The Modified Penn Classification: Easier to Predict Mortality After Acute Type A Dissection Repair

To the Editor:

We read with great interest the article by Ghoreishi and colleagues [1], which proposed a novel formula inspired by the Penn classification [2] to predict operative mortality based on the preoperative biochemical analysis. Nevertheless, this well-illustrated investigation is deserving of additional comments.

Zindovic and associates [3] found that in patients undergoing acute type A aortic dissection (ATAAD) repair, elevated preoperative lactic acid levels were associated with poorer early survival in those presenting with malperfusion syndrome. Nonetheless, in many of the patients, even significant preoperative hyperlactatemia was transient and was not associated with adverse outcome. Therefore, elevated levels preoperatively are poor predictors of postoperative mortality [3].

Based on an ischemic malperfusion pattern to stratify operative mortality risk, the Penn classification [2] has been externally validated. Nevertheless, the Penn classification categorizes several ischemic conditions together, which may represent an oversimplification. Accordingly, the classic Penn classification might still underestimate the surgical risk of ATAAD in the setting with critical organ-specific ischemia (including mesenteric ischemia, major cerebral ischemia, and coronary malperfusion) [4]. For that reason, we suggest dividing the Penn class Ab into subclasses Ab-1 and Ab-2, which is the so-called the modified Penn classification (see Table 1 in Li and associates [4]). Additionally, in order to provide clinicians a rapid, simple, easier, and accurate evaluation for reasonable outcomes in emergency scenarios, class Aa/Ab-1 could be grouped as "uncomplicated" ATAAD and class Ab-2/Ac/Abc grouped as "complicated" ATAAD [4]. We studied 255 consecutive surgically treated ATAAD patients from 1997 to 2017 retrospectively, divided into 2 groups (complicated and uncomplicated), based on this modified Penn classification. The overall 30-day mortality was 13.7%. Of these, 166 patients were "uncomplicated" with a 7.8% operative mortality (including Aa: 7.8%; Ab-1: 7.8%). On the other hand, 89 patients were "complicated" with a 24.7% mortality rate (including Ab-2: 20.0%; Ac: 26.7%; and Abc: 27.3%). After this modification, we think the modified Penn classification could be easier to apply and would more adequately identify patients with higher or lower risk of in-hospital mortality after surgical repair.

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References

1. Ghoreishi M, Wise ES, Croal-Abrahams L, et al. A novel risk score predicts operative mortality after acute type A aortic dissection repair. Ann Thorac Surg 2018;106:1759–66.
2. Augoustides JG, Geirsson A, Szeto WY, et al. Observational study of mortality risk stratification by ischemic presentation in patients with acute type A aortic dissection: the Penn classification. Nat Clin Pract Cardiovasc Med 2009;6:140–6.
3. Zindovic I, Luts C, Bjursten H, et al. Perioperative hyperlactemia is a poor predictor of outcome in patients undergoing surgery for acute type-A aortic dissection. J Cardiothorac Vasc Anesth 2018;32:2479–84.
4. Li HW, Shih YC, Liu HH, et al. Reconsidering the impact of pre-operative malperfusion on acute type A dissection: the modified Penn classification. J Am Coll Cardiol 2016;67:121–2.

Aneurysmal Degeneration of Extracellular Matrix in Arterial Reconstruction

To the Editor:

We genuinely congratulate Jacobsen and associates [1] for their study. The use of prosthetic materials in the repair of congenital heart anomalies creates many disadvantages such as calcification, degeneration, and lack of growth potential. Repeated surgical interventions are needed because of these limitations [2]. As we mentioned in our study [3], we also used decellularized porcine small intestinal submucosa—termed extracellular matrix (ECM) by the manufacturer (CorMatrix, Roswell, GA)—during Norwood palliation in 8 patients with hypoplastic left heart syndrome, as an alternative. In the preoperative evaluation of second-stage operation, 2 of the patients had aneurysm formation at the ascending aorta and aortic arch with maximum aortic dimensions of 3.2 cm and 4.8 cm, respectively. In a third patient, during the second-stage operation, dissection and rupture occured in the ECM patch while cannulation was performed. Pathology examinations of the resected ECM material of all patients revealed mixed type of inflammation, calcification, foreign body granulomas, giant cells, and chronic inflammation with macrophage accumulation. There are also similar studies in the literature about the disadvantages of the ECM patch. Dobrilovic and colleagues [4] reported early catastrophic patch disruption in 2 patients and pseudoaneurysm in 1 patient who had undergone femoral artery endarterectomy and patchplasty with ECM because of peripheral artery disease. Corno and coworkers [5] reported a 25.5% rate of reintervention in 51 patiens who had undergone aortic arch reconstruction or aortic coarctation repair, and the reason for the reintervention was the obstruction in the ECM patch used to enlarge the aortic arch/isthmus.

Considering the rarity of the studies about ECM patch used for Norwood operation, we were disappointed that Jacobsen and colleagues [1] did not mention our study, published in the same journal. We think that surgeons should be very cautious when using ECM patch for not only Norwood operations, but all kinds of arterial reconstructions.

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References

1. Jacobsen RM, Mitchell ME, Woods RK, Loomba RS, Tweddell JS. Porcine small intestinal submucosa may be a suitable material for Norwood arch reconstruction. Ann Thorac Surg 2018;106:1847–52.
2. Calfa D, Bacha E. New technologies for surgery of the congenital cardiac defect. Rambam Maimonides Med J 2013;4:e0019.
3. Erek E, Aydin S, Suzan D, Yildiz O, Demir IH, Odemis E. Early degeneration of extracellular maxtix used for aortic reconstruction during Norwood operation. Ann Thorac Surg 2016;101:758–60.
4. Dobrilovic N, Soukas P, Sadiq I, Goldstein L, Raman J. Early complications of biologic extracellular matrix patch after use for femoral artery repair. J Vasc Surg 2017;65:705–10.
5. Corno AF, Smith P, Bezuska L, Mimic B. Is decellularized porcine small intestine submucosa patch suitable for aortic arch repair? Front Pediatr 2018;6:149.