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EDITORIAL

Short term outcome of thoracic endovascular aortic repair in patients with thoracic aortic diseases

Hamdy Soliman [a], Mohammed N. El-Ganainy [a,*], Reham M. Darweesh [b], Sameh Bakhoum [b], Mohammed Abdel-Ghany [b]

[a] National Heart Institute, Cairo, Egypt
[b] Cardiovascular Medicine Department, Cairo University, Egypt

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ABSTRACT

Aim and background: Open surgical repair for thoracic aortic diseases is associated with a high perioperative mortality and morbidity. Most of type B aortic dissections are uncomplicated and are medically treated which carries a high mortality rate. Thoracic endovascular aortic repair is the first-line therapy for isolated aneurysms of the descending aorta and complicated type B aortic dissection. The aim of this study is to test the safety of early thoracic endovascular aortic repair in patients with uncomplicated type B aortic dissection and patients with thoracic aortic aneurysms.

Methods: A total of 30 patients (24 men and 6 females; mean age 59 ± 8 years) with uncomplicated type B aortic dissection and descending thoracic aortic aneurysm who underwent endovascular aortic repair in National Heart Institute and Cairo University hospitals were followed up. Clinical follow-up data was done at one, three and twelve months thereafter. Clinical follow-up events included death, neurological deficits, symptoms of chronic mal-perfusion syndrome and secondary intervention. Multi-slice computed tomography was performed at three and six months after intervention.

Results: Of the 30 patients, 24 patients had aortic dissection, and 6 patients had an aortic aneurysm. 7 patients underwent hybrid technique and the rest underwent the basic endovascular technique in whom success rate was 100%. Two patients developed type I endoleak, however both improved after short term follow up. The total mortality rate was 10% throughout the follow-up. Both death and endoleak occurred in subacute and chronic cases, while using TEVAR in acute AD and aneurysm showed no side effects. Early thoracic endovascular aortic repair showed better results and less complications.

Conclusion: Along with medical treatment, early thoracic endovascular aortic repair in uncomplicated type B aortic dissections and thoracic aortic aneurysms is associated with better outcome.

1. Introduction

In addition to coronary and peripheral artery diseases, aortic diseases contribute to the wide spectrum of arterial diseases. These aortic diseases include aortic aneurysms and aortic dissection.[1] The Global Burden Disease 2010 project demonstrated that the overall global death rate from aortic aneurysms and AD increased from 2.49 to 2.78 per 100,000 in habitants between 1990 and 2010, with higher rates for men.[2]

A thoracic aortic aneurysm, is abnormal bulge in a weakened wall of the aorta in the chest area and can cause a variety of symptoms and often life-threatening complications. Due to the serious risks it presents, timely diagnosis and treatment of a thoracic aneurysms are critical. The standard surgical treatment for thoracic aortic aneurysms is open-chest aneurysm repair, but surgeons are now able to treat many thoracic and thoracoabdominal aneurysms with a minimally invasive procedure called an endovascular stent graft.[3]

Aortic dissection is a potentially life-threatening condition that occurs when a tear is formed in the wall of the aorta. Stanford type B or DeBakey III aortic dissection originates in the descending thoracic aorta without retrograde extension into the ascending aorta. Type B aortic dissection may be classified as uncomplicated or complicated. Approximately 25% of patients presenting with type B aortic dissection are complicated at admission by malperfusion

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* Corresponding author at: Cardiovascular Medicine Department, National Heart Institute, Cairo, Egypt.

E-mail addresses: helliwa717@gmail.com (H. Soliman), mohammednabil_eg@hotmail.com (M.N. El-Ganainy), rdrehame@gmail.com (R.M. Darweesh), samehbakhoum@live.com (S. Bakhoum), dr.elghanymm@gmail.com (M. Abdel-Ghany).

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syndrome or hemodynamic instability, resulting in a high risk of early death if untreated.[4]

An acute aortic dissection (<2 weeks) is associated with high morbidity and mortality rates (highest mortality in the first 7 days).[5] Because of the high mortality rates associated with surgery, stable patients with uncomplicated type B dissection usually receive non operative treatment. 70% of type B aortic dissections are uncomplicated and are medically treated only which carries a 50% 5-year mortality rate.[6,7]

Patients with complicated type B aortic dissection secondary to aortic rupture, intractable pain, and/or end-organ ischemia because of aortic branch vessel involvement require intervention, but OSR is associated with high mortality rates. Such patients have increasingly been undergoing endovascular treatment, with encouraging results.[8] The advent of endovascular repair of the thoracic aorta [TEVAR] has altered the management algorithm for pathologies that affect the aortic arch and descending thoracic aorta. In recent years, the number of thoracic endovascular procedures has risen.[9]

The increased use of TEVAR has been driven by the early morbidity and mortality advantage reported when endovascular therapy is compared with open surgical treatment of the thoracic aorta.[10] TEVAR is now considered the first-line therapy for isolated aneurysms of the descending thoracic aorta.[11] TEVAR is recommended in treatment of complicated type B aortic dissection and should be considered in uncomplicated aortic dissection.[12]

The aim of this study is to test the safety of using TEVAR in treating patients with aortic aneurysm and uncomplicated type B aortic dissection, in early intervention, and showed the outcome results through 12 months follow up.

2. Patients and methods

This study included 30 patients recruited from the patients with uncomplicated thoracic type B aortic dissection and descending aortic aneurysm who had expected life-span longer than 1 year and underwent endovascular aortic repair in National Heart Institute and Cairo University hospitals in the period between 2014 and 2016. Patients who had dissection involving the ascending aorta, severe valvular disease, CAD need surgical intervention, history of bleeding diathesis, sepsis or active endocarditis were excluded. The Ethical approval for research was obtained from the Research Ethics Committee, Faculty of Medicine, Cairo University.

All patients were subjected to full history and physical examination.12 lead ECG, chest X-ray, full echocardiographic evaluation were performed for all patients. All patients were subjected to CT scan including of thoracic, abdominal aorta and iliac-femoral axis. The following were calculated: Diameter of the aorta at different levels – Size and morphology of the aneurysm and its relationship to the side branches – Length (typically $\geq$ 20 mm) and diameter (typically $\leq$ 40 mm) of the healthy proximal and distal landing zones – Site of the proximal entry tear of the dissection, its extent and the involvement of important aortic branches (e.g. left subclavian artery) – Anatomy of the coronary arteries (Fig. 1).

A team of TEVAR includes two interventional cardiologists, a cardiac surgeon and an anesthesiologist. The procedure was done under general anesthesia and mechanical ventilation through trans-femoral approach. Common femoral artery was explored surgically with insertion of 6 French sheeth, an angled catheter and guidewire were used to access the abdominal aorta, and then advanced under fluoroscopic guidance into ascending aorta. It is important to keep this guidewire in place during the entire endovascular procedure. The anesthesiologist should be forewarned about these guidewires and watch for any arrhythmias they may cause. Deployment of Aortic stents differs from one company to another but all are self-expandable stents and we sometimes need post stenting dilatation in some cases, all the procedure was done under fluoroscopy and contrast injection for accurate positioning Fig. 2. In situations involving important aortic side branches (e.g. left subclavian artery), TEVAR was often preceded by limited surgical revascularization of these branches (the 'hybrid' approach).

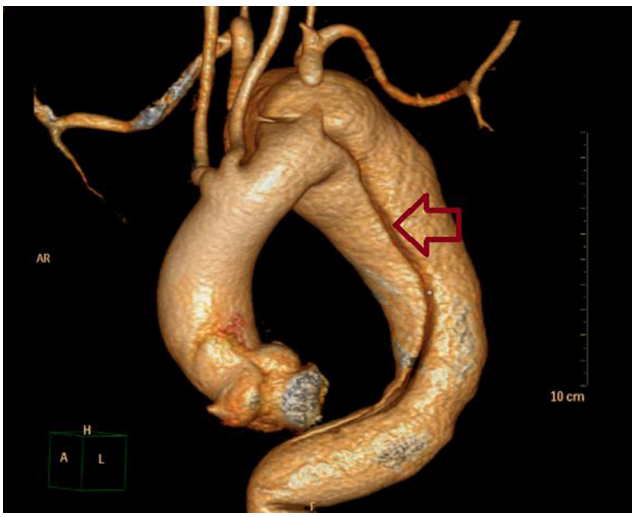

Fig. 1. Example of AD.

Clinical follow-up events included: death from all causes, Aorta related deaths, neurological deficits (stroke or TIAs), symptoms of chronic peripheral mal perfusion syndrome (claudication, abdominal pain) and 2ry endovascular or surgical re-intervention. Multislice CT was performed at average three and six months after intervention Fig. 3.

2.1. Primary outcome measures

The primary endpoints were technical success during implantation, 30-day all-cause mortality and surgical conversion. The technical success of TEVAR was defined as successful deployment of the stent graft with complete coverage of the primary entry tear and no signs of type I endoleak at the end of the procedure. Technical

Fig. 2. Define position of stent under fluoroscopy.