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CASE REPORT

Diminished Epiphyseal Growth Following Iatrogenic Vascular Trauma

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Introduction

Trauma is the commonest cause of acute arterial occlusion in childhood and may require urgent elective revascularisation. Epiphyseal growth defects secondary to ischaemia present rarely to the vascular surgeon.

Case Report

A 6-year-old girl was presented with a history of increasing walking disability. There were no symptoms of vascular insufficiency, but orthopaedic assessment revealed 4 cm shortening of the left leg.

She had been under surgery for aortic coarctation at the age of 1 week and 5.5 months, for Shone syndrome (subaortic stenosis, ventricular septum defect, parachute initial valve, left upper vena cava). The first operation consisted of correction of isthmic stenosis. During the second procedure transatrial resection of subaortic stenosis through the ventricular septum defect (VDS) was accomplished. Secondly, the VSD was closed by patch plasty (PTFE allograft).

Before and after her heart surgery she underwent transfemoral catheter examination of heart valve function, which was normal.

At no point were ischaemic symptoms or signs recognised clinically in either leg.

Six years later, impaired mobility and shortening of the left leg was reported by the mother. Transfemoral assessment of the heart revealed atrial and ventricular pressures to be normal. However, complete occlusion of the left common and external iliac artery was noted (Fig. 1).

There were no femoral or peripheral pulses of the left foot. There was no evidence of foot ischaemia. Measurement of leg length showed a shortening of the left leg by 4.0 cm (Table 1).

In addition, there was a difference in circumference of the left upper thigh of −2.0 cm. Assessment of foot–ankle pressure revealed only a moderate decrease (Table 1). Expecting further leg shortening and walking disability, which already had led to a slight skoliosis, a decision was made to perform a vascular reconstruction. A left-sided iliofemoral autologous vein bypass was inserted by a retroperitoneal approach. The vein graft was harvested from the right healthy leg because of its larger size. The postoperative course was uneventful.

Result

Follow-up measurements are listed in Table 1. Ankle–brachial pressure index (ABI) improved rapidly but leg shortening was much slower. Two years postoperatively there was still a difference of 0.8 cm. At the last follow-up, 2.5 years after surgery, all measures had equalised (Table 1). The 8.5-year-old girl showed normal development and activities.

Figure 2 shows MR angiography demonstrating a slight dilatation of the saphenous vein graft in left iliaco-femoral position compared to the original vessels.

Discussion

There are few reports of arterial reconstruction for epiphyseal growth defects. Pinkerton *et al.*[1] reported

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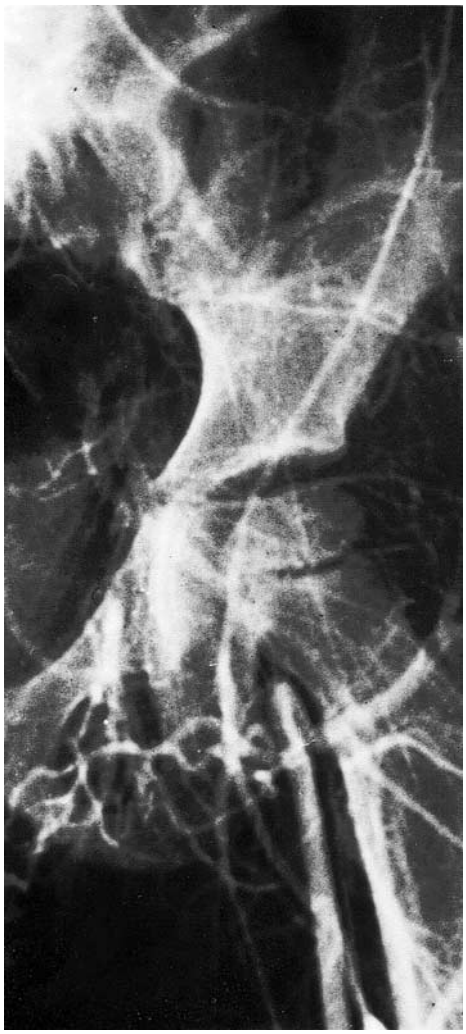

Fig. 1. Catheter arteriogram of iliac vessels showing complete occlusion of left common and external iliac artery in a 5-year-old child.

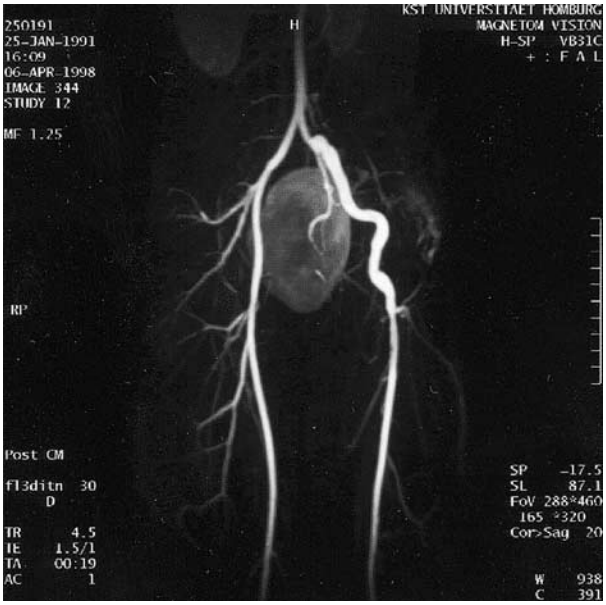

Fig. 2. MRI angiography of postoperative result after autologous vein graft bypassing of aorto-iliac occlusion on the left side of a 5-year-old child. The vein bypass seems slightly dilated.

a persistence of leg shortening even after successful arterial reconstruction, but concluded that surgical treatment is successful even if there is no decrease in leg shortening.

It appears, however, that epiphyseal growth can be normalised by abolishing underlying vascular insufficiency leading to an accelerated growth of the atrophic extremity. In the present case leg length was completely equalised after 2.5 years. Bloom and coworkers report on three children with iliac artery occlusion who were treated by bovine hetero-grafts.[2] Whitehouse *et al.* described five children supplied with four autologous vein grafts and 1 Dacron™-bypass in one child.[3] Klein and colleagues operated on four children with vascular injuries at the lower extremity leading to growth defects.[4]

A review article[5] shows indirectly a benefit for young children with vascular injuries if they are treated immediately by surgical reconstruction. The rate of leg shortening is reduced from 23% (non-operated) to 9% (vascular reconstruction).

Also, in children with at first unrecognised vascular trauma, successful outcome in treatment of leg shortening by later vascular reconstruction can be accomplished and, therefore, should be considered

Table 1. Epiphyseal growth defect after vascular occlusion. Quality control following vascular reconstruction in a 6-year-old girl.

	Ankle–brachial index ABI right foot	ABI left foot	Difference in leg length (l)
Preoperatively	1.09	0.75	4.00 cm
Postoperatively			
3 months	1.03	0.90	3.40 cm
10 months	1.09	1.07	1.25 cm
2 years	1.09	1.07	0.80 cm
2.5 years	1.00	1.10	0.00 cm

whenever epiphyseal growth defects caused by vascular obstruction are recognised.

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