ANEURYSM OF THE SUBCLAVIAN ARTERY

Petr Utíkal[a], Petr Bachleda[a], Martin Köcher[b], Josef Novotný[c], Petr Dráč[a], Pavel Dráč[d]

[a] *1st Department of Surgery, University Hospital, Olomouc*
[b] *Department of Radiology, University Hospital, Olomouc*
[c] *Department of Radiology, Military Hospital, Olomouc*
[d] *Department of Traumatology, University Hospital, 775 20 Olomouc, Czech Republic*

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In this case report about a female patient with a true aneurysm of the left subclavian artery (SAA), the authors would like to present the symptoms, possibilities of diagnostics and management of this rarely appearing pathology. The diagnosis of a randomly found aneurysm in a symptomfree patient was confirmed by spiral AGCT. Classical surgical procedure was indicated for the patient. With a combined supra- infraclavicular approach the partial resection of the aneurysm and its revascularization by a ePTFE prosthetic interposition were performed. A histological investigation showed nonspecific changes in the aneurysm wall. Two years after the operation the patient is without any complications and with complete functional vascular reconstruction and optimal limb function.

INTRODUCTION

The true SAA is not commonly found among peripheral aneurysms. In the fifteen years of our clinical vascular practice we have encountered this for the first time. Similarly as for aneurysms in other locations, the main justification of an operation is to preserve the viability of a limb and prevent life-threatening complications. The aim of this case report of a patient with a left subclavian artery aneurysm compared with the literature concerning this problem is to present the symptoms, diagnostic possibilities and management of this rare pathology.

CASE REPORT

A 49 year old healthy woman was screened in the oncology department for breast tumours (positive family history – her sister died of a breast carcinoma). A resistance in the left supraclavicular area was found, which was considered to be a lipoma. After half a year a control ultrasonic investigation was performed and an aneurysm was suspected. A consulted vascular surgeon described a painless pulsatile resistance in the left supraclavicular area with an audible systolic murmur. Past medical history (injury, cannulation, inflammation, thoracic outlet syndrome) was negative. Threedimensional AGCT with a spiral shift confirmed a true aneurysm in the middle third of the left subclavian artery without any sign of a rupture or a mural thrombosis. The aneurysm was of a fusiform shape and its dimension was 6 x 2cm (Fig. 1, 2). The finding on other arteries of the aortic arch was normal. No pathology belonging to the thoracic outlet syndrome complex (TOS) was found. The patient was without any vascular risk (diabetes mellitus, hypertension, hyperlipaemia, nicotinism). We found no associated aneurysms in other locations. On the 25th of April 1997 the patient underwent a surgical management. The procedure was performed under general anaesthesia, general heparinization (7500 IU i.v.) and protected by antibiotics (Zinacef 1.5 gr i.v., 3 doses). The patient was inclined, with a support to the thoracic part of the vertebral column and with the limb apposed to the body on the side of the aneurysm. Two incisions were performed for this procedure. The first was led above clavicle lateral to the insertion of the sternocleidomastoid muscle. The subclavian artery proximal to the aneurysm was denuded. The distal part of the artery was reached from an oblique incision in the deltoid pectoral trigone. The sac was sheared longitudinally, thromb and sclerotic masses were removed and the free margins were resected. A prosthesis from ePTFE GORE TEX fy GORE (stretch type with rings) of 8 mm in diameter with both connections end to end by ePTFE GORE stitches 5.0 was used for revascularization of the limb. The operating wounds were closed with Redon's drainage. The patient was free from general or local complications and was sent home on the seventh postoperative day with a permanent antiaggregant therapy (anopyrin 100mg 1 x 1 a day). During the operation no manifesting pathology belonging to the TOS was found and the finding on the sac of the aneurysm was evaluated unambiguously as an atherosclerotic affection. Histological investigation, however, surprisingly described only undetermined changes. The check-up six months

after the operation showed the limb well supplied by blood, fully and freely movable with quality palpable pulse on the periphery of the limb. The dopplerometric investigation confirmed comparable flow parameters to the opposite healthy limb. An AG check after one year showed free passage reconstruction (Fig. 3). Two years after the operation the patient is without any problems and dopplerometric check has confirmed good flow parameters.

DISCUSSION

SAA and its case reports in accessible literature are rare. The first attempt at a surgical therapy of the SAA was carried out by Valentine Mott in 1818 and the first successfull ligature of the subclavian artery with an aneurysm was carried out by A. W. Smyth in l864[1]. The incidence of true SAA is relatively rare, it is only 0.l3 per cent of all aneurysms[8]. We meet false aneurysm more often as a result of iatrogenic damage during a cannulation of the subclavian vein or after an injury. The true aneurysm of the distal part of the subclavian artery is mostly a poststenotic one belonging to the TOS, but it is very rare. In literature the incidence is 1.1 per cent in patients with TOS[4]. The histological investigation of the aneurysm of the middle part of the subclavian artery did not confirm in our case an atherosclerotic origin. According to the location a poststenotic aneurysm by the scalenic syndrome was possible, but the patient was without any symptoms and peroperatively we did not find any causing pathology. Purely atherosclerotic aneurysm is localized the most frequently in the proximal part of the subclavian artery, just as are aneurysms related to cystic medial necrosis, Marfan's syndrome, mycotic aneurysm and aneurysms of genetic syndromes (Turner's syndrome)[8]. In spite of appearing mostly onesided, it is always neccesary to exclude involvement of the other side and above all other associated aneurysms appearing in more than 30 per cent of patients[2]. The aneurysm of the proximal part of the subclavian artery is symptomless for a long time, it presents only with undetermined discomfort in the neck /rarely dysphagia, dyspnoea/ or in the shoulder region and it is found randomly. Peripheral embolism of the upper limb is the most frequent clinical manifestation of an aneurysm situated in the middle and distal part of the subclavian artery. The anatomy and dynamics of the costoclavicular region with repeated compression of the artery with the aneurysm during movement of the humeral girdle lead to it[3]. It can manifest itself as an acute peripheral ischemia or microembolisms manifesting themselves as Raynaud's syndrome. When an aneurysm is situated centrally, vertebral artery embolisms can occur[1]. Thrombotic occlusion and rupture are rare, but a rupture of an aneurysm to the bronchus with haemoptysis was described[1]. The aneurysm can cause an oppresion of the subclavian vein leading to thrombosis with oedema of the limb. Neurological symptoms from the pressure of the aneurysm to the brachial plexus manifest by dysaesthesias in the ulnar nerve area and Raynaud's phenomenon in the vegetative component. The aneurysms in this region are not very accessible to clinical investigation. In every case of an obscure resistance a suspicion of an aneurysm must be considered and a vascular surgeon has to be consulted. Also dopplerometric investigation is not precise enough in the subclavian region to achieve a diagnosis. AG is determinated for the diagnostics according to the therapeutical process. In our clinic we have good experiences with the threedimensional AGCT with a spiral shift. It gives a good cubic picture of the relation of the aneurysm to the surroundings and of presence of a thrombus[6]. Classical surgical treatment is the method of choice for the management of the SAA with an effort of an elective preventive operation. An exclusion of the aneurysm from the blood circulation and revascularization of the limb is the base. The indication to an elective operation of SAA (also symptomless one) is done similar as in other locations by its bad prognosis. All aneurysms grow and during time, they may complicate. A symptomatic aneurysm, above all containing a mural thrombus with high embolism risk, is an unambiguous indication to an operation. A complicated aneurysm is indication for an urgent operation. We prefer a surgical embolectomy by Fogarty's catheter also for getting a free passage of the peripheral distribution of the limb in case of an acute ischemia. The approach was chosen according to the location of the aneurysm and anatomical relations. The combined supra-infraclavicular approach used in our case is suitable for surgical management of an aneurysm in the middle and the distal part of the subclavian artery. It is easy, the patient is loaded minimally, it causes better visibility and a safe operation. If necessary, it is possible to cut both the insertions of the sternocleidomastoid muscle, or it is possible to cut anterior scalenus muscle and then the small pectoral muscle and partly the great pectoral muscle below clavicle. When visibility is worse, there is a possibility to join both the incisions and cut the clavicle[3]. It is possible to use a modified supraclavicular approach with a subperiostal resection of the medial part of the clavicle primarly in cases of big aneurysms[10]. A classical posterolateral thoracotomy through the fifth intercostal space is preferred for the aneurysms of the proximal part of the left subclavian artery. The sternotomy is preferred for the central aneurysms on the right side[1,8]. It is always necessary to eliminate the cause in case of poststenotic distal aneurysms belonging to the TOS. An extirpation of a cervical rib or a resection of the first rib is so performed before a procedure of an aneurysm[4]. It is suitable to add a thoracic sympatectomy in case of an aneurysm with symptoms of chronic ischemia based on an old embolism to the periphery of the limb or with symptoms of Raynaud's phenomenon. It is possible to perform it mostly simultaneously with the same approach or separately by thoracoscopy[3,5]. The axillary approach is suitable for management of a small distal poststenotic aneurysm. This allows performance of the

first rib resection, respectively to remove all the causes of the compressions, to perform upper thoracic sympatectomy and to treat the aneurysm at the same time[3]. It is necessary to take care of the brachial plexus, the recurrent and phrenical nerve and the thoracic duct during preparation. If it is not possible to separate the sac of the aneurysm from the surrounding structures, we do not prepare it unnecessarily and we avoid their possible injury. A partial resection of the aneurysm sac with a revascularization of the limb by an interposition either subclavian-subclavian or subclavian-axillary, is then the main surgical procedure. We prefer using an artificial vascular prosthesis from ePTFE material as a substitution. In this area it has unambiguously better results than autologous saphena or another autologous vein mostly not of good quality and inadequate by diameter and than a vascular prosthesis from dacron[4]. In case of a centrally located aneurysm we can perform its exclusion (a ligature with a tangential suture of the sac) and revascularization of the limb extraanatomically by a carotical-subclavian or axillary-axillary by pass[2,9]. It is also possible to perform a subclavian-carotical reimplantation[1]. In this period the possibility of management of an aneurysm by an endoluminal stent-graft cannot be neglected. This new method can apply especially for a certain type of subclavian artery aneurysms which are localized in the proximal part of the artery and for posttraumatic false aneurysms. It can be the method of choice for high operative risk patients[7,11].

CONCLUSION

According to possible complications an active access is necessary for the SAA with an elective preventive management effort. A surgical partial resection and revascularization using an artificial vascular prosthesis from ePTFE interposition is the method of choice.

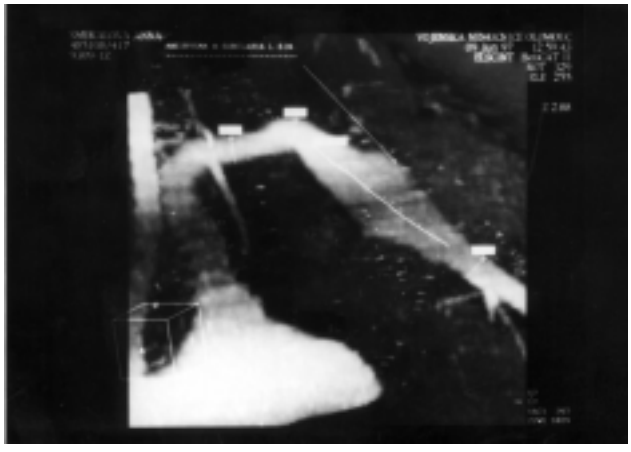

Fig. 1. AG CT of the SAA.

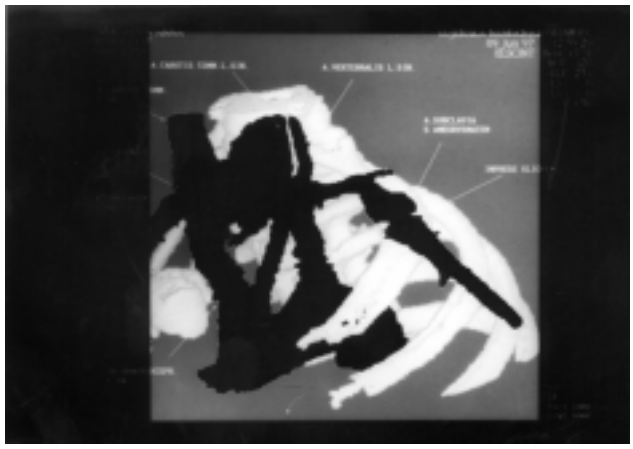

Fig. 2. Spiral CT of the SAA.

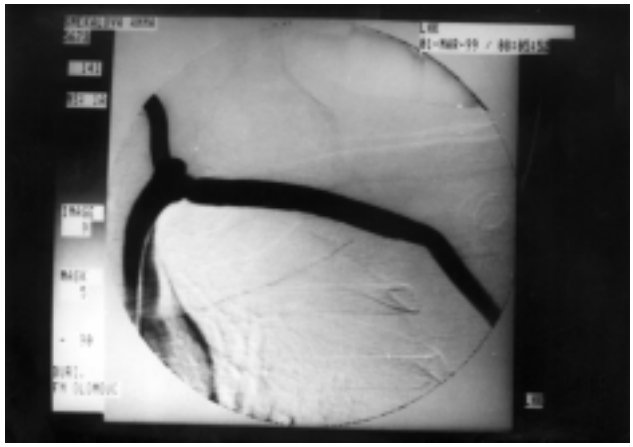

Fig. 3. AG after reconstruction.

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