Case Report

Vascular access in a hemiplegic deformed arm

Mohie E. Omar, Nicholas Davies and Andrew Ready

University Hospital of Birmingham, Renal Surgery, Birmingham, United Kingdom

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Introduction

Successful vascular access is of paramount importance to all patients on haemodialysis, but it becomes critical in an individual patient for whom transplantation is not an option and for whom dialysis offers the only hope for survival. In such patients exhaustion of vascular access sites becomes an increasingly difficult problem. We report a case in which vascular access was created in an upper limb with severe deformity, which under normal circumstances would have been excluded from useful vascular access.

Case

A 41-year-old Caucasian male in end stage renal failure on haemodialysis presented with recurrent episodes of line infections; a subclavian line had been inserted due to perceived lack of remaining vascular access sites. However, the right arm had not been explored for access due to the fact that it had a significant flexion deformity at the elbow and wrist joint as part of right spastic hemiplegia following a traumatic spinal injury in his infancy.

In view of the difficult access circumstance, the right arm was re-evaluated. Blood pressure difference between the two arms was less than 20 mmHg, and his systolic blood pressure was above 110 mmHg. Duplex examination of his arm revealed a normal triphasic signal over radial and ulnar arteries. There was no cephalic vein on ultrasound, the basilic vein was 3 mm in diameter and his brachial artery diameter was 2.5 mm.

Accordingly, a single stage basilic fistula operation was performed under general anaesthesia. After 6 weeks the fistula was assessed; there was a strong thrill and the basilic vein was dilated to 6.9 mm with no sign of hand ischaemia, hence the fistula was successfully needled.

Eighteen months after surgery, the patient is still dialyzing through his right basilic fistula with the pump flow of 350 ml/min and achieving a urea reduction ratio of 74.

Discussion

It is known that strokes and transient ischemic attacks are both bad prognostic indicators for successful fistula maturation [1].

Limited data are available from both human and animal research regarding vascular changes associated with limb weakness. Grande and dos Santos [2] studied the size of blood vessels and blood flow in the arterial tree of the upper limb after nerve root avulsion and subsequent muscular atrophy. He found a significant reduction in the width of the lumen of the arteries and veins added to a reduced blood flow in the affected limb compared with the normal one. Arterial wall thickening was also noted and attributed to intimal hyperplasia. These findings suggest that arterial wall hyperplasia and reduced arterial blood flow occurs in denervated or paralyzed limbs [2].

Based on available evidence [1,2] a fistula in a deformed paralyzed arm is not likely to mature; however, in this case a successful basilic fistula was created based on a systolic blood pressure above 110 mmHg in the affected limb and the preoperative ultrasonic diameter of the brachial artery and basilic vein above the critical value. The recommended critical vessel diameters with 90% chance of primary patency were 1.5 mm for the artery and 2.5 for the vein [3,4].

In summary, it appears that vascular remodelling associated with hemiplegia is not universal and if the vessel diameters were above the recommended level, a successful fistula could be created with acceptable medium term fistula survival.
Conflict of interest statement. None declared.

References


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