Cardiac arrest lasted for approximately 30 seconds and endovascular maneuvers were performed. Altogether, four temporary arrests were necessary for dilation and stent implantation (Fig 2). Immediately after stent placement, the central venous oxygen saturation increased from 68% to 78%, whereas the central venous pressure decreased to 10 mm Hg. After removal of the central endovascular catheters, the patient was weaned from ECC without difficulty. The femoral cannulas were removed and the groin was closed. During all measures and maneuvers our patient remained responsive and comfortable. The following clinical course of the patient was uneventful and he was discharged 6 days after the intervention.

Comment

Primary pulmonary artery sarcoma is a very rare tumor with only a few hundred cases having been reported in the literature [1]. Without surgery the median survival time is 1.5 month. However, surgery can potentially prolong survival time to 10 months [1]. Eighteen months after the first surgical intervention this patient had a tumor recurrence leading to right ventricle outflow obstruction with severe circulatory impairment develop. In the absence of a surgical option, an interventional approach was conceptualized. In this patient there was specific concern that complete right ventricular outflow obstruction during balloon inflation and stent release might result in complete cardiac failure. This led us to select ECC to support systemic and pulmonary circulation during the stent procedure. In addition, transient cardiac arrest was induced to avoid any cardiac disturbance during stent release. Moreover, avoidance of a mediastinal mass syndrome was achieved by deliberately preserving the patient’s ability to breathe spontaneously. We believed that general anesthesia and mechanical ventilation might have the potential to obstruct our patient’s airway or pulmonary artery by collapsing tumor masses. During the whole procedure the patient was only slightly sedated, and he tolerated the procedure well and felt comfortable. We have found only one comparable case in the literature [2]. To reduce an increase in right ventricular afterload these colleagues also established percutaneous cardiopulmonary support. However they performed the complete procedure under general anesthesia.

We believe that this approach is unique. With the combination of preserved spontaneous breathing, ECC and temporary cardiac arrest, balloon inflation and stent release was safe, yet the technical efforts and expenses may cause controversial viewpoints. However, in a patient whose oxygenation was dependent on only two lobes of a single lung combined with circulatory failure we saw the medical and surgical needs of the patient most safely met with the use of ECC under local anesthesia combined with light sedation.

In selected patients this approach is a safe technique with surprisingly high patient comfort and is an effective alternative to techniques implementing general anesthesia.

References


Treatment of Acute Type A Dissection by Percutaneous Endovascular Stent-Graft Placement

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Acute type A dissections are a life threatening condition requiring immediate surgical intervention to avoid aortic rupture or pericardial tamponade. Success of surgical intervention is markedly limited in those patients with advanced age, neurological deficits, and multiple co-morbidities at the time of treatment. We report the successful endovascular stent-graft treatment in a patient suffering from an acute type A dissection. Due to the

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presence of multiple comorbidities the patient was considered too high risk for surgical treatment.


Endovascular stent-graft treatment has emerged as an alternative treatment option for various diseases of the descending aorta including aortic type B dissections and penetrating ulcers. So far, percutaneous endovascular stent-graft treatment of ascending aortic disease was only performed in patients with subacute type A dissections and penetrating ulcers. We report the successful percutaneous endovascular stent-graft treatment of an acute aortic type A dissection as the primary and sole treatment of a patient.
An 84-year-old man was admitted to our emergency department due to the onset of severe chest pain (6 hours previously). At the time of admission the patient had paraplegia develop without any signs of central nervous damage. Computed tomographic scan revealed an acute aortic type A dissection with an entry tear in the mid portion of the ascending aorta (Fig 1). After intensive care treatment and steroid bolus therapy, paraplegia completely dissolved [1]. Due to the patients advanced age, the development of intermittent paraplegia, and the presence of several comorbidities (ie, diabetes, history of cerebrovascular and peripheral vascular disease, and chronic renal insufficiency), we refused to perform open surgery. Therefore the patient was presented with the option of stent-graft treatment. The patient agreed to undergo percutaneous stent-graft treatment through written and informed consent.

A custom made stent-graft fitting the dimension of the ascending aorta (from the sinotubular junction to the brachiocephalic trunk) was tailored. As soon as the costume made stent-graft was available, endovascular treatment was performed.

With the patient under general anesthesia, a custom made covered stent (Jotec, Hechingen, Germany) 46/85 mm was advanced into the ascending aorta through the right common femoral artery. Before deploying the stent-graft, the patient was paced to 180 bpm using a temporary ventricular pacemaker that was placed in the right subclavian vein. This was done to decrease cardiac output and consecutively minimize the risk of dislodging the stent-graft while deployment was undertaken. Thereafter the stent-graft was deployed distal to the coronary arteries (controlled by transesophageal echocardiography) and proximal to the brachiocephalic trunk. Completion angiography after stent-graft deployment revealed regular perfusion of the coronary arteries, complete exclusion of the dissection, as well as regular perfusion of the supra-aortic vessels (Fig 2). Aortic valve competence was confirmed by transesophageal echocardiography.

The patient was extubated immediately after the procedure, returned to the regular ward on postoperative day 1, and was discharged 7 days after stent-graft placement. Completion computed tomographic scans at hospital discharge and 1 month after stent-graft placement revealed stable position of the stent-graft in the ascending aorta, regular perfusion of the true lumen, and aneurismal sac shrinkage (Figs 3A, 3B).

Comment

In patients with advanced age and multiple comorbidities, surgical treatment of acute aortic type A dissections is limited by a high perioperative mortality [2]. Endovascular treatment of descending aortic disease has developed as an accepted treatment alternative due to less invasiveness in these patients [3]. Endovascular stent-graft treatment of aortic type A dissection in the nonacute setting, as well as treatment of penetrating ulcers has been reported in the past [4, 5]. We report on successful percutaneous treatment of an acute Stanford type A dissection with a covered stent graft as primary and sole treatment.

The main benefit of this approach is its minimally invasive fashion, avoiding sternotomy as well as circulatory arrest. However, endovascular treatment bears the risk of catheter intervention-associated complications. Endovascular treatment of type A dissections further bears the risk of compromising the aortic valve, the coronary arteries, and the supraaortic vessels due to the special anatomy of the ascending aorta. In addition this treatment can only be offered to those patients with uncompromised aortic valve function (ie, no higher grade insufficiency) and an entry tear well above the coronary ostia in order to obtain a sufficient landing zone. Furthermore, the long-term durability of this approach is uncertain. Nevertheless this approach may add as an alternative treatment option in patients with multiple comorbidities and high surgical risk. A prerequisite before offering this approach to a broader patient population is exact knowledge on the needed stent-graft dimensions as there will be not enough time to tailor make a stent-graft in the majority of patients with acute type A dissections. Broader application of this technique will reveal its safety and efficacy, especially with regard to long-term outcome.

In conclusion, endovascular treatment of type A dissections is a promising option for those patients not suitable for conventional surgical repair and may add to the weaponry of cardiothoracic surgeons.

References