Timing is everything

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Chou and colleagues¹ from the Yale group report their early and late outcomes from intramural hematoma (IMH) and penetrating atheromatous ulcers (PAU) in the thoracic aorta. This experience spanned 20 years and included 105 patients, of whom 55 and 53 had IMH and PAU, respectively. This study updated their experience in 2002,² and it maintains a continued aggressive stance with open interventions. In the report, Chou and colleagues¹ provide several definitive conclusions that warrant comment:

1. Patients with IMH and PAU are older and more frequently female than those with classic dissection. My colleagues and I have also observed this in our experience.³
2. Rupture was reported to occur more frequently with IMH and PAU than with classic dissection. It must be recognized that Chou and colleagues¹ used a relatively subjective definition for “rupture state” that included both rupture and impending rupture. Furthermore, Chou and colleagues¹ noted that rupture or impending rupture could include radiographic evidence of “extra-aortic blood,” “increasing pleural effusion,” or “worsening of aortic contour,” as well as clinical findings of “persistent pain.” Although these are important clinical findings that should be noted, they do not necessarily equate with what most consider “real” rupture. As such, the condition of rupture may be overrepresented.
3. No branch occlusions occurred in either IMH or PAU. Although this is intuitively expected and has been observed by my own group as well, it should be emphasized that IMH may convert to classic dissection, which can then develop branch occlusion. Although this series observed no instances, the surgeon should continue vigilant anticipation of any possible complication. IMH and PAU are subsets of acute aortic syndrome—and one should always anticipate the worst.
4. True healing of IMH and PAU is rare, with “worsening” and the requirement for late surgery common. Much of this conclusion was based on the posthospitalization radiographic surveillance of Chou and colleagues.¹ It must be recognized that only 59% of patients with

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Central Message

Diagnosis of IMH-PAU is reliant on 1 image. Management should take into account location and clinical state, both of which can change.

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IMH and 56% with PAU had posthospitalization imaging. With a 10-year overall survival of 33%, there is no doubt that IMH and PAU may portend poor late outcomes. Meaningful conclusions about the natural progression of the disease after surgery remain limited, however, because these figures were likely influenced by incomplete radiographic follow-up.

5. An open surgical approach was safe for both IMH and PAU when performed the acute and chronic phase. In general, the location of the IMH and PAU (ascending vs descending thoracic aorta) determines the need for open operative intervention. Chou and colleagues¹ acknowledged that the location was important and consequently reported these subgroups in Table 2 of their article. With smaller groups, however, specific information about location becomes less relevant.
6. A low threshold for intervention for impending rupture or radiographic worsening was associated with low early mortality and satisfactory late outcomes. Chou and colleagues¹ are to be credited with excellent operative results in this morbid patient population, but patient selection remains a key to operative success. Although Chou and colleagues¹ recommend an aggressive approach to clinically malignant IMH and PAU, there were 8 cases (Figure 2 in their article) in which

FIGURE 1. A, Computed tomographic image of patient with acute type A intramural hematoma. No obvious intimal flap is seen in imaging. B, Intraoperative photograph of the ascending aortic intramural hematoma. C, Operative exposure of the ascending and aortic root revealed a small tear (arrow) in the noncoronary sinus of the aortic root.

intervention was indicated but not performed, all leading to eventual death.

7. An aggressive approach toward surgical repair may be warranted because of frequent radiographically evident progression and infrequent healing of IMH and PAU. Because this conclusion was based on less than 60% radiographic follow-up, such an aggressive stance may not be warranted. It is agreed that the indication for surgical intervention should be based on the clinical situation, and Chou and colleagues¹ provide details on the definition of “rupture state,” which is the clinical situation. Less emphasis, however, was placed on the location of the IMH and PAU. It has been our group’s stance to be aggressive with IMH and PAU that involve the ascending aorta, although this has differed from what has been reported from Asian centers.^{4,5} At any rate, the decision to intervene should be determined on an individual basis.

An interesting point, not stated in the conclusions, was the increased frequency of aortic branching variants (isolated left vertebral artery, bovine arch, and aberrant left subclavian artery) that occurred in 27% of patients with IMH and PAU. Although one could surmise that this relates to differing flow patterns or genetics, the significance remains uncertain.

In conclusion, the management of IMH and PAU remains controversial. Much of the controversy may be based on the fact that the currently agreed on definitions are dependent solely on imaging. Chou and colleagues¹ defined IMH as “crescentic or circular shadowing within the aortic wall without intimal flap or flow communication” and PAU as “contract opacified projections into the medial wall with mushroomlike appearance.” These definitions clearly evoke an image of what to expect but are only descriptive of an event that occurred at *one point in time*, the time at which the image was obtained. Acute aortic syndromes, whether classic dissection, IMH, or PAU, may evolve clinically, depending on multiple factors, and unless more frequent imaging is performed—which is not practical—the true pathology may not be known. Remembering that IMH is “radiographic diagnosis,” IMH may simply be a specific point on the disease spectrum of acute aortic dissection, as opposed to a phase in the progression to classic dissection. Figure 1 demonstrates an example of a radiographically diagnosed acute type A IMH that is discovered at surgery to involve a tear not previously appreciated on imaging.

At any rate, we must continue to characterize this combined entity—IMH and PAU—as has been done by the Yale group. What must be recognized, however, is that the diagnosis of IMH and PAU is ultimately dependent on a single image at a single point in time of a situation that can change with time. Moreover, the management should equally take into account the location of the pathology and the individual clinical state—which can also change with time. In the end, timing is everything.

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