Endovascular stenting for type B dissection involving a right-sided aortic arch

Maria Grazia Croccia, Maurizio Levantino, Roberto Cioni and Uberto Bortolotti

Abstract

Endovascular stent-graft repair is emerging as the treatment of choice for complicated type B aortic dissection. In this report we describe a patient who presented with type B aortic dissection involving a right-sided aortic arch (RAA), a rare congenital vascular anomaly. The initial aggressive medical treatment proved unsuccessful due to false aneurysm expansion. Given the greater complexity of conventional surgical repair and the limited experience with this rare malformation, endovascular repair was preferred and successfully performed. We report the first case of endovascular repair of type B dissection involving RAA, confirming that endovascular treatment is technically feasible also when the dissection involves this unusual vascular malformation.

Keywords: Aortic dissection • Aortic arch anomalies • Endovascular stenting

CASE REPORT

A 62-year old man, with a previous diagnosis of a thoracic aneurysm of 46 mm, was referred to our unit because of thoracic pain of sudden onset. On admission, he was found to be hypertensive and a transthoracic 2D echocardiogram was unremarkable, showing a preserved left ventricular function. Computed tomography (CT) revealed type B aortic dissection and the presence of RAA and a right descending thoracic aorta (Fig. 1a). The dissection originated 7 cm from the right subclavian artery extending for 9 cm in the descending aorta. The maximal diameter of the aorta was 52 mm with a partial mural thrombosis. Three-dimensional angio CT reconstruction showed the anatomic abnormality with mirror-image branching of the great vessels (Fig. 2). The first arch branch was the left innominate artery, giving rise to the left common carotid and the left subclavian arteries; the right common carotid and the right subclavian arteries arose beyond the left innominate artery. The patient was initially managed conservatively with aggressive antihypertensive therapy. Five days later, however, he started complaining of recurrent chest pain and dysphagia; another CT scan showed an evident enlargement of the false lumen. Considering the complexity of his aortic anatomy, the patient was scheduled for an endovascular stent-grafting treatment of the aortic lesion. The procedure was performed under general anaesthesia and endotracheal intubation with complete haemodynamic monitoring. Transoesophageal echocardiography was used to monitor the cardiac function and to visualize the guidewire insertion and advancement into the true aortic lumen. Through a right groin incision the femoral artery was exposed and cannulated. A 200-mm relay stent-graft (Bolton Medical, Sunrise, FL, USA), with a proximal diameter of 40 mm and a distal diameter of 36 mm, was deployed just below the origin of the right subclavian artery (Fig. 1b). A control angiogram revealed complete flow exclusion of the false lumen and the correct position of the stent-graft. The subsequent postoperative course was uneventful. Control CT scans at 3 and 6 months showed a small type I endoleak with a thrombosis of the false lumen, for which a decision to treat the patient conservatively was taken; the patient however refused further treatment. He remains asymptomatic 2 years after the procedure and the CT scan at this time shows a trend towards further reduction of the endoleak.

DISCUSSION

RAA is a rare congenital vascular malformation with an incidence of 0.05–0.1% of the population and aneurysms or even
dissections involving RAA are even more uncommon. Successful surgical treatment of aneurysms or a dissection involving RAA have previously been reported in a limited number of cases [2]. Such reports have outlined the complexity of the repair and the technical challenges, particularly related to the presence of anomalous aortic arch vessels and the relation of the aorta with the trachea and the oesophagus. The repair is often complicated also by the need to use cardiopulmonary bypass and deep hypothermic circulatory arrest [2].

Endovascular stent-grafting is becoming an appealing alternative to surgical treatment in both chronic aneurysms and acute dissections of the descending thoracic aorta. The endovascular stenting of thoracic aneurysms associated with RAA has been reported recently. Okada et al. reported the repair of a 6 cm sac- cular aortic thoracic aneurysm in a patient with RAA [3]. The procedure was feasible and the outcome successful, also owing to a particularly favourable anatomy of the lesion. Subsequently, Naoum and associates described a patient with RAA and an aberrant left subclavian artery, who underwent a successful endovascular repair of a descending thoracic aortic aneurysm using multiple stents [4]. These authors confirmed the feasibility of the procedure, calling attention to the need for an accurate preoperative clinical and anatomical evaluation when selecting patients for an endovascular treatment of aortic lesions associated with RAA. More recently, Klonaris and colleagues have described a case of endovascular repair of a right-sided descending thoracic aortic aneurysm associated with RAA with an aberrant left subclavian artery arising from a Kommerell’s diverticulum [5].

The present patient represents the first reported case of a type B dissection associated with RAA treated with an endovascular approach. However, a similar case with chronic type A dissection treated by the frozen elephant trunk technique in a combined surgical/endovascular approach has been reported recently [6]. The endovascular treatment has become a viable therapeutic alternative for patients with aortic aneurysms and the present paper demonstrates that it is feasible with acceptable results also in the cases of a dissection of the thoracic aorta associated with RAA. Major advantages, compared with a standard surgical approach, include the lower level of invasiveness and the avoidance of more complex repairs and of the need for circulatory arrest, commonly required with conventional surgical techniques. In our case the origin of the dissection quite far from the left subclavian artery provided a favourable anatomical pattern to obtain an adequate landing zone without the need of performing a left subclavian–carotid bypass.

Finally, also in our experience, accurate preoperative imaging with the aid of three-dimensional reconstructions appeared effective for adequate interventional planning.

Conflict of interest: none declared

REFERENCES


