

Graft type for femoro-popliteal bypass surgery

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Cochrane review abstract

Choice of bypass graft material for lower limb arterial bypasses

A person with severely diseased arteries in the leg(s), can experience pain on walking only short distances (critical claudication), pain at rest, or death of tissues in the leg. When the main thigh artery has a long blockage, the best option is to insert a bypass to carry the blood from an artery with good blood flow to the affected artery below the block. Bypass is intended to save limbs that might otherwise require amputation. The different types of material available to create the bypass include the person's own vein (autologous vein), human umbilical vein (HUV) and synthetic materials polytetrafluoroethylene (PTFE) or Dacron, alone or with the blood thinning agent heparin bonded to the inside of the graft. It has been clear for some time that bypass grafts extending to below the knee do not remain patent with good blood flow as well as do above the knee grafts. The aim of this review was to determine the most effective type of material. We identified 13 randomised controlled trials that included 2313 patients, 1955 patients undergoing above the knee and 358 below the knee grafts.

From our analysis, autologous vein had a better primary patency rate than PTFE, HUV or Dacron for above the knee grafts. Adding a 'cuff' of vein improved the patency of PTFE for grafts extending to below the knee, in one trial (358 procedures). Few results were available for how long the limb survived following the bypass procedure. Protocols for patients to receive antiplatelet or anticoagulant medications varied extensively between trials, and in some cases within trials.

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Abstract

Background

Femoro-popliteal bypass is implemented to save limbs that might otherwise require amputation, in patients with ischaemic rest pain or tissue loss; and to improve walking distance in patients with severe life-limiting claudication. Contemporary practice involves using autologous vein, polytetrafluoroethylene (PTFE) or Dacron as a bypass conduit.

This is an update of a Cochrane review first published in 1999 and previously updated in 2002.

Objectives

The objective of this review was to determine the most effective type of graft for femoro-popliteal bypass surgery.

Search strategy

The Cochrane Peripheral Vascular Diseases Group searched their Specialised Register (last searched January 2010) and the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2010, Issue 1 for last search). The authors searched reference lists of relevant articles, and handsearched conference proceedings from the British and European Vascular Surgical Societies.

Selection criteria

Randomised trials comparing femoro-popliteal grafts.

Data collection and analysis

Two authors (CT and ADM) screened studies, extracted data and assessed trials.

Main results

Thirteen randomised control trials were included with a total of 2313 patients (1955 above knee, 358 below knee bypass surgery). Seven graft types were compared (reversed and in situ autologous vein, PTFE with and without vein cuff, human umbilical vein (HUV), Dacron and heparin bonded Dacron (HBD).

Above the knee, there was a benefit in primary patency for autologous vein over PTFE ($P = 0.0001$) and HUV ($P = 0.0003$) by 60 months. Dacron showed primary patency benefit over PTFE by 24 months ($P = 0.02$), continuing to 60 months ($P = 0.02$). HUV also showed benefit over PTFE by 24 months ($P = 0.0003$) in one trial. Below the knee, in the one trial there was a significant benefit in primary patency for PTFE with a vein cuff when compared to PTFE alone at all time intervals to 24 months ($P = 0.03$).

Limited data were available for limb survival. Antiplatelet and anticoagulant protocols varied extensively between trials, and in some cases within trials.

Authors' conclusions

There was a clear primary patency benefit for autologous vein when compared to synthetic materials for above knee bypasses. In the long term (five years) Dacron confers a small primary patency benefit over PTFE for above knee bypass. PTFE with a vein cuff improved primary patency when compared to PTFE alone for below knee bypasses. Further randomised data is needed to ascertain whether this information translates into improvement in limb survival.