Endovascular repair in atypical traumatic rupture of thoracic aorta

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SUMMARY: Endovascular repair in atypical traumatic rupture of thoracic aorta.

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Introduction. The traumatic rupture of thoracic aorta is a surgical emergency with high risk of morbidity and mortality.

Case report. We describe the case of an atypical rupture of retrocardiac thoracic aorta with dissection of brachiocephalic trunk and spleen trauma occurred after a road accident. TC scan and perioperative angiography showed an atypical rupture of thoracic aorta.

Conclusion. A combined treatment, endovascular for retrocardiac thoracic aorta and surgical for brachiocephalic artery, has been useful to diminish the hemodynamic and organ ischemic problems associated with open surgery.

KEY WORDS: Thoracic aorta - Atypical rupture - Endovascular repair. Aorta toracica - Rottura atipica - Riparazione endovascolare.

We decided a combined treatment, endovascular for retrocardiac thoracic aorta and open for brachiocephalic trunk, in order to diminish the hemodynamic, metabolic and organ ischemic complications (medullar ischaemia specially) associated with open surgery (3).

Case report

We describe the case of a 19 years old man who, after a road accident, was taken at Emergency Department for thoracic and abdominal pain with normal hemodynamic and neurological state.

The X-ray of chest demonstrated mediastinic widening and CT scan of chest and abdomen showed a dissection of brachiocephalic trunk and rupture of retrocardiac aorta with mediastinic hematoma and splenic bruises (Fig. 1).

After CT scan the patient presented a severe hypotension and bradycardia associated with lypothimia; electrocardiogram showed ST-segment elevations through leads V1-V3 revealing a severe myocardial ischaemia. Haemoglobin was 5.8 mg/dl.
We took urgently the patient to operatory room. We performed a catheterization of right femoral artery and left brachial artery. The arteriography confirmed a retrocardiac rupture of thoracic aorta and a little ostial dissection of brachiocephalic trunk. We positioned Cook Zenith device (24-24 mm of diameter and 10 mm of length) in the side of rupture by surgical access of left femoral artery. The postprocedure angiography showed a perfect repair of thoracic aorta (Fig. 2).

The postprocedure abdominal echography showed an hypoechogenic perisplenic area revealing a splenic rupture, so we had to perform a xifo-umbilical laparotomy and a splenectomy. In the postoperative period, haemoglobin and hemodynamic conditions were stabilized but color-Doppler of sovraortic trunks showed an extension of the dissection on the branchiocephalic trunk without neurological deficit. Then we performed a sternotomy and a prosthetic bypass between aorta and brachiocephalic trunk with termino-lateral anastomosis on the descendent aorta and termino-terminal on the brachiocephalic trunk with ligature of distal stump. There weren't any neurological and cardiologic complications.

After two years, the CT follow-up demonstrated the absence of endoleak and the patency of bypass.

Discussion

The traumatic rupture of thoracic aorta is characterized by an high mortality. In literature the risk of spontaneous rupture is 8.8% in the first 30 hours and 72% in the first week in patients hemodinamically stable at admission in Emergency Department (4). The isthmic aorta is more interested in the traumatic rupture. The ruptures are generally subadventitial, circumferential or partial (in an case in the concavity of isthmic aorta) (5, 6).

The aortic lesion of our patient is particular because it is a retrocardiac rupture, interposed between the diaphragmatic pillars, and for the unusual pathophysiologic mechanism. In fact, literature doesn’t report traumatic lesions in the retrocardiac aorta where there is a protective action of diaphragmatic muscles and a higher resistance of the surrounding structures. The pathophysiologic mechanism could be explicated by a sudden deceleration generating a velocity gradient in descendent aorta. This condition occurred in systole and the radial force of contusion slid the heart injuring the aortic wall.

The X-ray chest performed in emergency showed indirect signs of aortic rupture and CT scan provided us useful informations. Aortography is an invasive examination but also the gold standard in the traumatic lesions of thoracic aorta and it was conclusive for our diagnosis and the choice of endoprosthesis.

We preferred the hybrid treatment because of the high mortality and morbidity of totally open treatment. In fact, the endovascular repair of the atypical aortic rupture allowed us to avoid the substitution of thoracic aorta (and, consequently, the possible risk of a medullary ischaemia) and to perform the aorto-brachiocephalic bypass.
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References


