

Uncommon local surgical complications of angioaccess in chronic haemodialysis patients

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SUMMARY

Access surgery for chronic haemodialysis patients is currently one of the most commonly performed vascular procedures. It can be associated with high rate of complications if not performed properly in the first instance. This paper suggests a reasonable approach to minimize the frequency of some of the uncommon local surgical complications.

INTRODUCTION

In 1960, Mr. Clyde Shields was reported as the world's first long-term haemodialysis patient after the placement of an arteriovenous shunt in his left forearm⁽¹⁾. He required over 50 access procedure which helped him to survive for 11 years emphasizing the importance of angioaccess surgery in the long-term prognosis of these patients. Over the last 30 years, various techniques were described to obtain blood access including external shunts, major venous cannulation, several procedures of autogenous and synthetic arteriovenous fistulae. Access Surgery is currently one of the most commonly performed vascular operations. However, it is associated with high rate of complications if not performed properly in the first instance⁽²⁾. In this paper, the author's experience in angioaccess surgery for haemodialysis patients over 3 years period will be reviewed with special emphasis on the uncommon local surgical complications.

MATERIALS AND METHODS

Over 3 years period starting April, 1993, our vascular group performed 414 various vascular access procedures for haemodialysis patients. Our team consisted of 2 residents, 1 registrar and 2 consultants (headed by the author). Patients were managed according to the following protocol whenever applicable: We always start with an attempt of a conventional (Brescia-Cimino) radiocephalic arteriovenous fistula (AVF) under local anaesthesia in the non-dominant hand. Alternatively, arteriovenous fistula in the snuff box (Tabaciere) was considered. If the previous were not applicable, a distal wrist fistula ulnar-basilic was attempted. Forearm fistulae were carried out selectively. Subsequently, a direct autogenous arteriovenous fistula in the antecubital fossa was created. Synthetic AVF using PTFE were performed as a last resort usually in the arm as a straight tube. Other procedures were tailored to the patient needs. Finally, permecath insertion was considered appropriate in the short life-span patients and/or when previous procedures failed.

RESULTS

A total of 414 angioaccess procedures were performed over 3 years period. Three hundred eighteen procedures were a conventional (B-C) radiocephalic arteriovenous fistula (76.8 %). The remaining procedures $n = 96$ (23.2 %) included : ulno-basilic 9 (2.2%), forearm fistulae 7 (1.7 %), direct brachial (antecubital) fistulae 47 (11.4 %) and 8 (1.9 %) fistulae were created using the in situ valve cutter in antegrade fashion. In 20 patients (4.8%) it was not possible to perform an autogenous fistula, therefore PTFE grafts were used as straight tubes in the arm ($n = 4$) and the remaining at the forearm ($n = 16$) level in a straight or loop fashion. Permecath insertion was optimum in the last 5 patients (1.2 %) after failure of previous procedures and/or in patients with limited life-span. The commonest local surgical complication was thrombosis of AVF and in our practice the first year cumulative failure rate was 22.0 %. In contrast, the overall rate of non-occlusive complications were uncommon (4.8 %). These 20 cases were distributed in the following frequencies : 14 (3.4%) cases presented with aneurysms and were surgically repaired. The aneurysm formation was encountered equally in the arterial and venous sides of the fistulae. Three patients (0.7 %) presented with steal phenomenon and all were among those fistulae created at the brachial level. Two patients presented with bleeding from the angioaccess site and one patient had evidence of venous hypertension.

DISCUSSION

Similar to other authors^(2,3), thrombosis of the angioaccess was the commonest complication. However, since this report was intended to discuss the uncommon complications, the discussion will be limited to those complications. In this regard, the arteriovenous aneurysms predominated (3.4 %) and these were equally distributed as arterial (1.7 %) and venous aneurysms (1.7 %). The rate of arterial aneurysms in our experience is high and double the rate of Haimov et al⁽⁴⁾ series (1.7 % vs. 0.8 %). In contrast the rate of venous aneurysms compared favourably to rates in the literature⁽⁵⁾. Only one case of false aneurysm was encountered after repeated puncturing

of a PTFE graft. Certainly, some of these aneurysms can be avoided if one improves his surgical techniques and when a graft is used, clean and accurate puncturing is mandatory. In managing these aneurysms, we tried to preserve as much as possible of blood access particularly in venous aneurysms where small aneurysms were observed expectantly and large underwent partial resection. However, arterial aneurysms were resected and the A.V.F. was refashioned.

Steal phenomenon was noticed in 3 cases (0.7 %). This is less than what was reported by Haimov et al⁽⁴⁾ (1.6 %). All of our cases were in patients with proximal brachial fistulae 3/57 (5 %). The incidence in the literature varied 5 % - 25 %. Despite of this association, we still think as the others do that the brachiocephalic elbow fistula is a good fistula as an alternative for wrist fistula when the wrist veins or the radial artery are in poor condition⁽⁶⁾. In managing the steal we opted to close the fistula and redo it again as a safe approach particularly in elderly diabetic patients. One of our patients had evidence of venous hypertension after a side-side radiocephalic A.V.F. In summary, we feel that the non-occlusive local surgical complications of angioaccess are rare and may be avoided. However, when it happens outcome depends on early detection and proper decision-making. A conventional B-C radiocephalic AVF remains the best and should always be attempted, whenever possible. To minimize the complication rate, angioaccess construction should not be considered as a minor surgical procedure. Ideally, it should be executed and/or supervised by the surgeons who are versed in them together with their follow-ups.

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