continuity was performed using PTFE graft of 8 mm diameter between the left common femoral artery and the right common femoral artery associated to another graft between this latter and the ipsilateral popliteal artery just after the Hunter's canal (figure 1). In the early post-operative period, the patient developed an important lower limb edema that completely resolved within one week after physiotherapy and heparin.

References

1. Brooks, A.D., et al., Soft tissue sarcomas of the groin: diagnosis, management, and prognosis. J Am Coll Surg, 2001. 193: 130-6.
2. El-Sherbiny, M., Limb sparing surgical resection of groin sarcoma. Surgical approach and reconstructive options. J Egypt Natl Canc Inst, 2008. 20: 281-93.
3. Schwarzbach, M.H., et al., Results of limb-sparing surgery with vascular replacement for soft tissue sarcoma in the lower extremity. J Vasc Surg, 2005. 42: 88-97

Tarak Damak1, Mourad Hakim2, Achraf Hadiji 1, Amira Triki1, Hajer Abaza3, Sobhi Mleyhi2, Hatem Bouzaiene1, Jamel Ben Hassouna1, Riadh Chargui1, Khaled Rahal1.

1 Department of surgical oncology, 3 Department of biochemistry; Salah Azaiz Institute. Tunis, Tunisia

2 Department of cardiovascular and thoracic surgery, Rabta Hospital. Tunis, Tunisia.

Tracheo-aortic fatal fistula after tracheostomy: a rare complication to keep in mind.

Vascular complications after tracheostomy are rare but severe, impairing the patient's prognosis and requiring prompt management [1, 2]. We report a new observation of a 17-year-old boy with a trisomy 21 and a Dandy-Walker malformation which presented 6 months after tracheostomy with severe bleeding from the cannula secondary to complex tracheo-innominate artery and tracheo-aortic fistula which was unnoticed initially but was fatal at recurrence.

Case report

A 17-year-old-boy with a trisomy 21 and a Dandy-Walker malformation was referred to our department for severe bleeding from a tracheostomy tube. He had a history of acute respiratory failure secondary to severe pneumonia which required mechanic-ventilation 10 months earlier. The patient received a tracheostomy, for prolonged oro-tracheal intubation and was discharged. Six months after tracheostomy, he presented for severe bleeding from the cannula. Fiberoptic bronchoscopy showed no abnormalities in the proximal part of the bronchial tree, but severe bleeding occured after removal cannula, preventing further exploration.

Patient underwent in emergency a cervico-manubriotomy, which showed a fistula between the innominate artery and the trachea. A trans-tracheal closure of the fistula was performed with Teflon stamps.

Third-postoperative-day chest-CT showed a diffuse circumferential thickening of the tracheal wall, which was the seat of calcification with densification of the mediastinal fat. There was no vascular leakage after contrast injection (Fig.1-2). Considering the high risk of hemorrhage recurrence, an extra-anatomical bypass using an autologous pericardium-tube graft was decided.

Through median sternotomy and a right subclavian incision, the right subclavian artery and the ascendant aorta were dissected. A 60x80 mm2 patch was taken from the pericardium and treated with glutaraldehyde. A 6 mm self-made tube graft was constructed from the pericardium patch. Under beating-heart and lateral clamping of the aorta, the pericardial tube was interposed between the ascendant aorta and the right subclavian artery, through an extra-pleural tunneled path. The innominate artery was sutured at both sides of the fistula. At the end of the procedure, a good capillary signal was detected at the right fingers. The third hour postoperatively, patient developed right fingers cyanosis with loss of the radial and humeral artery pulses. At Doppler-ultrasound, there was no blood-flow in both arteries. A CT-angiography showed thrombosis of the subclavian artery bypass, occlusion of the right subclavian artery over a distance of 37 mm at 33 mm of its origin with a normal blood flow at the distal subclavian artery, the axillary artery and the arteries of the right upper limb. The patient was reoperated through median sternotomy. An embolectomy was performed with a balloon Fogarty catheter at the proximal part of the graft with a good patency result. Post-operatively, the patient presented severe sepsis which required epinephrine support. At the second day post-operatively, he presented a severe pulsatile hemorrhage from the tracheostomy cannula. The patient was reoperated through median sternotomy. Intra-operative exploration with further dissection of the mediastinal great vessels revealed a second fistula between the posterior side of the aortic arch and the trachea which was unnoticed during the previous procedures (Fig.3). Unfortunately, the patient presented intra-operatively a cardiac arrest which was refractory to resuscitation.

Figure 1 : Diffuse circumferential thickening of the tracheal wall, with calcification between the trachea and the innominate artery.

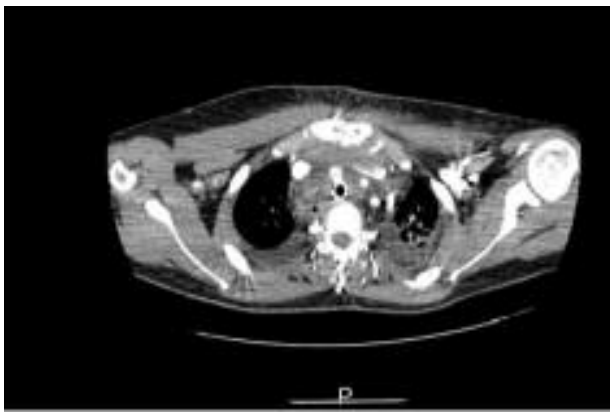


Figure 2 : Tracheal wall thickening with a tight contact between the trachea and the aortic arch.

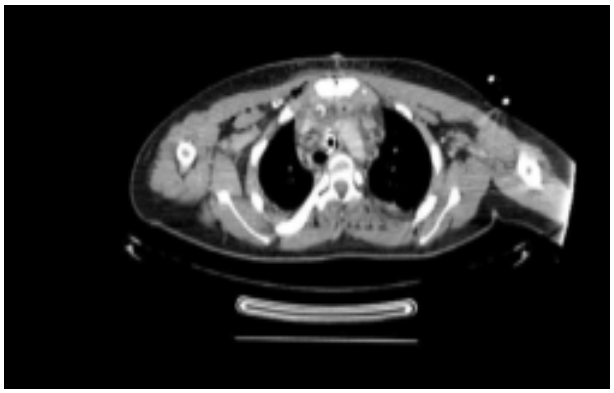
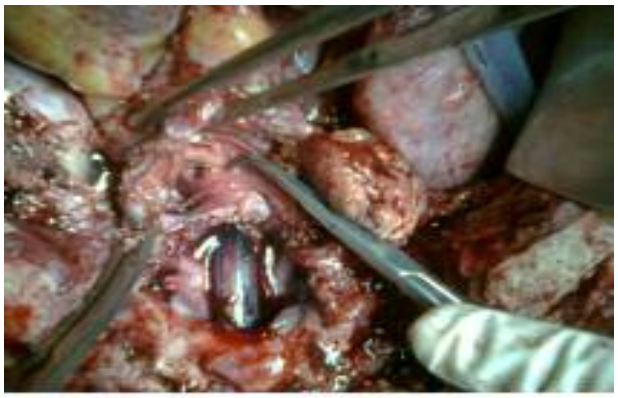


Figure 3 : The second fistula between the trachea and the aortic arch (tip of the dissector).



Discussion

Tracheostomised patients are at risk of complications in 4 to 65% of the cases, which may occur at any time [1]. Within them, tracheo-innominate artery fistula, reported in our observation, is a late complication that occurs in about 1% of cases [2]. It results from necrosis after long term erosion of the anterior tracheal wall and cartilage adjacent to the posterior wall of the innominate artery [3] which crosses the anterior trachea anywhere from the 6th to the 13th tracheal rings behind the manubrium. Thus a high-lying innominate artery crossing the trachea above the 4th tracheal ring [4] is a risk factor for fistula especially in young patients, with neurological impairment and secondary chest and muscle deformities, like in our patient who had a 21 trisomy with a Dandy Walker syndrome [5]. Severe hemorrhage will occur with a high mortality rate estimated at 90% in case of absence of immediate resuscitation or surgical management. However 50% of the patients presenting tracheo-innominate artery fistula often present sentinel hemorrhages which have to be considered and investigated with such complication kept in mind. Once a tracheo innominate fistula is diagnosed, rapid hemostasis and definitive operative repair are highly recommended although an immediate endovascular procedure after diagnostic angiography may be an option [6]. Endovascular embolization and stent grafts have been reported to be successful in hemodynamically stable patients but have many drawbacks. These techniques depend on the operator's expertise; present a high risk of infection and a high risk of recurrence [7].

In case of severe hemorrhage, bleeding control should precede immediate surgical exploration and repair of the fistula [8]. In our patient, the first procedure aimed to stop the bleeding. Complete dissection and exploration of the vessels were not possible. The high risk of hemorrhage recurrence, advocated the second procedure. Different techniques were applied for the management of tracheo-innominate fistula such as: direct suture, resection and ligation of innominate artery, graft interposition using autologous or prosthetic materials, reconstruction of the artery using anatomical and extra anatomical bypasses, with a variable outcome depending from the applied technique [9]. We opted for an extra-anatomical bypass with a self-made pericardial tube graft. Although the tracheo-innominate fistula was excluded and secured, the outcome in our patient was highly dependent from an unnoticed second fistula between the aortic arch and the trachea which caused a fatal hemorrhage. Reports of such complication are scarce and not well documented. However, its occurrence changed drastically the outcome of our patient. Thus, complete exploration of the trachea and the great vessels in such patients is highly recommended before any surgical repair whenever possible.

Conclusion

Tracheo-arterial fistulas although rare, are severe complications with a high risk of mortality, which have to be well investigated in order to be managed in time. Whenever a surgical procedure is indicated, complete exploration of the aortic arch and the supra-aortic vessels have to be performed.

References:

1-Imai T, Takase M, Takeda S, Hosone K, Tomiyama S, Nakanowatari Y. Fatal tracheo-innominate artery fistula after tracheostomy in a patient with Pelizaeus-Merzbacher disease. J Nippon Med Sch 2012; 79: 274-9.

2-Allan JS, Wright CD. Tracheo-innominate fistula: diagnosis and management. Chest Surg Clin N Am 2003; 13: 331- 41.

3-Dyer R, Fisher S. Tracheal-innominate and tracheal esophageal fistula. In Complication in Thoratic Surgery (Wolfe W, ed), 1992; p 294, Mosby-Year Book, 1992 St. Louis.

4-Grant CA, Dempsey G, Harrison J, Jones T. Tracheo-innominate artery fistula after percutaneous tracheostomy: three case reports and a clinical review. Br J Anaesth 2006; 96: 127–31.

5-Hisamatsu C, Okata Y, Zaima A et al. Innominate artery transection for patients with severe chest deformity: optimal indication and timing. Pediatr Surg Int 2012 Sep; 28: 877-81.

6-Wright CD. Management of tracheo-innominate artery fistula. Chest Surg Clin N Am 1996; 6: 865–73.

7-Wang PK, Yen PS, Shyr MH, Chen TY, Chen A, Liu HT. Endovascular repair of tracheo-innominate artery fistula. Acta Anaesthesiol Taiwan 2009; 47: 36-9.

8-Grant CA, Dempsey G, Harrison J, Jones T. Tracheo-innominate artery fistula after percutaneous tracheostomy: three case reports and a clinical review. Br J Anaesth 2006; 96: 127–31.

9-Gasparri MG, Nicolosi AC, Almassi GH. A novel approach to the management of tracheo-innominate artery fistula. Ann Thorac Surg 2004; 77: 1424-6.

Ben Youssef Atef, Zairi Sarra, Ziadi Jalel, Bousnina Mouna, Ouerghi Sonia, Mestiri Taher, Kilani Tarek.

Department of Thoracic and Cardio-Vascular Surgery. A.Mami Hospital. Ariana. Medical School of Tunis. Tunisia.