

AORTIC ANASTOMOTIC PSEUDOANEURYSM. A COMPLICATION OF ABDOMINAL AORTIC SURGERY

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ABSTRACT

The incidence of graft infection and development of anastomotic pseudoaneurysm following aorto-femoral reconstructive surgery is low (0.8-6%). However, when these complications occur, their severity is extreme. The aortic anastomotic pseudoaneurysm is the least evident at its onset and most frequently diagnosed when rupture takes place and its dramatic effects become apparent. The diagnosis of aortic graft infection is difficult to establish clinically. All these arguments, together with our clinical experience, prompted this investigation.

The conclusion of the study is that the risk of developing an aortic anastomotic aneurysm can never be ruled out, though its frequency decreases with time. Postoperative screening after aortic surgery, even in asymptomatic patients, is always desirable.

Key Words: aortic graft infection, anastomotic aneurysm, segmental graft excision.

INTRODUCTION

The current methods of treatment for aorto-iliac obstruction are well established. Despite the progress in the surgical treatment of aorto-iliac obstruction, early and late postoperative complications continue to occur in a considerable number of patients. The infection of the aortic graft is considered the most serious complication of aortic reconstructive surgery, leading to the development of anastomotic pseudoaneurysm or aorto-enteric fistula, with disastrous consequences.^{1,2} Though a rare occurrence, the aortic anastomotic aneurysm accounts for high morbidity and mortality rates (20-50%).³⁻⁵

CASE REPORT

B.G., a 42-years-old male patient, smoker, was admitted to the Surgical Clinic II of Cluj-Napoca on

September 19, 2002 (Rec-2111) with the characteristic symptoms for peripheral obstructive arterial disease, namely permanent pain in the lower limbs, more intense at night, not responding to common painkillers, dry patchy necrosis of the left hallux, infected ulceration of 3 cm in diameter on the postero-lateral surface of the left calf, marked bilateral calf edema due to supine position. Physical examination evidenced bilateral absence of pulsation at the femoral level. Aorto-arteriography showed complete obstruction of the left common iliac artery from the origin and obstruction of the right external iliac artery from the origin, with refill at the level of the common femoral arteries through collateral vessels. At the distal level the arteries were permeable, more visible on the right side. Leriche's syndrome, stage IV, low form, was diagnosed. Routine laboratory tests evidenced leukocytosis and high ESR, which indicated antibiotic treatment (Ceftriaxone 2 x 1 g/day) initiated on the first day of admission and continued throughout the whole hospitalization period.

Taking into account the clinical and laboratory findings, and the advanced stage of the disease, surgery was indicated. Surgical procedure was performed 6 days after admission, during which trophic lesions showed a tendency to limit, although pain was persistent. Aorto-femoral bypass (end-to-side) with Terom[®] (20 x 10 mm), the type available at that time, was performed. Given the good distal run-off, the early postoperative evolution was good. The patient

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presented for follow-up examination 3 months later, able to walk more than 500 m, with distal lesions completely healed and distal pulse present both at palpation and at Doppler examination.

After 6 months the patient started to experience lumbar pain, and, in the absence of intermittent claudication, he was referred by the general practitioner to the Rheumatology Outpatient Unit. A lumbar spine X-ray was performed which showed the presence of a lumbo-sacral transition vertebra, marked physiological lordosis, anterior L₃ and L₄ osteophytes, marked concavity of vertebral plateaus. For 10 days the patient followed the prescribed treatment with Indomethacin, but in that period lumbar pain became severe and started to radiate to the right lower extremity. Under the circumstances the patient was admitted to the Neurological Clinic with the diagnosis: right crural and obturative neuralgia. Routine laboratory tests evidenced alteration of liver probes: GOT-69U/I, GPT-14U/I, GGT 862U/I. Considering the patient's history of alcohol consumption, the presence of hepatomegaly and altered liver tests, abdominal ultrasound was performed. Ultrasound examination revealed a slight liver enlargement of 17.5 cm and also a perianastomotic dilatation of 8.5 cm diameter, developed backwards to the spine and the right psoas muscle. The dilation contour was irregular, with thin parietal zones (Fig.1). The same examination showed a completely functional bypass, dislodged towards the left side.



Figure 1. Ultrasound aspect of the aortic anastomotic pseudoaneurysm

The diagnosis of aortic anastomotic pseudoaneurysm was established and the patient was transferred to the surgical clinic in emergency. The patient's condition deteriorated within the next hours, pain increased in intensity and radiated more and more to the right leg. Clinical examination brought forward a pulsating abdominal mass of 10-12 cm diameter. Diuresis was present. The patient had normal

temperature, but biochemistry evidenced leukocytosis (13,900/mm³) and high ESR (87-120). Since CT scan was not available, ultrasound examination was repeated, showing bowel obstruction and a pseudoaneurysm of about 9 cm diameter and 14 cm length, with the remaining lumen of the graft of 3 cm, to the inferior renal pole; no evidence could be provided regarding the renal arteries. The case was considered an aortic anastomotic pseudoaneurysm with rapid development and imminent threat of rupture. Surgical indication was absolute and urgent.

The main operative steps were: isolation of the pseudoaneurysm, its resection together with the infected prosthetic fragment, and restoration of the vascular continuity. The approach was transperitoneal. Isolation was difficult, the first isolated and clamped segment was between the pseudoaneurysm and aorta. At the same time the old forked, pulsating prosthesis was isolated by clamping the two distal branches. The pseudoaneurysm was opened. The cavity was 10 x 12 cm large and full of thrombi and necrotic tissue debris (Fig.2). The pseudoaneurysm was partially resected, preserving the posterior wall, and the sample was sent to pathology for histological examination. A fragment of the prosthesis was also resected, from its insertion to the aorta to near the forking, and a sample was sent for bacteriological examination. Between the healthy aorta and the remaining graft a tubular Dacron prosthesis (18 mm) previously immersed in Benzylpenicillin and Metronidazole was interposed and sutured by the end-to-end technique (Fig. 3). The newly inserted graft was sheathed in an omental fragment and then in the remaining portion of the pseudoaneurysm, and an aspiration drainage tube was introduced into the cavity. Before obtaining the results of the bacteriological tests, antibiotic therapy with Amoxiclav[®] and Gentamicin was initiated and Metronidazole perfusions were administered.

Figure 2. Intraoperative aspect of the pseudoaneurysmal cavity



Figure 3. In situ replacement of the resected aortic graft

RESULTS

Postoperative (p.o.) evolution was good, regarding both local and general conditions. However the body temperature curve indicated a septic condition within the first 3 p.o. days. The bacteriological examination of a prosthetic fragment evidenced a *Pyocyanic bacillus* culture, resistant to Colistin, Ticarcillin, Cefoperazol, Carbenicillin; germs were sensitive at Imipenem, Norfloxacin, Ceftazidime, Amikacin, Piperacillin, Piperacillin with Tazobactam (Tazocin). Targeted antibiotic therapy with Tazocin and Norfloxacin was immediately administered and the patient's temperature dropped on the 4th p.o. day; from then on the recovery was uneventful and the patient was discharged cured. The echo-Doppler follow-up examination performed after 6 weeks evidenced a regular contour of the aorta and the graft, blood flow present in both branches (Figs. 4a, 4b).

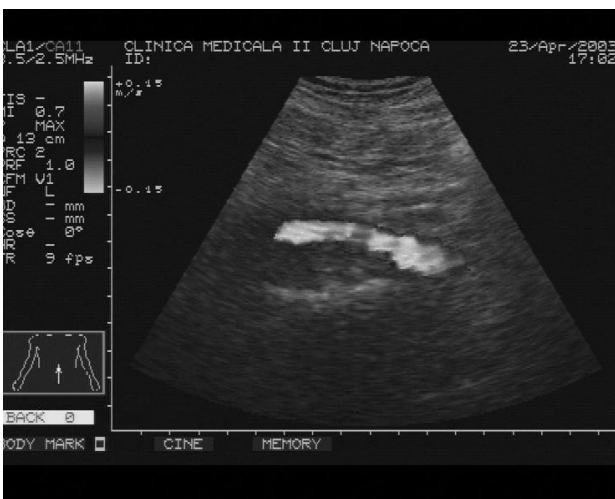


Figure 4a. Postoperative echo-Doppler aspect of the reconstructed aortic segment.

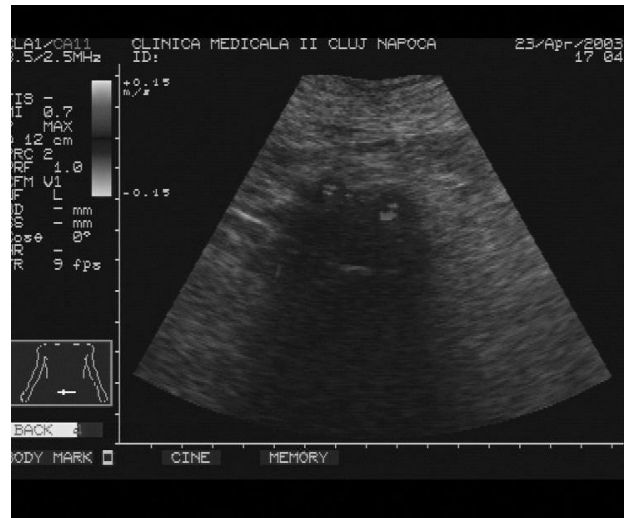


Figure 4b. Postoperative echo-Doppler aspect of the permeable forked prosthetic branches.

DISCUSSION

The infection of the aortic graft is considered to be the most severe complication of aortic reconstructive surgery. Though rare (0.8-6%), it still entails high morbidity and mortality rates (20-50%).³⁻⁵ Its severity is extreme when it is followed by the development of a pseudoaneurysm (with possible evolution towards rupture), or an aorto-enteric fistula. The diagnosis of graft infection is difficult to establish clinically. Ultrasonography and CT scan helps the diagnostic process when the infected graft is associated with the development of a pseudoaneurysm. Maximal abdominal aortic pseudoaneurysm diameter measured with CT is significantly and consistently larger than maximal pseudoaneurysm diameter measured with ultrasound.^{6,7} MRI could provide more useful information.⁸

The pseudoaneurysm, characterized by a pulsatile hematoma connected to the arterial lumen and walls forming a fibrous capsule, is the least evident clinically at onset. Therefore follow-up screening of the patients with aortic surgery in order to detect complications in due time seems entirely justified.^{9,10}

Among the methods of treatment in patients with septicemia, extensive, graft infection and retroperitoneal abscess, surgical removal of the entire graft, followed by an extranatomical bypass, may be taken into consideration. The manifestation of the infection at the bilateral inguinal level suggests that the infection involves the entire prosthesis and its complete removal with extranatomical revascularisation is indicated.¹¹⁻¹³

A surgical technique to be considered in the case of less extensive infections, with less dramatic clinical picture, used for our patient, is the excision of a fragment of the graft and the *in situ* replacement of the infected aortic graft, followed by targeted antibiotic

therapy. This procedure is applicable in the absence of retroperitoneal abscesses or septicemia, cases for which the low-grade infection has been introduced.^{14,15} It is indicated to keep the prosthesis in antibiotic solution (e.g., Benzylpenicillin, Rifampicin, Tobramycin, Metronidazole) before putting it in place.^{14,16} The application of an omental sheath around the new aortic graft as well as the placement of a drainage tube into the cavity, allowing postoperative antiseptic irrigation and monitorisation of the bacterial population, are useful and efficient against infection.¹⁷

CONCLUSIONS

1. The risk of developing complications such as graft infection or pseudoaneurysm after aorto-femoral reconstructive surgery represents a permanent danger, even though the incidence decreases with the time elapsed from the intervention.

2. Because aortic pseudoaneurysm is diagnosed in most cases at the time of rupture and its disastrous consequences, follow-up screening at well established time intervals is recommended in order to check its extension.

3. *In situ* replacement of the infected graft segment entails a lower operative mortality rate, limb salvage and ensures a good survival rate as well as a good quality of life.

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