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Percutaneous transaxillary access for TAVR: another opportunity to stay out of the chest

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Transthoracic access (transapical or transaortic) for transcatheter aortic valve replacement (TAVR) is associated with higher morbidity and mortality compared with transfemoral arterial access(1,2). Consequently, percutaneous transfemoral access has become the preferred approach for TAVR and other technologies that require large-bore access such as mechanical circulatory support devices. Yet despite device miniaturization, some patients remain ineligible for transfemoral arterial access because their iliofemoral arteries are small in caliber, calcified, and/or tortuous.

The axillary artery has recently emerged as a promising alternative approach amenable to fully percutaneous access(3). In this issue of the journal, Arnett *et al.* report the systematic CT analysis of axillary and iliofemoral arteries in 208 consecutive TAVR patients(4). Subclavian and axillary angiography can be easily integrated into the cardiac portion of a standard TAVR work-up CT scan by extending the field of view towards the head. No additional contrast is required.

In this series, the axillary arteries were on average smaller than the iliofemoral arteries, which one would expect since the subtended upper extremity tissue mass is less than the lower extremity. BMI was independently associated with larger axillary arteries, and diabetes and tobacco use were associated with smaller axillary arteries, though not significant stenotic disease. Current commercially available TAVR devices require minimal luminal diameters of 5.0–6.0mm depending on the type and size of the planned transcatheter heart valve. In this report, 11% of patients had both axillary arteries <5.5mm and just 4% had both axillary arteries <5.0mm. Importantly, although there was an association between iliofemoral and axillary artery diameters, axillary arteries were larger (>5.0mm) in the subset of patients with small (<5.0mm) and presumably diseased iliofemoral arteries suggesting that axillary access was feasible in these patients. In general, the upper extremity arteries were also comparatively free of calcification, stenosis and tortuosity even when the iliofemoral arteries were diseased.

This work accompanies the remarkable progress this UW Seattle team has made in reducing axillary artery access from a surgical procedure to a percutaneous procedure(3). Certainly, percutaneous axillary access deserves a place alongside other extrathoracic access

approaches. Combined, these observations suggest that there are currently two surgical – carotid and subclavian – and two fully percutaneous – axillary and transcaval(5) – options for large-bore access among patients who are ineligible for conventional transfemoral arterial access. Given the increased mortality and reduced quality of life after transthoracic access compared with percutaneous extrathoracic access, this experience adds further justification to search for transaxillary or transcaval access whenever transfemoral arterial access is unavailable with dual goals to stay out of the chest and use fully percutaneous techniques whenever possible.

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Key Points

- Axillary arteries are less calcified and tortuous than iliofemoral arteries
- Axillary artery minimal luminal diameters are usually >5.0mm even in patients with iliofemoral artery diameters <5.0mm
- Axillary and transcaval access are the only non-surgical fully percutaneous options for large-bore arterial access for TAVR or mechanical circulatory support devices