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Reply to the Editor:

We thank Dr Medford¹ for the valuable additional analysis concerning the cost benefits of cryobiopsy based on our recently published article in the *Journal*.²

We assume that routine use of a flexible cryoprobe to obtain tissue samples is cost-effective. However, it has to be considered that cryobiopsies generally require protected airways (ie, intubation). In addition, deep sedation using midazolam or disoprivan, if not general anesthesia, is required. In most countries, this makes additional personnel or an additional physician (eventually an anesthetist) necessary, which in turn leads to an increase in costs. Further, different health care systems may have different tariffs for bronchoscopic procedures, and this might cause a variation in final cost-effectiveness between different countries. Studies investigating the cost-effectiveness are under way. Most likely, cryobiopsy is a method that will result in cost savings over time. In this sense, we absolutely agree with Dr Medford.

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BENEFIT OF USING TOTAL ARCH REPLACEMENT COMBINED WITH STENTED ELEPHANT TRUNK IMPLANTATION DURING ARCH RECONSTRUCTION

To the Editor:

We read with great interest the recent article by Xydas and colleagues.¹ In this study, they introduced a novel technique using left carotid-subclavian bypass (CSB) before arch replacement with staged thoracic stent grafting to achieve hybrid arch reconstruction. Compared with the conventional method, the major advantage of this technique is using prepared CSB to anastomose the left carotid artery to the graft before cardiopulmonary bypass (CPB). Only 2 anastomoses (anastomoses of the distal graft to the aorta and the graft to the innominate artery) must be done during hypothermic circulatory arrest (HCA), decreasing selective antegrade cerebral perfusion (SACP), CPB and aortic crossclamp times, and limiting HCA.

Currently, HCA with SACP is widely used as routine means to protect the central nervous system during

aortic arch replacement; however, to some degree, the safe time of HCA with SACP is limited. Therefore, the best way to protect the brain and spinal cord is to shorten the period of HCA as much as possible. Even though the technique of Xydas and associates¹ mentioned in this article could reduce the HCA time by using CSB to complete the anastomosis of the left carotid artery to the graft off CPB, we still think a few questions and limitations need to be considered when using this method. First, the premise of using CSB depends on the pathologic changes of the arch without spreading to the left subclavian artery. Second, might the shunt of CSB lead to cerebral malperfusion during this short term? Third, compared with the technique we used (total arch replacement combined with stented elephant trunk implantation, which we called the "Sun's procedure",²⁻⁴ Xydas' method still requires staged thoracic stent grafting to achieve hybrid arch reconstruction.

In our opinion, the Sun's procedure for arch reconstruction is more efficient, simple, and safe. The Sun procedure has been advocated and developed by our research group since 2003.^{5,6} Herein, we have summarized the Sun's surgical procedure and made a comparison with the CBS procedure.

A stent graft (MicroPort Medical Company Limited, Shanghai, China) (Figure 1) and 4-branched prosthetic graft (Meadox Hemashield Platinum 4 Branch Graft; Boston Scientific Inc, Boston, Mass) were used in total arch replacement combined with stented elephant trunk implantation. Cannulation of the right axillary artery was used for CPB and SCP. The arterial line was bifurcated for the right axillary artery and for lower body perfusion via 1 branch of a 4-branched prosthetic graft. During cooling, the proximal ascending aorta was opened longitudinally, and aortic root procedures could be done if necessary. HCA was established when the target

FIGURE 1. Stented graft. A, Catheter sheath containing the stented graft in a bound and compressed state. B, Stent graft springs open and expands completely.

temperature was reached. SACP was initiated through the right axillary artery. The ascending aorta and transverse arch were opened. The stented elephant trunk was then inserted into the true lumen of the descending thoracic aorta in a compressed state. The proximal edge of the residual aorta was trimmed to match the proximal end of the stent graft. The anastomosis between the 4-branched prosthetic graft and the distal aorta containing the intraluminal stented graft was carried out using the “open” aortic technique. Once the anastomosis was completed, lower body perfusion was started via the limb of the 4-branched prosthetic graft. Then the left common carotid, innominate, and left subclavian arteries were anastomosed to the respective limbs of the 4-branched prosthetic graft in an end-to-end style in turn.

In conclusion, the benefits of the Sun’s procedure (1) result in less late dilatation of the dissected descending aorta, (2) prolong the reoperation interval or reduce the number of late thoracoabdominal aortic replacements except in a patent false lumen around the stented elephant trunk, and (3) facilitate late thoracoabdominal aortic

replacement. Other than that, compared with the CSB procedure, only 1 anastomosis needs to be finished under HCA with SACP, which could shorten SACP time during HCA, possibly decreasing cerebral injury during HCA and also avoiding radiology exposure to the patients with staged thoracic stent grafting to achieve hybrid arch reconstruction.

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Reply to the Editor:

We read with appreciation the letter by Ji and associates from the Beijing Anzhen Hospital concerning our article, “Use of Carotid–Subclavian Bypass and Thoracic Endovascular Aortic Repair to Minimize Cerebral Ischemia.”¹ We described the use of left carotid–subclavian bypass (CSB) combined with staged thoracic stent grafting to achieve total aortic arch replacement (TAAR) with decreased selective antegrade cerebral perfusion (SACP), cardiopulmonary bypass (CPB), and aortic crossclamp times.

Ji’s group (Sun and colleagues²⁻⁴) have recently reported their experience with the “Sun procedure,” with total arch replacement and concomitant stented elephant trunk implantation to treat acute type A aortic dissection. Their general approach involves cannulation of the axillary artery and antegrade perfusion via 1 limb of a 4-branched prosthetic graft. Cooling is performed with a target temperature of 18°C to 22°C. SACP is initiated, the stented elephant trunk is deployed, and the distal aortic anastomosis is