FIGURE 3. Three-dimensional reconstructed computed tomography in anteroposterior (left), lateral (center), and left posterior oblique (right) projections gives a clear overview of how the total endovascular repair was achieved.

Perfusion to both arms and vertebral arteries can be well preserved. These endovascular devices are usually available in an endovascular suite and do not need a custom-made process.

DISCUSSION

A Kommerell diverticulum that accompanies the aberrant left subclavian artery origin from right aortic arch usually expands with time. The risk of rupture and dissection increases with size expansion. In the endovascular era, arch debranching with aortic endografting is the mainstay of elective treatment for Kommerell diverticulum.¹ When an acute type B dissection complicates this picture, however, especially in the presence of malperfusion, surgical risk

rises. If we can make the operation completely endovascular, it might be better tolerated. Our method, which uses bilateral subclavian artery snorkels and aortic endografting, is less invasive, although it requires expert endovascular and open skills to perform. It does not need custom-made devices and is suitable for emergency settings.

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EDITORIAL COMMENTARY

Through the endovascular looking glass: Total endovascular repair for combined congenital and acute aortic arch disease

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Through the lens of endovascular aortic techniques, new treatment horizons for a broad spectrum of aortic diseases are coming into better focus. Although endovascular therapies for zone 0 appear off in the distance and are still a bit hazy, total endovascular arch repair is becoming a more focused reality.¹ As our understanding improves

of the structural nuances associated with a diverse array of aortic diseases, concomitant advances in radiographic imaging of the aorta have enabled skilled clinicians to push the endovascular envelope. Moreover, the march of endovascular treatments of complex aortic disease continues on, mostly using standard, off-the-shelf endovascular

devices being applied in new and creative ways. In this issue of the *Journal*, Hsu and colleagues² describe the first reported total endovascular repair of a patient with a right-sided aortic arch, aberrant left subclavian artery, Kommerell diverticulum, and an acute type B aortic dissection.

There are a number of notable aspects to this innovative report. First, the description of this unique constellation of aortic problems is unusual in its own right and becomes considerably more rare with the addition of an acute type B aortic dissection. Even so, the mirror image anatomy of right-sided aortic arch, aberrant left subclavian artery, and Kommerell diverticulum is conceptually no different to treat from an endovascular perspective than the more common left-sided presentation.³ As the authors note, the standard left-sided aortic arch, aberrant right subclavian artery, and Kommerell diverticulum has been successfully treated with hybrid revascularization of the subclavian arteries and endovascular aortic stent grafting.⁴ Similarly, acute type B aortic dissections have been successfully shown to be amenable to thoracic endovascular repair.⁵ When these 2 aortic pathologies are combined in the same patient, it makes logical sense that an endovascular approach is still feasible, as demonstrated by Hsu and colleagues.²

Several important technical factors employed in this report need to be highlighted. First, the femoral access point was accessed percutaneously, whereas the bilateral brachial access points were reached using an open technique to accommodate 11F sheaths. The bilateral upper extremity access was necessary due to the requirement to snorkel the great arteries and avoid surgical bypasses or sternotomy. Second, the diameter sizing of the aortic

stent graft was selected to be 30% larger than the aortic diameter. It is common to select a 10% to 20% oversize of the aortic stent graft in aortic aneurysm cases and 0% to 10% oversizing in aortic dissection cases. The choice of 30% oversizing was designed to accommodate the 2 snorkel grafts, which were adjacent and parallel to the aortic stent graft. The extra diameter of the aortic stent graft in this case allowed for extra material to fold around the snorkel graft and minimize or eliminate the gutters between the snorkel graft and the aortic stent.

Third, 2 aortic stent grafts were used due to severe tapering of the aorta, with the distal component (the smaller of the 2) deployed first followed by the larger, proximal component. This is standard technique for aneurysm treatment, but less so for aortic dissection. Fourth, this is a challenging procedure to perform and it takes an expert proficient in both open and endovascular surgery techniques to conduct this procedure safely.

Hsu and colleagues² have described a unique total endovascular approach to a combined congenital and acute aortic arch problem. All of the medical devices and endovascular techniques are currently available and the authors did not employ a special research device. Based on the success reported by Hsu and colleagues,² along with others, it appears that even with a well-polished endovascular looking glass, the future looks bright for total endovascular solutions for complex aortic disease.

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