dissection, patients with chronic dissection display less consistent aortic remodeling (thoracic false-lumen thrombosis in 31%-91% among patients with chronic dissection vs 80%-90% among patients with acute dissection).³ Stent-graft coverage of the primary entry tear is often insufficient, leading to aneurysm formation in the distal aorta. In addition, some techniques have been shown to occlude the false lumen and promote thrombosis and false-lumen remodeling.^{4,5}

The technique described here has some merit. The stent graft implanted into the false lumen completely blocked blood flow to the aneurysm and preserved blood flow to the celiac and renal arteries. In this case, neither the true nor the false lumen thrombosed, and neither lumen was perfused by the patent intercostal arteries, suggesting that this technique could be performed successfully. In our report, the false lumen served as the distal landing zone of one stent graft. After our patient's treatment for aortic dissection 12 years previously, the diameters of the distal descending aorta and thoracoabdominal aorta were nearly normal and did not change during follow-up. They thus appeared to have sufficient wall strength for stent-graft implantation.

This novel kissing stent technique was used effectively for a chronic aortic dissection aneurysm. It excluded the aneurysm completely and maintained blood flow to the visceral arteries. This technique may be an alternative for patients considered to be at high risk if undergoing open surgery.

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EDITORIAL COMMENTARY

Innovation is mandatory in chronic type B aortic dissection

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Chronic type B aortic dissection (cTBAD), either primary or secondary after open surgery for acute type A aortic dissection, remains a threat for the patient and a major medical challenge. The cTBADs are heterogeneous with regard to patient-related risk factors, interval since onset, morphology, false-lumen status, site, and numbers of entries and reentries, as well as varying origins of the spinal and visceral arteries. In the long run, rupture of a false lumen aneurysm causes most of the dissection-related mortality. Traditionally, cTBAD has been treated with open surgery, but because this carries a high risk in patients

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Central Message

An innovative endovascular “kissing stents” technique may avoid rupture and ensure distal perfusion in chronic type B aortic dissection.

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with comorbidity, innovations in endovascular treatment or hybrid procedures are warranted. Yoshitake and colleagues¹ have developed the interesting endovascular “kissing stents” technique, which may prevent thoracic aortic aneurysmal rupture and potentially prolong survival and postpone reinterventions.

The kissing stents technique, which is well described in Yoshitake and colleagues’ article in this issue of the *Journal of Thoracic and Cardiovascular Surgery*,¹ demands a stable proximal landing zone. This may be the native aorta or more likely a standard or “frozen” elephant trunk from previous aortic arch surgery, as in the case report, or alternatively an aortic stent graft.

The concept of the kissing stents technique is intriguing, with its objective of excluding a disastrous thoracic aortic aneurysm and secondarily ensuring antegrade flow to the visceral arteries arising both from the true and false lumina distal to the landing zone of the parallel stent grafts. Given that the treated aortic segment in this case was straight and the applied stent grafts were “off the shelf” rather than custom made, one may assume that the choice of stent grafts was of minor importance. The case study describes an effective and relatively simple new “kissing” stent-graft technique in a patient at high risk, but with only 11 months of follow-up the platform to evaluate its potential is very limited.

It has been shown that endovascular treatment of type B aortic dissection may be performed similarly in both the acute (<15 days) and the subacute (<92 days) phases because of the greater aortic plasticity relative that in patients with cTBAD.² The fibrous and rigid dissection flap, with poor remodeling capacity, and a proximal entry tear, with persistent false-lumen perfusion of spinal, visceral, and lower extremity arteries, together impose major challenges in the treatment of cTBAD. Persistent false-lumen flow causes a high risk of lethal aneurysm formation. Since the introduction of debranching techniques for endovascular treatment of atherosclerotic thoracoabdominal aortic aneurysms, cTBAD with aneurysmal growth greater than 55 mm or a growth rate greater than 5 mm per year has become the main remaining indication for either open or hybrid surgery in patients at low to moderate risk. Particularly for patients at high risk, the kissing stents technique thus provides an interesting alternative.

International guidelines and consensus reports are as yet not helpful in dealing with cTBAD. Because we are applying recent stent-graft technology, few studies are available, and innovative endovascular techniques are usually performed in low numbers just as kissing stent grafts were implanted in this single patient.¹ The scarce evidence is a major reason that stent grafting in cTBAD remains controversial and has evolved slowly, even in highly developed countries.³ Further, it is well known that both open and endovascular treatments of cTBAD are associated with a

high likelihood of reintervention as a result of distal type 1 endoleaks or persistent perfusion of the false lumen with aortic expansion.² Both for primary treatment and reinterventions, innovation and pioneer surgical techniques should be welcomed. An important breakthrough in the treatment of diseases of the descending aorta came along with the establishment of the elephant trunk technique and later the frozen elephant trunk technique, with these techniques also advantageous as an early step in complicated type B dissections.⁴⁻⁶ Alternative open and endovascular strategies may also proceed from an origin at the level of the elephant trunk, as in the kissing stents technique report.¹

There is no doubt that open repair and hybrid surgery both offer patients with low or intermediate risk an effective treatment so long as the surgery is not postponed until late complications have occurred. Whatever method is used, reinterventions must be expected in this complicated disease.^{7,8}

The innovative kissing stents technique is comparable to such other pioneering methods as the vascular plug and the knickerbocker techniques,^{9,10} both of which have the intention of occluding the false lumen and avoiding backflow. The first method occludes the false lumen from the inside, whereas the knickerbocker technique aims to occlude the false lumen from the outside. By controlled rupture of the dissection membrane with a large compliant balloon, this subsequently allows expansion of an overdimensioned stent graft to apply the occlusion effect.¹⁰

The kissing stent-graft technique is so far the latest, but probably not the last, innovative method that should be included in the increasing armamentarium of sophisticated stent-graft techniques. In the future, we should welcome even more innovation and pioneering in thoracic aortic stent grafting for cTBAD.

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