Finding value in a common medical misnomer: The importance of identifying a bovine arch in patients with aortic coarctation

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In 1944, the first successful repair of an aortic coarctation was performed by Clarence Crafoord on a 12-year-old boy in Sweden.1 Surgical techniques for coarctation repair have evolved, and they now include prosthetic patch aortoplasty, subclavian flap aortoplasty, and resection with extended end-to-end anastomosis.

In neonates, surgical approach is often in question when dealing with distal arch anomalies or coarctation. Surgical outcomes for coarctation repair have focused on reintervention rates secondary to recoarctation. Numerous factors are associated with increased risk of recoarctation, including age younger than 2 to 3 months, weight less than 2 kg, suture material, and the presence of residual ductal tissue.2

In this issue of the Journal, Turek and colleagues3 describe the potential association of a bovine aortic arch with recoarctation after surgical repair. Bovine aortic arch is a medical misnomer. This anomaly, in which the innominate and left carotid arteries emanate as a common trunk from the aorta, is found in approximately 13% of humans, but not in cattle.4

Turek and colleagues3 report on 49 patients in a 5-year period who underwent coarctation repair by resection with extended end-to-end anastomosis through a left thoracotomy. In their cohort, 6 patients had recoarctation develop (echocardiographic gradient >20 mm Hg). Interestingly, all 6 weighed more than 2 kg at the time of the initial surgery. A bovine arch was found in 4 of the 6 patients who required reintervention. Turek and colleagues3 hypothesize that a bovine arch limits the tangible distance available for vascular clamp placement because of the need for adequate cerebral perfusion and increases the likelihood of an imperfect surgical result. They refer to this phenomenon as a “clamping index.”

Perhaps more interesting was their comparison of preoperative chart documentation with a retrospective review of the initial echocardiographic studies to ascertain the identification a bovine arch. Only 3 patients in the total population (6.1%) were found to have this arch anomaly noted within their medical records, whereas retrospective echocardiographic review revealed there to be 14 (28.6%). Such a phenomenon may be attributed to a lack of importance placed on this anomaly with regard to surgical planning.

Although the article of Turek and colleagues3 is the product of a smaller study cohort, and the incidence of reintervention was quite limited, this potential anatomic association merits consideration. In multidisciplinary programmatic discussions and family counseling sessions, the importance of accurately identifying a bovine arch and assessing its potential impact may alter surgical strategy. More specifically, the article suggests the need to adjust previously accepted risk factors regarding recoarctation to include not only demographic data but also anatomic specifics. The value of this article is thus immediately apparent for congenital heart surgeons. Such contributions indeed may contain much power despite smaller cohort size or outcome measurability.

References