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Late Reoperation in Vascular Surgery

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Objectives: *Assessment of late reoperation (after 30 days) following vascular surgery.*
Design: *Analysis of a prospectively collected database of consecutive patients undergoing vascular surgery.*
Setting: *A single teaching unit's experience between 1986–1993.*
Materials: *Patients undergoing 2501 primary arterial reconstructions.*
Chief outcome measures: *Reoperation after 30 days.*
Main results: *One hundred and fifty eight patients (6%) underwent further operations, at more than 1 month after the primary procedure. Primary procedures at highest risk for reoperations were axillobifemoral bypasses and femorodistal bypasses with respective late reoperation rates of 20% and 16%. The majority of patients required late reoperation because of graft occlusion or stenosis. Overall, of the 158 late reoperations performed, 114 were related to the same arterial segment with the same presenting symptoms as the primary operation, and 44 for a different indication. A second or subsequent reoperation was required in 54 patients and the overall operative mortality was 11%.*
Conclusion: *Patients undergoing certain vascular procedures, should be informed of the high risk of a subsequent procedure when consent is obtained.*

Key Words: Vascular surgery; Reoperation.

Introduction

With the expanding range and number of procedures being performed by vascular surgeons and the increasing longevity of the population,[1,2] the need for further interventions is likely to increase. Accurate operation-specific information is required to predict outcomes and to inform the patients preoperatively.[3] There are also resource and medico-legal implications. Early reoperation rates in vascular surgery are already well known,[4–7] with rates between 8–12%. However, these studies have only looked at procedures within 30 days of the initial operation, or during the same hospital stay and they concentrated on technical problems in the perioperative period including haemorrhage and graft occlusion. In this study, the longer term outcome of vascular procedures and late reoperation rates have been reviewed.

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Methods

Data collected prospectively on a computerised database at the Bristol Royal Infirmary (BRI), on all patients undergoing vascular procedures, were used to identify those patients who underwent a primary vascular procedure at the BRI and then went on to a further operative intervention after 30 days on the same side or site. Patients not included in the study were those who underwent their primary procedure at another centre and those initially operated on at the BRI and who then had a 'late' subsequent procedure elsewhere. The data on the vascular procedures were collected prospectively over a 7 year period from January 1986 – December 1993, and the analyses were performed retrospectively. The minimum time from operation to data analysis was 6 months. This system does not allow calculation of numbers of patients at risk as no attempt was made to evaluate those patients who died and concentrates only on reoperation rates.

The demographic and operation details on the patients are entered directly into the database by the surgeon using a computer terminal in the operating theatre suite. A member of the junior staff and the

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vascular nurse enter the 30 day/discharge details including complications to the main computer network in the vascular studies unit. All entries are then reviewed at a monthly audit meeting by all the members of the vascular unit and any corrections to the computerised database are made. The database used is a modification of DBaseIV (Ashton Tate Ltd., U.K.). This series does not include patients who had radiological interventions for a late complication.

Results

Over the 7-year period, 2501 patients underwent primary vascular procedures. This group of patients consisted of 1926 males and 575 females of a mean age 71 years (range 49–91). Of these, 158 patients (6%) required a further procedure on the same side or site after 30 days (Table 1). Of the late reoperation group, 33% required yet another procedure. The overall 30-day mortality of the late reoperation group was 11% as opposed to a mortality rate of 9% for the non-reoperated group. There were two peak times after the initial procedure at which time reoperation was performed, these were between 30–60 days and approximately 9 months (Fig. 1).

The late reoperation rates for particular procedures ranged from 0.2% for carotid endarterectomies to 20% for axillobifemoral bypass. The two reoperation groups (axillobifemoral and femorodistal) that required reoperation most frequently also carried the highest mortality rate. Overall, of the 158 late reoperations performed, 114 were for the same symptoms as the original operation, and 44 for a different problem, but related to the site of the primary procedure. The indication for surgery was a graft occlusion or stenosis (109), critical ischaemia (14), graft infection (14), false aneurysm (9), non-healing stump (9) and haemorrhage (3).

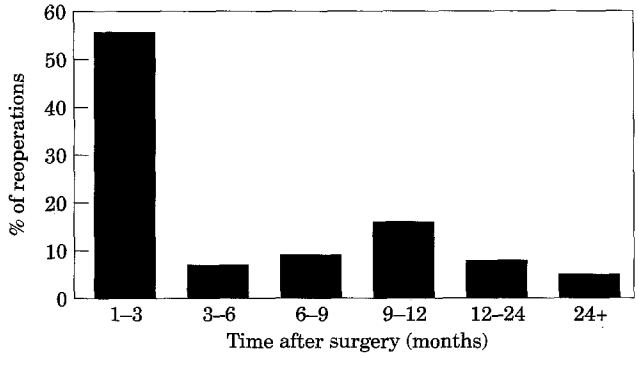

Fig. 1. Time of reoperation after primary surgery ($n = 158$).

Table 1. Late reoperation rates for different procedures with the 30 day mortality after the reoperation

	Total opns.	Late reoperation	% Mortality
AAA non ruptured	293	4 (1%)	0
AAA ruptured	140	11 (8%)	0
Amptutation	569	9 (2%)	33
Femorodistal	528	84 (16%)	9.5
CEA	393	1 (0.2%)	100
Aortobifemoral	247	17 (7%)	5.9
Iliofemoral	94	8 (9%)	12.5
Axillobifemoral	30	6 (20%)	0
Fem-Fem crossover	207	16 (8%)	6.2
Total	2501	158 (6%)	11

AAA = Abdominal aortic aneurysm
CEA = carotid endarterectomy

Femorodistal

In the femorodistal group there were 528 cases. In the 444 patients of mean age 66 years (range 58–79) who did not require a late operation the early mortality rate was 5%, compared to 9.5% in the 84 patients of mean age 78 years (range 72–86) who required a late reoperation. The overall late reoperation rate was 16% (Table 2). This group constituted 84 (53%) of the 158 patients who required a late reoperation. Fifty-seven (68%) of these cases were to have vascularisation to the limb improved; of these 22 patients (40%) required a subsequent further associated procedure. In total, 27 patients (32%) who required a late reoperation underwent an amputation, with a subsequent revision rate of 24%.

The reoperation rate was the highest in the axillobifemoral group at 20%. Graft infection was the indication for further surgery in four patients and graft occlusion in two patients. The only patient who required a late operation following carotid endarterectomy had a medial necrosis of a vein patch which ruptured after 18 months causing a false aneurysm and the patient died during an emergency repair.

Table 2. Reoperation procedures in the femorodistal group

Procedure	Reoperation	Subsequent procedure
Graft revision	43	13
Amputation	27	6
Embolectomy	11	8
Profundaplasty	1	0
Vein patch	2	1
Total	84	28

Table 3. Showing the early reoperation rates from other series

Centre	No. of operations	% Early reoperations
Cleveland (1979)	8824	8.4
Sweden (1989)	1569	11
Oxford (1990)	1176	12
Bristol (1994)	2426	10.6

Refs 3–6.

Discussion

The performance of major arterial surgery has implications for the patient, surgeon, and healthcare planner especially in view of the increased longevity of the population.[7–9] Vascular surgery is a particularly high risk speciality in terms of reoperation and possible failure of a procedure[10,11] and early reoperation rates ranging from 8–12% have already been well documented[3–6] (Table 3). However, there are no general reports on late reoperation rates following vascular surgery, though there are for specific procedures. This study has shown that there is indeed a further risk of surgery for the patient, with an overall late reoperation rate of 6%. However, this series highlights the arbituary nature of early and late, where 30 days after surgery is used to divide the two groups. It should be noted that over 50% of late reoperations occurred between 30 days and 3 months after surgery. Therefore, by taking the percentage early reoperation rate of 10.6% from our unit's previous study[6] it may be more appropriate to present the data by saying that within the first 6 months after vascular surgery the risk of reoperation is about 14% compared to 3% after 6 months.

The axillobifemoral group showed a notably high late reoperation rate of 20%. This is unfortunate as this procedure is performed on particularly high risk cases who were considered either not suitable for major abdominal surgery or for the treatment of an infected aortic graft. Surprisingly within this group there was no early perioperative mortality.

The patients undergoing femorodistal bypass had a high late reoperation rate of 16%. However, it must be noted that many of these procedures were performed on a patent graft having been identified as being at risk of occlusion by the graft surveillance programme.[12,13] Not surprisingly most of these occurred within the first 6 months after surgery which is the period in which the majority of vein graft stenoses are initially detected.[13–15] These data do not include graft stenoses that may have been treated by angioplasty and further highlights the workload generated by a graft surveillance programme. This alone should be an argument for the need to conduct a randomised control study to confirm the benefits of graft surveillance, as the evidence to date has been generated from data using comparison with historical controls.[13–18]

Patients who undergo procedures such as thyroid surgery are routinely informed of the risk of laryngeal nerve palsy as a complication of the procedure,[19,20] despite the complication occurring in 0.1% of cases. With an overall late reoperation rate of 6% for vascular surgery, the risk of subsequent procedures should probably be explained as an integral part of informed consent for potential candidates.[20,21] This is probably of particular relevance in those patients who are in the high risk groups undergoing femorodistal bypass and axillobifemoral bypass.

In conclusion, this study has highlighted the incidence of late reoperation after vascular surgery. It emphasises the need to accept the fact that reoperation in vascular surgery is part of normal clinical practice. Certain high risk groups have been identified and these should probably be warned of the risks and consequences of reoperation.[21]

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