Patency Following Successful Thrombolysis of Occluded Vascular Grafts


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Aim: to determine patency after successful lysis of occluded bypass grafts.

Methods: data were collected from four centres with a wide experience of thrombolysis. Outcome following successful lysis was determined from prospectively collected data or case notes. Data from 75 patients, 53 men, were analysed.

Results: median age at time of lysis was 68 years (range 33–88). Median age of graft was 12 months (range 1–120). Patency at 12 months was 33% (95% conf. interval: 21–44%). There were no differences in patency depending on whether the graft was above or below the inguinal ligament or whether an additional procedure eg. percutaneous or vein patch angioplasty was carried out. However in those 48 cases when lysis was deemed complete, i.e. there was restoration of graft patency and at least one vessel run off patency at 12 months was 39% compared with 17% if lysis was incomplete (p = 0.04).

Conclusions: at the present time it is difficult to justify routine thrombolysis of occluded grafts when patency, based on intention to treat, is approximately 20% at one year. Following successful graft lysis the role of anticoagulation and careful graft surveillance require further investigation.

Key Words: Thrombolysis; Vascular grafts.

Introduction

A recent review suggested that intra-arterial thrombolysis should be restricted to patients with graft occlusions and those with short-duration ischaemia.1 Successful lysis can be expected following graft occlusions in approximately two thirds of cases.2,3 The National Audit of Thrombolysis in Acute Leg Ischaemia (NATALI) database contains 421 episodes of graft lysis. Complete lysis was achieved in 201 (48%) cases and partial lysis in 92 (22%). Thus successful thrombolysis was achieved in 70% of lysis attempts (unpublished data). However, thrombolysis is associated with complications. Major haemorrhage occurs in 5% of cases, minor haemorrhage in 15% and stroke in at least 1%.4 Clinical evidence of distal embolisation has been reported in approximately 10% of cases.5 Sub-clinical, micro-emboli are probably even more common whilst at the other end of the spectrum acute limb deterioration during thrombolysis due to massive embolisation occurs in approximately 2% of cases.6

Bearing in mind the relatively high complication rate graft thrombolysis can only be justified if long term patency after initial successful lysis were maintained. The aim of this study was to determine patency following successful graft thrombolysis.

Patients and Methods

Four centres were identified from the NATALI database which had wide experience of graft thrombolysis and who could provide data on follow up. NATALI only has results up to 30 days following treatment. Outcome of patients having successful graft lysis was determined from prospectively collected data supplemented if necessary by review of casenotes. In patients undergoing more than one episode of thrombolysis only the first was analysed.

Following discharge from hospital patients were seen routinely at six monthly intervals. They were advised to contact the unit directly if symptoms suggestive of graft occlusion occurred. Patency was determined by clinical examination and calculation of

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ankle brachial pressure indices. Duplex or angiography were carried out if clinically indicated. Vein grafts underwent three monthly duplex surveillance. A total of 75 patients, 53 men, were identified. Median age of patient at time of thrombolysis was 68 years (range 33–88 years). Median age of graft prior to occlusion and thrombolysis was 12 months (range 1–120 months). There were 17 grafts above the inguinal ligament (single limb of aortofemoral bifurcation graft 9, iliofemoral graft 5, femorofemoral cross over graft 2 and axillofemoral graft 1) and 58 grafts were below the inguinal ligament (prosthetic grafts 47 and vein grafts 11).

In 27 cases a distal anastomotic stenosis was revealed with thrombolysis. These were treated with percutaneous transluminal angioplasty in 20 cases and vein patch angioplasty in seven. In 48 cases no procedure was undertaken following thrombolysis.

Following successful thrombolysis 10 patients received oral anticoagulation with warfarin. The remainder were placed on a daily regimen of 75 mg aspirin.

Not included in this paper are indications for the original graft, symptoms at occlusion, complications of thrombolysis and the type of agent and method used for thrombolysis.

Patency was calculated by the Kaplan–Meier method and differences compared by the log rank test.

Overall patency, following initial successful thrombolysis, was 33% (95% CI: 21–44%) at 12 months and 27% (95% CI: 17–40%) at 18 months (Fig. 1). Seven patients died during the follow-up period. Treatment following re-occlusion is shown in Table 1. Of the eight patients undergoing further thrombolysis: five grafts re-occluded within one month of treatment, one ligament (single limb of aortofemoral bifurcation graft 9, iliofemoral graft 5, femorofemoral cross over graft 2 and axillofemoral graft 1) and 58 grafts were below the inguinal ligament (prosthetic grafts 47 and vein grafts 11).

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Patency, comparing men with women is shown in Fig. 2. Although at all time points patency was greater with men this failed to reach statistical significance (p = 0.11). At 12 months patency was 38% vs 21%.

In 48 cases lysis was deemed complete. In other words the graft was cleared along with at least one vessel run-off. In 27 cases patency was deemed incomplete but clinically useful. Grafts with completely restored patency had significantly improved long term patency compared with those grafts where only partial patency was achieved (p = 0.04). At 12 months patency was 37% vs 17%.

An additional procedure following lysis did not result in an advantage in patency over one year, p = 0.58, (Fig. 4). At 12 months patency was 29% vs 35% in grafts with and without additional procedures, respectively.
Patency following successful thrombolysis of occluded vascular grafts

Inguinal grafts, it could still be worth considering lysis for these grafts, particularly in men. These results also need to be balanced against morbidity and mortality encountered with lysis. There is some evidence that complications are higher with thrombolysis of grafts compared with native arteries. We found that acute limb deterioration, due to massive embolisation, was approximately twice as likely in patients undergoing graft thrombolysis compared with those undergoing native artery treatment.6 In an analysis of more than 1000 patients in the NATALI database haemorrhagic complications were also higher in patients undergoing graft lysis.10

The STILE trial11 randomised patients to receive either thrombolysis or operation for the initial treatment of limb ischaemia. Comerata et al.8 analysed a subgroup of patients from that trial who had treatment for occluded grafts. Though the numbers were small there did appear to be an advantage in terms of lower amputation rate for patients undergoing lysis rather than operation if ischaemia was of short duration (less than 14 days). No such advantage was seen with longer duration of ischaemia. Patients with grafts below the inguinal ligament had better results with operation than lysis at 30 days and 1-year. Morbidity was higher with attempted lysis of synthetic compared with vein grafts.

In 27 of our cases an underlying stenosis was identified and treated. These patients fared no better than those in whom an underlying lesion was not identified. Others have described a higher incidence and treatment of underlying stenoses.7 However, overall patency in that study (approximately 30% at one year) was similar to ours. These authors also found that patency was dependent upon the age of the graft. Secondary patency was 21.5 months in grafts in place for more than one year compared with seven months for newer grafts. No such pattern was apparent in our series.

If lysis is radiologically incomplete, even though there appears to be clinical benefit from lysis, long term results are poor. In only 17% of such cases in our series was patency maintained at one year. Under these circumstances early graft replacement should be considered.

Whether intensive surveillance, anticoagulation or attempts to control intimal hyperplasia will help to maintain patency after thrombolysis remains to be seen. However, at present once a graft has failed results of salvage are poor. A recent series of attempted surgical salvage of 40 occluded above knee prosthetic femoropopliteal bypasses described a one year patency of only 29%.11 The majority of these patients had...
thrombectomy with or without patch angioplasty. Graft replacement or conservative treatment may be the best option under these circumstances.

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References


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