

surgery if the retrograde component of the dissection involves more than the non-coronary sinus in order to prevent the need for late reoperation in this segment [13]. Regarding the extent of arch surgery, our own data indicate that if the primary entry tear is eliminated during surgery for acute type A aortic dissection, the need for later arch or thoraco-abdominal reoperation is very low. However, in case of the intimal tear or in case of a huge communication between both lumina in the arch or the descending aorta, the persistence of such a communication is an independent risk factor for the need for late repair due to aneurysmal degeneration [14].

Perioperative mortality was low and well comparable to other recently published series, which should serve as the benchmark for aortic arch surgery. However, the rate of perioperative neurological injury was significant. After analysing all 5 cases of neurological injury, we realized that causes were multifactorial. Two patients had thrombotic masses within the aortic arch and most likely sustained embolization. The third patient had an initially uneventful course, then sustained surgical bleeding and had neurological injury due to prolonged hypotension but without any functional sequelae during follow-up. A fourth patient underwent redo surgery due to endocarditis and had a prolonged cardiopulmonary bypass run and suffered from a diffuse morphological pattern of brain injury. The last patient had an initially uneventful course and sustained a stroke while being on the ward without any functional sequelae at the time of discharge. There was no need for redo surgery in the treated aortic segments during follow-up.

As combined surgical and endovascular techniques as well as total endovascular branched arch repair are progressing, the evaluation of conventional arch surgery in the context of these new alternatives is warranted. In the present series, we are convinced that the majority of patients would not have been candidates for combined surgical/endovascular or total endovascular repair due to several reasons. A significant proportion needed root surgery and the latter combined with endovascular procedures is currently mutually exclusive. Furthermore, aneurysmal formation on the basis of a chronic dissection is a weak indication for a solely endovascular approach, and is successful only under specific morphological and functional conditions [15, 16]. Finally, some patients required concomitant treatment for structural heart disease.

Limitations of the study

Without doubt, this series contains all the drawbacks of a retrospective single-centre analysis. The number of patients in this series seems small but it represents a highly selected cohort of patients. We do perform on average 250 thoracic aortic cases in Berne yearly, including an average of 35 open thoraco-abdominal replacements. Therefore, the overall experience of our centre is large for European dimensions. With this article, we intended to depict that aortic arch surgery in the current era has become an adjunct of a complex multistep procedure and is not an isolated operation, at least in our setting.

In summary, open total aortic arch replacement shows very satisfying results. A significant proportion of patients undergo total arch replacement as a redo procedure and as a part of a complex multisegmental aortic pathology.

Conflict of interest: none declared.

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eComment. Total surgical aortic arch replacement

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We would like to congratulate Czerny *et al.* for their very well written article and favourable results [1]. The authors conclude that open total aortic arch replacement shows very satisfying results, mainly due to improvements in perfusion technology, better surgical technique, and careful anesthesiology management.

In our experience, out of 52 consecutive patients that required open total aortic arch replacement, either for dissection or aneurysmal disease, the 30-day mortality was 4.3% and the perioperative neurological injury was 7.1%. We use deep hypothermic circulatory arrest in all patients with retrograde cerebral perfusion through the superior vena cava. We routinely cannulate the femoral artery when necessary, instead of the axillary artery. Almost one quarter of our patients underwent a re-operation, with the majority having a prior ascending aortic aneurysm repair. We use the elephant trunk technique in cases of aneurysmal dilatation of the thoracic aorta.

It is our strong belief that the key to a successful outcome in open aortic arch replacement is surgical perfection and speed of the operation, in order to minimize the body ischaemia during the circulatory arrest. This means that it is a type of

surgery that should be performed only by experienced surgeons in large referral centres.

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