

## Bovine Arch Anatomy Influences Re-Coarctation Rates in the Era of the Extended End-to-End Anastomosis

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### ABSTRACT

**Background:** Previous work suggests arch anatomy does not influence re-coarctation after extended end-to-end anastomosis via a left thoracotomy, yet in these studies bovine arch is grossly underreported. This study aims to: 1) assess chart review reliability in bovine arch identification, 2) determine re-coarctation risk with a bovine arch, and 3) explore an anatomic explanation for recurrent arch obstruction based on arch anatomy.

**Methods:** 63 patients underwent surgical repair for aortic coarctation via an extended end-to-end anastomosis at a single institution over a 7 year period (2008-2014). Echocardiographic images from these patients were specifically reviewed for arch anatomy and compared to a chart review of the echocardiographic reports looking for the same. Recurrent arch obstruction was defined as an echocardiographic gradient across the repair  $\geq 25$  mmHg and compared across arch anatomies. For cases with angiographic images (21/63; 9 bovine arches; 12 normal arches), a scaled distance (clamping index) between the left subclavian artery and placement of the cross-clamp was then calculated for normal anatomy versus bovine arch anatomy (Fig. 1).

**Results:** Only 2/63 (3.2%) patients were indicated on chart review to have a bovine arch, compared to 20/63 (31.8%;  $p=0.03$ ) on targeted retrospective review. For patients with a bovine arch, 5/20 (25%) had a follow-up gradient  $\geq 25$ . Conversely, for patients with normal aortic arch anatomy, 4/43 (9.3%) had a follow-up gradient  $\geq 25$  ( $p<0.05$ ). The mean clamping index for patients with normal arch anatomy was 1.4, while the mean for patients with bovine arch anatomy was only 0.86. Age and weight at time of operation was not significantly different between study groups.

**Conclusions:** Bovine arch anatomy often goes undocumented on preoperative imaging assessment. Patients undergoing extended end-to-end repair with bovine arch anatomy are at increased risk of recurrent arch obstruction. This may be due to a reduced clampable distance to facilitate repair. These results could impact preoperative assessment, parental counseling and surgical approach.

Fig. 1.

