Available online at www.sciencedirect.com
ScienceDirect
journal homepage: http://www.elsevier.com/locate/crvasa

Case report

Minimally invasive treatment of a life threatening ruptured thoracic aortic aneurysm

I. Petrov [a,*], Z. Stankov [a], S. Stefanov [b], Tz. Minchev [c], P. Polomski [a], H. Stojanov [d], G. Kozarova [e], G. Adam [a]

[a] Department of Invasive Cardiology, "City Clinic" University Hospital, Sofia, Bulgaria
[b] Department of Vascular Surgery, "City Clinic" University Hospital, Sofia, Bulgaria
[c] Department of Thoracic Surgery, "Tokuda" Hospital, Sofia, Bulgaria
[d] Department of Anesthesiology, "City Clinic" University Hospital, Sofia, Bulgaria
[e] Department of Diagnostic Imaging, "City Clinic" University Hospital, Sofia, Bulgaria

ARTICLE INFO

Article history:
Received 11 October 2015
Accepted 15 November 2015
Available online xxx

Keywords:
TEVAR
Aortic aneurysm
Aortic aneurysm rupture
VATS
Endovascular treatment

ABSTRACT

We report a case of a life threatening thoracic aortic aneurysm rupture, treated successfully with minimally invasive approach. A 34-year-old man was admitted to our hospital in critical clinical condition, presenting with acute chest pain for 18 h, hematemesis and rapidly decreasing hemoglobin, despite of massive transfusion done, severe hypotension, anuria and ileus. The patient had history of surgical aortic coarctation repair at age of 13. Contrast-enhanced CT images revealed a thoracic aortic aneurysm rupture with severe left-sided hemothorax. Based on the patient general condition, age and anatomy of the lesion, thoracic endovascular aneurysm repair (TEVAR) was done. Two stent grafts Valiant were implanted in the thoracic aorta covering the entry tear engaging the LSA ostium. Because of residual filling of the aneurysmal sac through left subclavian artery, vascular occluder was implanted, causing complete isolation of the aneurysm from the blood flow. Very short and successful recovery period was observed. Due to residual coagulum in left pleural space the patient was directed for VATS evacuation. Aortic aneurysm rupture is a potentially fatal condition, but when diagnosed early, it can be successfully treated by endovascular methods. In this case a totally non-surgical minimally invasive approach (TEVAR and vascular plug to isolate the dissection and VATS assisted hemothorax evacuation) resulted efficiently and in lifesaving manner with fast recovery without any sequelae despite the critical clinical presentation.

* *Corresponding author*. Tel.: +359 888720014.
E-mail address: petrovivo@hotmail.com (I. Petrov).
http://dx.doi.org/10.1016/j.crvasa.2015.11.002

Please cite this article in press as: I. Petrov et al., Minimally invasive treatment of a life threatening ruptured thoracic aortic aneurysm, Cor et Vasa (2015), http://dx.doi.org/10.1016/j.crvasa.2015.11.002

Introduction

Thoracic aortic aneurysm is a disease, affecting approximately 10.4 per 100 000 persons per year [1]. The incidence is far greater in patients, operated for aortic coarctation in the past. Early and late postoperative aneurysm/pseudoaneurysm may occur near correction site according to operative technique used: 17% for subclavian flap angioplasty, 14% after patch angioplasty, 6% after interposition graft repair, and occasionally after end-to-end anastomosis [2]. The advanced age of surgical repair is independent risk factor for local aneurysm formation [3]. Several epidemiologic studies have shown that such aneurysms must be early diagnosed (regular follow-up imaging for all operated patients is mandatory) and treated, because of high rupture and death rate [4]. Thoracic aortic aneurysm rupture is a condition with extremely high mortality. The clinical approach to these patients dramatically changed in the last two decades, when the Thoracic EndoVascular Aortic Repair (TEVAR) became available. Several case reports, case series and meta-analyses reveal advantages of TEVAR versus open-surgery in cases of acute aortic rupture.

Case presentation

A 34-year-old male patient was referred to our Emergency department in state of hypovolemic shock, approximately 18 h after sudden, new onset severe chest pain during physical activity, accompanied by hematemesis. The patient had a history of aortic coarctation repair at 13 years, with no subsequent follow-up. Risk factors were active smoking and uncontrolled hypertension (usual systolic blood pressure 150–160 mmHg), without known collagenopathy.

At admission, patient was in a critical condition despite of all resuscitation activities done during the transportation (including 7 units of fresh blood transfusion). He was in hypovolemic shock, unresponsive, with pale skin, blood pressure 90/50 mmHg, tachycardia 122 beats per minute, with no breathing in the left thoracic side. An electrocardiogram showed sinus tachycardia with no conduction abnormalities. Laboratory results revealed anemic syndrome with Hb – 95 g/l, Hct – 0.272 (despite massive blood transfusion during transportation).

The initial evaluation of patient included emergency chest X-ray and CT aortography that revealed ruptured aortic aneurysm with massive pleural effusion (hemothorax) with significant left to right deviation of the esophagus, trachea and thoracic aorta. There was also mediastinal shift and displacement of the left diaphragm caudally with spleen and left kidney compression because of extremely big blood volume in the pleural space (Figs. 1 and 2). The CT reveals active bleeding persisting in left pleural space (marked with star in Fig. 2) and another find: left subclavian artery arising from the aneurysmal sac. Fig. 2 shows left diaphragm shift (from concave to convex) and displacement of left kidney from massive hemothorax. The measured size of the aneurysm was 95 mm × 58 mm involving the ostium of the left subclavian artery (LSA). A 3D reconstruction on the heart, aorta (including aneurysm) and main vessels was made for better visualization (Fig. 3).

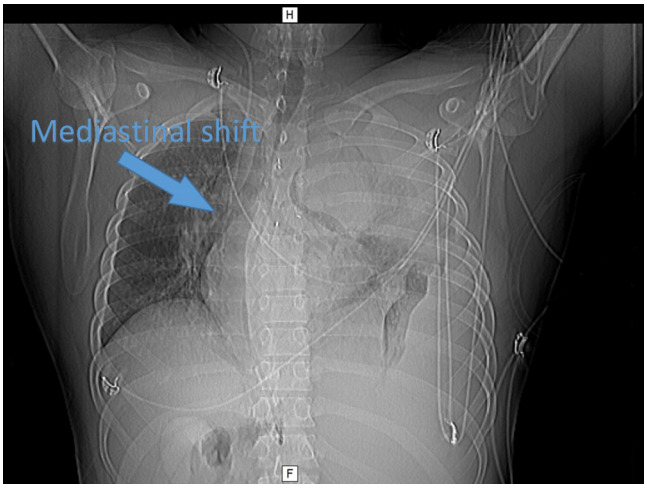

Fig. 1 – Diagnostic CT revealing massive pleural effusion.

During the short clinical discussion our heart team considered that the open surgery correction of aneurysm rupture in this clinical state was associated with huge intraoperative mortality. Based on the general condition, age, localization of the rupture site and following the up-to-date guidelines for type B aortic dissection management emergency, TEVAR repair was chosen by the multidisciplinary heart team.

A multidisciplinary team was gathered including: two invasive cardiologists (with rich experience in TEVAR procedures), anesthesiologist, vascular surgeon, radiologist, and nurse team. The whole procedure was performed with local

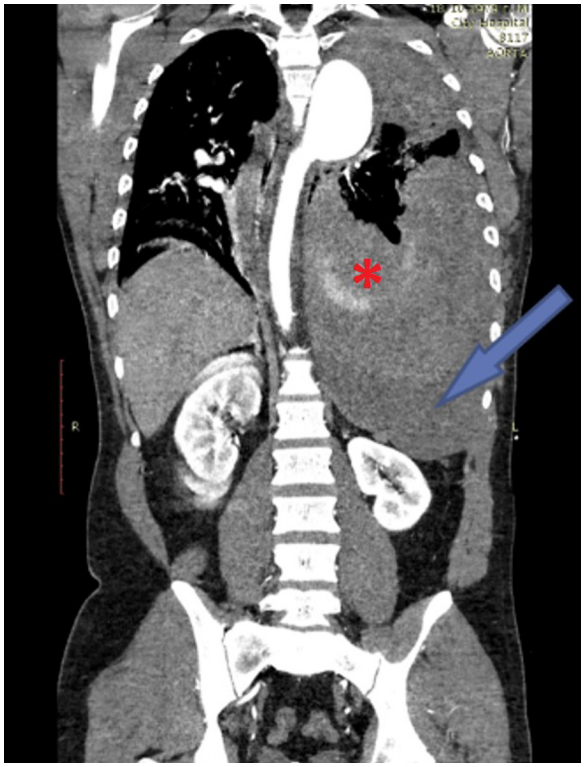

Fig. 2 – Initial CT aortography with active bleeding persisting.

Please cite this article in press as: I. Petrov et al., Minimally invasive treatment of a life threatening ruptured thoracic aortic aneurysm, Cor et Vasa (2015), http://dx.doi.org/10.1016/j.crvasa.2015.11.002