

From Bridging to Solution-Endovascular Treatment of Traumatic Aortic Rupture

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Even though the first scientific report of traumatic rupture of the thoracic aorta was published nearly 100 years ago [1], first successful open treatments were reported not until the beginning of the 1950s [2,3]. The discussion in the following decades was characterized by the question where the therapy of the aortic rupture will be going to. On the one hand the conservative approach was postulated [4], while on the other hand the open surgical way was favoured [3]. With the upcoming endovascular era in the early 1990's even traumatic ruptures of the thoracic aorta were treated with the new instrument of the endovascular stent graft. With the further development of the grafts, particularly adopted to the anatomic structure of the aortic arch or the transition of the aortic arch and to the descending aorta, therapeutic results were getting better.

During the "open surgery era" traumatic aortic rupture was treated via left thoracotomy as surgical approach and following repair of the damaged aorta. If suitable a "clamp and sew"- repair was performed with interposition of a graft as alternative procedure in case of mishap. Surgery was done using one-lung ventilation and if necessary with cardiopulmonary bypass assistance. This procedure requires full dose heparinization with all of the possible upcoming complications for the multitrauma patient. Due to the full heparinization, mortality rates in this era were as high as 18.2% under cardiopulmonary bypass and only 11.9% with distal perfusion Paraplegia rates varied from 2.3% to 19.2% [5].

During the early beginnings of the "endovascular era" the available stent grafts were everything but perfectly adapted to the curvature of the aortic arch. Misalignment at the inner curve was seen frequently and caused in some patients an infolding of the stent graft [6]. With the newer generations of the devices, this problem seems to diminish. Mortality rates related to aortic repair are very low meanwhile, but varying from 0% [7] up to 7.2% in larger multicenter prospective trials. Also paraplegia rates are nearly down to 0% [8]. A major disadvantage of the endovascular repair is the necessity of a proximal landing zone, long enough for a safe positioning of the graft. This causes the overstenting of the left subclavian artery in up to 75%. Resulting problems e.g. cerebellar stroke and arm ischemia, are very rare and only a few cases of left subclavian revascularisation were reported [9]. Device associated problems like migration of the graft and endoleaks are scarce and can be managed using an endovascular approach. These

problems are more likely in very young people, because of the tight angulation of the aortic arch and the small aortic diameter. Finding the correct fitting size of the graft without oversizing it is quite difficult in young multitrauma patients. This is due to the aortic diameter differences of up to 30% when looking at the systolic and diastolic movement measurements [6].

Short and midterm results are significant better in the endovascular treatment groups, when compared to open surgery. But also long term results are encouraging. Endovascular treatment is getting more and more gold standard and now we are beyond the bridging era. For the vast majority of patients endovascular therapy might be the solution and a definitive cure.

References

1. Kuhn LP (1925) Traumatic rupture of thoracic aorta and review of fifty-five abdominal injuries. *Illinois M J* 26: 420.
2. Cooley DA, Creech O, de Makey ME (1956) Surgical treatment of aortic aneurysms. *Am Surg* 22: 1043-1051.
3. De Bakey ME, Cooley DA, Creech O Jr (1955) Resection of the aorta for aneurysms and occlusive disease with particular reference to the use of hypothermia; analysis of 240 cases. *Trans Am Coll Cardiol* 5: 153-157.
4. Steinberg I (1957) Chronic traumatic aneurysm of the thoracic aorta: report of five cases, with a plea for conservative treatment. *N Engl J Med* 257: 913-918.
5. Oppell von UO, Dunne TT, De Groot KM, Zilla P (1994) Spinal cord protection in the absence of collateral circulation: meta-analysis of mortality and paraplegia. *J Card Surg* 9: 685-691.
6. Sunder-Plassmann L, Oberhuber A, Mühling B, Lang G, Schelzig H, et al. (2009) Acute-stage TEVAR for traumatic aortic rupture: Special problems and long-term results. *Gefäßchirurgie* 14: 213-218.
7. Canaud L, Alric P, Branchereau P, Joyeux F, Hireche K, et al. (2011) Open versus endovascular repair for patients with acute traumatic rupture of the thoracic aorta. *J Thorac Cardiovascular Surg* 142: 1032-1037.
8. Demetriades D, Velmahos GC, Scalea TM, Jurkovich GJ, Karmy-Jones R, et al. (2008) Operative repair or endovascular stent graft in blunt traumatic thoracic aortic injuries: results of an American Association for the Surgery of Trauma Multicenter Study. *J Trauma* 64: 561-570.
9. Oberhuber A, Erhard L, Orend KH, Sunder-Plassmann L (2010) Ten years of endovascular treatment of traumatic aortic transection--a single centre experience. *Thorac Cardiovasc Surg* 58: 143-147.

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