CASE REPORT

‘Coral Reef’ Atherosclerosis of Suprarenal Aorta: Case Report and Literature Review

R. Pulli, W. Dorigo, L. Azas, D. Russo, I. A. Alessi and C. Pratesi

Cattedra di Chirurgia Vascolare, Università degli Sudi di Firenze, Firenze, Italy

Key Words: Coral reef; Suprarenal aorta; Hypertension; Aortic endarterectomy.

Introduction

The infrarenal abdominal aorta and aorto-iliac bifurcation are among the most common sites of chronic obliterative atherosclerosis. Occlusive disease usually occurs at the orifice of the renal and splanchnic branches. Localized obstructive disease of suprarenal aorta is exceedingly rare and few cases have been reported. From literature review we individuate 23 cases. The intraoperative findings consist of an irregular, calcified atheromatous mass, occupying most of the aortic lumen, strongly resembling a ‘coral reef’. Patients are commonly young females and heavy smokers. Usual symptoms are severe hypertension, splanchnic, renal or leg ischaemia.

We report the case of a young smoker female with history of claudication and severe hypertension with a calcified atheromatous plaque of suprarenal aorta.

Case Report

A 50-year-old woman was admitted to our institution with a 1 year history of lower extremity pain limiting her walking distance to 500 m. Severe hypertension refractory to medical management had been detected 8 months previously. For 20 years she had been medically treated for hyperlipidemia. There was no history of oral contraceptive use, premature menopause or connective tissue disorder. At physical examination femoral and distal pulses were absent bilaterally. No abdominal bruits were audible.

Diagnostic assessment

On Doppler examination the segmental pressures showed a consistent decrease in the upper thigh bilaterally. Ankle-brachial index was in the right and left side 0.6. Aortic duplex scan showed a heavily calcified thrombus reducing the aortic lumen and producing a trans-stenotic pressure gradient.

Aortography demonstrated a very unusual appearance of a calcified, asymmetric lesion in the proximal abdominal aorta from the diaphragm to the origin of the renal vessels. This lesion involved the visceral and renal arteries’ orifices, although these vessels were uniformly opacized. The infrarenal aortoiliac arteries were patent but showed slight atherosclerotic changes.

Biohumoral test did not show any abnormal modification of calcium/phosphorus metabolism.

Operative management

The patient underwent transaortic thromboendarterectomy. A transabdominal approach with mediastinal visceral rotation and division of the left crus of the diaphragm was performed with exposure of the abdominal aorta and its branches. Aortotomy incision for ‘trap door’ endarterectomy of the aorta was carried...
out. Transaortic endarterectomy was extended to the visceral and renal arteries’ orifices.

Pathological findings consisted of a macroscopic multiple rock-hard irregular vegetations, strongly resembling a ‘coral reef’. The aortotomy was closed with continuous 3–0 suture. The time of aortic clamping was 15 min.

Renal function was normal post operatively and improvement of hypertension was obtained. The patient was discharged 1 week later with good peripheral pulses.

Follow-up

Six months post operatively the blood pressure returned to normal value without antihypertensive drugs. Ankle/brachial index was 1. A control angio-MR showed the patency of repaired suprarenal aorta and its branches. The patient after 5 years is alive and symptom free.

Discussion

This atherosclerotic lesion restricted to the suprarenal aorta causes hypertension in almost all the patients and claudication in most of them. Visceral ischaemia and congestive heart failure may coexist.

Qvarfordt et al. published the most representative series in the literature regarding the study and the treatment of occlusive disease of proximal abdominal aorta. Nine patients, all middle-aged women, required aortic reconstruction to relieve serious ischaemic consequences of this lesion. The preoperative commonest symptoms were severe hypertension and claudication. In two patients visceral ischaemia and in three congestive heart failure coexisted. In all these patients a rare calcified atheroma of the suprarenal aorta was demonstrated. Peillon et al. described identical lesions in two patients. In one of these, concomitant abdominal angina was present.

In Table 1 we analyze the data from the whole group of cases found in the literature.

In our report the presenting symptoms were hypertension refractory to medical management and severe claudication. This unusual atherosclerotic lesion may be located also in the infrarenal aorta. Regardless of the location, the pathologic appearance is similar: a calcified exophytic mass causing severe luminal obstruction. Rosenberg et al. report a case of aorta ‘en pierre de corail’ associated with blue toe syndrome, in absence of other symptoms. The patient was a young female heavy smoker. Intraoperative findings showed an isolated lesion of infrarenal aorta.

Results from the pathologic study of these specimens showed intraplaque haemorrhage, inflammation and repair, with progressive calcification, which appears to be of the dystrophic type, as no evidence of disturbance of calcium metabolism was detected. In our case blood and urine levels of calcium and phosphorous were normal. It could be supposed that this pathologic process represents one feature of a broad spectrum of atherosclerotic disease, ranging from small ulcerated lesions to complete aortic obstruction, and falls in an intermediate group producing partial obstruction of the aorta and its proximal branches. Combe et al. report the case of a patient with preocclusive coralliform proliferation of the infrarenal aorta classified as secondary aortic amiloidosis with no specific lesion of aortic wall.

The impaired perfusion distal to the lesion seems to be the main cause of limb and renal ischaemia, due to the severe haemodynamic consequences of suprarenal obstructive lesion. These clinical manifestations are also observed in other disorders causing obstruction of abdominal aorta, particularly as abdominal aortic coarctation. This rare vascular abnormality, which represents from 0.5 to 2% of aortic coarctations, is usually due to hypertrophic changes of aortic media with intimal proliferation, without any sign of atherosclerotic damage. No evidence for this disorder was present in Qvarfordt’s series or in our case.

The aortographic appearance of a calcified lesion of the suprarenal aorta, which is often associated with atherosclerosis in the lower aorta and extensive intercostal collaterals in patients with hypertension and claudication, is diagnostic.

Differential diagnosis should be made with intraluminal thrombus or tumour involvement. Embolic obstruction of tibial vessels may coexist, but in Qvarfordt’s series this was never reported.

In most cases the treatment of choice is surgical intervention, although Walter et al. report on two asymptomatic patients who remained untreated, without developing symptoms in follow-up. However, in symptomatic patients surgical intervention is the only feasible therapeutical approach. The choice of surgical technique is between prosthetic bypass and transaortic endarterectomy. The latter is usually preferred, because of the risk of eventual thrombosis of the bypassed aortic segment, with resulting infarction of kidney and bowel. We must also consider that patients are usually young, so we tend to reduce prosthetic bypass
placement to avoid the long-term complications of prosthetic grafts. The endarterectomy technique, extended to visceral and renal arteries’ orifices, restores patency to the aortic lumen and ensures perfusion to the renal and visceral branches. Optimal exposure is required for surgical repair of this lesion. The left thoracoabdominal approach allows unlimited access to the suprarenal aorta. In our case, as the lesion was limited to abdominal aorta, a transabdominal approach allowed a good exposure of the suprarenal aorta and visceral branches. Anatomic access at this level is difficult and high perioperative and postoperative morbidity and mortality are registered. Qvarfordt reported two deaths in his series. However, this lesion threatens visceral, renal and lower extremity perfusion and its surgical management is, when successful, formidable.

In our case, the patient gained relief from refractory hypertension and limb ischaemia with a favourable impact on quality of life and survival. Results reported in the literature are similarly very good and no recidivation is described.

In conclusion ‘coral reef’ atherosclerosis of the suprarenal aorta represents a rare pathologic feature in the whole atherosclerotic obstructive disease of thoracoabdominal aorta.

In symptomatic patients surgery allows for a complete resolution of symptoms.

As patients are nearly always young women, surgical treatment is mandatory: in fact, if successful, it guarantees a considerable impact on patient’s quality of life.

References