Use of Expanded Polytetrafluoroethylene (IMPRA*) Grafts in Intra-Aortic Balloon Pump Access

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Abstract

In 40 patients requiring intra-aortic balloon counterpulsation assistance, the IMPRA* brand expanded polytetrafluoroethylene microporous graft was anastomosed to the common femoral artery for insertion of the balloon catheter. We feel that certain properties of this material make it very suitable for use in this clinical setting.

Introduction

Access for intra-aortic balloon counterpulsation is usually via the common femoral artery. We have found that the use of expanded microporous polytetrafluoroethylene (IMPRA*) graft, eight and ten millimeters in diameter, has facilitated hemostasis, manipulation, and insertion of the balloon catheter, as well as closure of the arteriotomy at the time of removal of the catheter.

Methods

In forty patients who underwent intra-aortic balloon pump insertion, a short length of IMPRA* graft was anastomosed to the common femoral artery. Both femoral arteries were palpated to find the stronger pulse. The groin offering the stronger pulse was then prepared and draped in the usual fashion. If the patient was awake, 1% lidocaine (without epinephrine) was used locally to anesthetize the skin and subcutaneous tissues. A skin incision was then made 8 to 10 centimeters in length, and sharp dissection was carried through the subcutaneous tissue until the common femoral artery was identified. Electrocautery was used to obtain hemostasis. The artery was inspected for adequate size and for the presence of plaque which would cause difficulty in catheterization. Tapes were passed around the artery both proximally and distally to control bleeding and to maneuver the vessel. Before occlusion of the vessel, 5,000 units of sodium heparin was administered intravenously to prevent thrombus formation distal to the balloon catheter. Fogarty vascular clamps were applied distally and proximally to the arteriotomy site. The proximal clamp was modified with two soft inserts instead of the usual hard one opposing a soft one, thus, allowing counterpulsation pumping to proceed once the catheter was in position. A stab incision was then made into the skin 5 centimeters distal to the groin incision, and the required length of balloon catheter was then measured from the stab incision to the sternal notch. The balloon catheter was then passed through the stab incision, and a sleeve of IMPRA* passed over the balloon well onto the catheter. A 6 to 8 millimeter transverse arteriotomy

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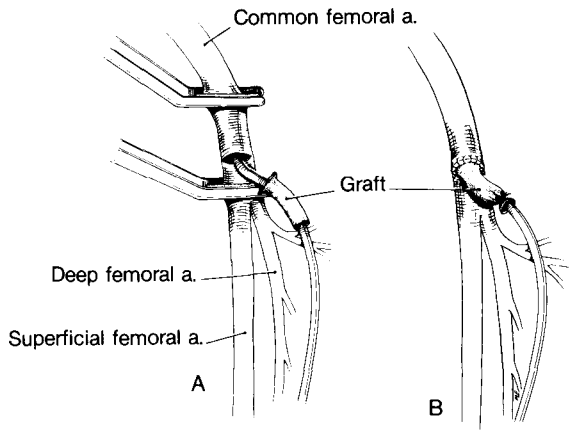

FIGURES A, B.

was made in the common femoral artery, the balloon inserted, and passed proximally until the tip was estimated to be at the level of the left subclavian artery. (See Figure A.) Satisfactory positioning of the catheter was ascertained by either chest x-ray, or by visualizing the manipulation under fluoroscopy when the procedure was done in the angiography suite. The proximal Fogarty clamp was clamped around the artery and catheter, and counterpulsation allowed to proceed. The sleeve of IMPRA* graft was anastomosed to the artery with a single running 5-0 or 6-0 monofilament suture. In five of the forty patients the graft was flared on the end intended for the anastomosis. This provided a sewing cuff which made suture placement much easier and more exact. A tie of umbilical tape was used to secure the sleeve to the balloon catheter close to the anastomosis, following which the Fogarty clamps were removed. The catheter was secured to the skin with an O Ethibond suture (See Figure B). The incision was irrigated with a dilute Betadine solution and further hemostasis was assured with electrocautery. The subcutaneous tissues were closed with 2-0 Vicryl, and the skin was closed with a subcuticular suture of 4-0 Vicryl. A light pressure dressing was applied.

Discussion

Our technique described above is essentially the net result of several contributions (1–4). A Dacron access sleeve has been the graft material of choice. For approximately two and one half years we have been using the IMPRA* graft brand expanded microporous polytetrafluoroethylene. Properties of this material for use in venous and arterial vascular replacement grafts, as well as arterial access have been well described in the literature (5–7). Some of these properties which make it a desirable material for intra-aortic balloon access include its ease of handling, conformability, pliability, and its hemostatic properties even in the heparinized patient. The material is also quite inert *in vivo*.

In our series of forty patients we have had no problems with hemostasis at the anastomosis or with the graft material itself in this clinical setting where we routinely heparinize the patient. Its pliability offers great ease and preciseness in performing the anastomosis to the femoral artery. The conformability of the material made possible the described flaring of one end which contributed to a secure anastomosis. One infection was encountered, and consisted of a femoral arteritis at the insertion site. *Pseudomonas aeruginosa* was cultured from the wall of the artery several months after use of the intra-aortic balloon. A chronic but subsequently resolving seroma developed in another patient who required Dacron patch arterioplasty post removal of the balloon catheter. We feel that neither of these wound complications can be directly attributed to the use of the IMPRA* graft. In conclusion, we have found the IMPRA* brand expanded microporous polytetrafluoroethylene graft to be quite useful for intra-aortic balloon counterpulsation.

Conclusion

The need for a graft material that will contribute to a secure anastomosis during the placing of intra-aortic balloons has led to the use of IMPRA* brand expanded microporous polytetrafluoroethylene graft. We have found this graft to be quite useful for intra-aortic balloon counterpulsation procedures.

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