

Hervé Rousseau · Jean-Philippe Verhoye · Jean-François Heautot (Eds.)

Thoracic Aortic Diseases

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With 242 Figures, 72 in Color and 35 Tables

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Preface

Alain Cerene

When, more than 30 years ago, I started my residency in cardiovascular surgery, lesions of the descending thoracic aorta were considered a big surgical challenge.

We were dealing with acute De Bakey type III dissections, now called Shumway type B, and did not really know at that time whether we should treat them surgically or medically. Post-operative morbidity and mortality were so important that in the end we decided to treat them medically when these dissections were free of complications.

Certainly, some of the patients could die from a rupture of the aorta, but overall the mortality was much lower than with surgery. This attitude still prevails today.

There were also acute traumatic ruptures of the distal aortic arch, and in this case emergency surgical treatment was the rule. After cross-clamping the thoracic aorta, the lesion was repaired as fast as possible. Also in these cases mortality was high, and morbidity was significant, especially regarding paraplegia.

Then we started using the Gott shunt. This shunt allowed perfusion of the distal aorta during clamping without the need for severe anticoagulation and thus proved useful in multiple-trauma patients. Nevertheless, the Gott shunt was quite difficult to use, and was not really reliable. However, it represented some progress.

Later we got to use “active” shunts, such as partial extracorporeal circulation systems left-left, or right-left with centrifuge pumps and “heparin-like” circuits, which did allow very low anticoagulation in multiple-trauma patients, and the results improved both with regard to mortality and morbidity, as fewer patients were dying and less paraplegia was noted, but this neurologic complication was still a major factor.

In the end, surgery of thoracic aortic aneurysms was providing the best results at that time, but mortality was still substantial, as was morbidity. Five to 10% of patients were dying post-operatively.

Surgeons like De Bakey, Cooley, Crawford, Johnson, Kouchoukos, and others made major contributions in improving surgical technique.

Since then, much progress has been made regarding indications, extra-corporeal circulation with the use of

deep hypothermia and circulatory arrest, anaesthesia, reanimation, and surgical techniques. We have also gained a better understanding of anatomy and physiology of spinal cord vascularisation. Presently, surgery of the descending thoracic aorta is not the “scary” event it used to be 30 years ago, but it still remains challenging.

We should not forget that some of the progress made in the surgical management of thoracic aortic aneurysms is due to improvements achieved in radiological imaging, which nowadays has become very reliable and is in practice devoid of risks.

In the early 1990s, an article by Parodi et al. entitled “Transfemoral intraluminal graft implantation for abdominal aortic aneurysms” heralded the development parallel to surgery of a new treatment strategy for aortic lesions, which could be repaired from “inside the lumen”.

Most major surgeons did not really pay attention to this publication, until Dake, a radiologist from Stanford University, demonstrated that it was possible to treat most of the lesions of the descending thoracic aorta by the use of endovascular stent grafts, with little trauma, short hospital stay, little paraplegia, and a very low mortality rate.

Since then, close collaboration between industry and medicine has brought many improvements in the development of these stent grafts and has allowed the vast majority of lesions of the descending thoracic aorta to be treated by this technique. Furthermore, this technique can now be used in combination with a simple surgical procedure to repair even lesions of the aortic arch, and, in our view, this is not yet the end.

Traumatic ruptures and acute type B dissections can now be treated in the same way. Most aneurysms are also manageable by this strategy if certain anatomic prerequisites are fulfilled. And this is not to mention ulcers and their complications, which have become very easy to treat. Problems may arise often now only from certain aneurysms due to chronic dissections, but even in these cases is one not in his or her right to try first the endoluminal approach, and, if this fails, to entrust the patient to the surgeon?

In fact, endoluminal stent grafting really is a revolution in therapy and, like every revolution, it has been met with some distrust or even hostility by those in relevant positions, the surgeons.

For them, every endoleak was a failure. What was to become of the grafts? One cannot, however, treat all lesions by these means! They were leaning on the limitations of the method while forgetting that it killed a lot fewer patients than surgery and that the number of paraplegias was infinitesimal.

Furthermore, neither the technological progress of aortic stent grafts nor the skills of the people implanting them have reached their conclusion.

Hence, there are three major issues in this field:

1. There is the issue of the restrictions of the access to the aorta owing to the state of the femoro-iliac axis, an issue which will fade away (but not disappear completely) as technological progress is achieved.
2. There is the issue of the balance of the actions of surgeons and radiologists.
 - (a) In our view, it is crucial that indications are established jointly.
 - (b) Should the procedure be performed in a surgical operating room or in a radiology unit equipped for surgery? The procedure requires sophisticated radiological equipment which is usually unavailable in surgical operating rooms. If surgeons argue that it is impossible to operate on an aortic rupture in a radiology unit, they are right. But what are the figures for aortic ruptures? In Toulouse, in our institution, we have seen none in 150 consecutive cases, and the only problems we had arose from the femoro-iliac axis. Migration of the stent graft to another part of the aorta always leaves enough time to take the patient to the surgical operating room. In view of this, does the radiological equipment usually available in surgical operating rooms

provide the necessary accuracy? We believe it does not. In fact, endoluminal stent grafting implies little surgery and there are nearly no complications which would require heavy-duty surgical equipment, while the interventional radiology technique is dependent upon the accuracy provided by sophisticated paraphernalia. So, in our view, the procedure should therefore be performed in a radiology unit equipped like an operating room, and it should be accomplished by an interdisciplinary medical and nursing staff including anaesthesiologists, surgeons, and radiologists.

3. There is the issue of who should operate? The radiologist, for the time being, needs the surgeon's help. The surgeon could do everything on his or her own! But we just proved that the procedure should be performed in a radiological unit! So why not a symbiosis between radiologists and surgeons, with a distribution of tasks and responsibilities, especially in terms of complications?

What needs to be avoided by every means is the recruitment of patients directly by radiologists, who would, once they did not need the surgeon's help anymore (and this is likely to happen soon for the femoral approach), establish the indication and perform the procedure on their own, calling the surgeon only if a complication arises. It would be equally hazardous for the surgeon to establish the indication alone and to perform the procedure by himself or herself in an operating room equipped only with austere mobile radiology gear. Neither of these two attitudes would benefit the patient and one must not forget that it is his or her interest that should always be at the heart of medical action.

Thus, our patients will be permitted to gain from the progress achieved in the field of cardiovascular surgery when necessary and from the accomplishments of interventional radiology the majority of the time.

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