertebra sign refers to a dense sclerotic vertebral body, which retains normal size and shape without any significant change in surrounding tissue or intervertebral discs. The ivory vertebra in blastic metastasis results from osteoblast stimulation that causes accelerated replacement of spinal tissue, which then converges and forms an increase in density.[1] Imaging findings may occur on single or multiple vertebral bodies. Although initially described on standard radiography, findings are best observed on CT.[2]

Patients with findings of ivory vertebra are usually middle-aged, with a history of cancer and subacute back pain. Ivory vertebra sign is typically associated with metastatic disease, most commonly of the breast or prostate. It is less frequently a manifestation of other cancers, such as lymphoma, plasmacytoma, chordoma, or primary bone sarcomas.[2] Paget's disease and osteomyelitis must also be excluded. A thorough history and physical examination, as well as a CBC count and erythrocyte sedimentation rate, should be considered while the patient is in the ED. Treatment must be aimed at the underlying pathology.[3]

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