MANUFACTURED HOMOLOGOUS VEIN GRAFT FOR CREATION OF ARTERIO-VENOUS FISTULA

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Introduction

Our experience of over 240 vein grafts and 70 expanded PTFE arterio-venous fistulas indicates that homologous vein graft is the method of choice in cases of standard A-V fistula failure [1].

Definite disadvantages of this method stem from its cumbersome preparation and the fact that self-made vein grafts are not always available, particularly in terms of size and length.

To overcome these difficulties, ready-made vein grafts are manufactured industrially.

Materials and methods

Saphenous stripped veins are collected by four vascular surgery teams. Samples are collected aseptically in vials containing 2g of Chloramphenicol per 100ml of saline solution [2]. After storage at 4°C for three weeks in order to destroy antigenicity [3] and to detect bacterially contaminated material, the preparation procedure is undertaken.

Over 10% of the veins collected (32/292) were chosen on the criteria of regularity of the vein segment, the size (5–8mm), the length (15–25cm) and the macroscopic appearance of the vascular wall. The collaterals were cut after cautious ligation with 5–0 Polydeck in order to prevent stenosis of the vein segment and/or diverticulum formation (Figure 1). A leakage test was performed under 300mmHg pressure. Finally, the vein grafts were stored in 2% Chloramphenicol solution at -20°C. All these procedures were performed under sterile conditions. A sample for bacteriological control was taken from each segment.

Ready-for-use vein grafts (Vasco-gref) were delivered in isotherm containers (Figure 2). Before use, the glass tube containing the vein graft was heated in water at 37°C.
Figure 1. Vein being selected and prepared. 1. Flushing with saline solution. 2. Tying of collateral vein. 3. Obturation of vasa vasorum. A selection is then made of the segment of uniform diameter and presenting a homogenous wall structure. Segments with aneurysmal dilatation or damaged area are rejected.

Figure 2. The finished product presented on a glass rod in a cylindrical Pyrex container sealed with an isotonic saline solution.
Results and comments

To date, excellent results have been obtained in the placement of 8 A-V fistulas and the repair of 3 standard, 3 PTFE and one homologous vein graft A-V fistulas (Table I).

| TABLE I. Manufactured homologous vein graft A-V fistulas. Preliminary results (n=15) |
|---|---|---|---|
| Approx length (cm) | Site | Number | Comment |
| Loop graft | Forearm | 3 | Wound infection in one: resection and new implantation at the opposite side. No complication in the two others |
| | Arm | 1 | No complication |
| Straight graft | Arm | 4 | No complication |
| | On previous A-V fistula | 3 | Segmental replacement for stenosis due to jet lesion |
| Repair | On alloplastic graft | 3 | Segmental replacement of infected prosthesis |
| | On homologous vein graft | 1 | Segmental replacement for stenosis due to jet lesion |

The manufactured vein graft provided better availability as compared to the self-made vein graft [4] and greater ease of placement as compared to xenografts and other synthetic conduits for blood access.

Application of industrially manufactured vein grafts could be extended to any vascular replacement surgery.

References

3 Barner HB, De Weese JA, Schenk EA. Angiology 1966; 17: 389