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Prospective Evaluation of Quality of Life After Conventional Abdominal Aortic Aneurysm Surgery

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Objectives: *To evaluate the changes in quality of life following conventional abdominal aortic aneurysm repair.*
Design: *Prospective study.*
Materials and methods: *Fifty-nine consecutive patients (50 men; nine women) in two surgical centres were investigated preoperatively, and at 6 weeks, 3 months and 6 months postoperatively. Quality of life was measured using the Short Form 36 (SF 36) questionnaire and the York Quality of Life questionnaire, from which the Rosser index was calculated.*
Results: *Rosser index assessment showed restoration of quality of life to preoperative levels by 3 months, and significant improvement at 6 months. Changes in the SF 36 revealed significant improvement in mental health, and physical role limitation at all times postoperatively. Social function worsened at 6 weeks but improved to preoperative levels by 3 and 6 months after surgery.*
Conclusions: *Quality of life was improved after open aortic aneurysm repair. The time course of recovery shows a predominant improvement between 6 weeks and 3 months postoperatively.*

Key Words: Abdominal aortic aneurysm; Quality of life.

Introduction

Quality of life (QL) issues have become increasingly important in all branches of surgery. Previous studies evaluating quality of life after abdominal aortic aneurysm repair have concentrated on the difference between elective and emergency operations,[1,2] or on aortic surgery in the specific age groups.[3,4] Most of these studies have been retrospective or used non-validated methods for measuring quality of life. The aims of this study were to evaluate prospectively quality of life in patients undergoing elective open abdominal aortic aneurysm repair, and to assess the time-course of postoperative recovery.

Materials and Methods

Fifty-nine consecutive patients in two surgical centres were prospectively studied before and after aortic aneurysm repair. Three patients within the study period declined to take part in the study. The patient group comprised 50 men and nine women, median age 74 years (range 51–83 years). Associated diseases and risk factors are shown in Table 1. Median aneurysm size (maximum ultrasound AP diameter) was 6 cm (range 5–10 cm).

Table 1. Associated diseases and risk factors.

	n	%
MI	20	34
Angina	12	20
Hypertension	20	34
Diabetes	4	7
Cerebrovascular disease	7	12
Current smoking	8	14
Ex-smokers	51	86
Hypercholesterolaemia	3	3

Questionnaires were sent with the patient's admission details and were therefore completed 2–3 weeks preoperatively. Further questionnaires were sent by post at 6 weeks, 3 months and 6 months following the operation. Non-responders were sent further questionnaires if no reply was received within 10 days.

QL was measured using the SF 36 questionnaire and the York Quality of Life questionnaire,[5] which provides

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Table 2. Matrix used to calculate Rosser index values for distress and disability scores obtained from the York QL questionnaire.

Disability score	Distress score (A)	Distress score (B)	Distress score (C)	Distress score (D)
I	1.000	0.995	0.990	0.967
II	0.990	0.986	0.973	0.932
III	0.980	0.972	0.956	0.912
IV	0.964	0.956	0.942	0.870
V	0.946	0.935	0.900	0.700
VI	0.875	0.845	0.680	0.000
VII	0.677	0.564	0.000	−1.480
VIII	−1.030	—	—	—

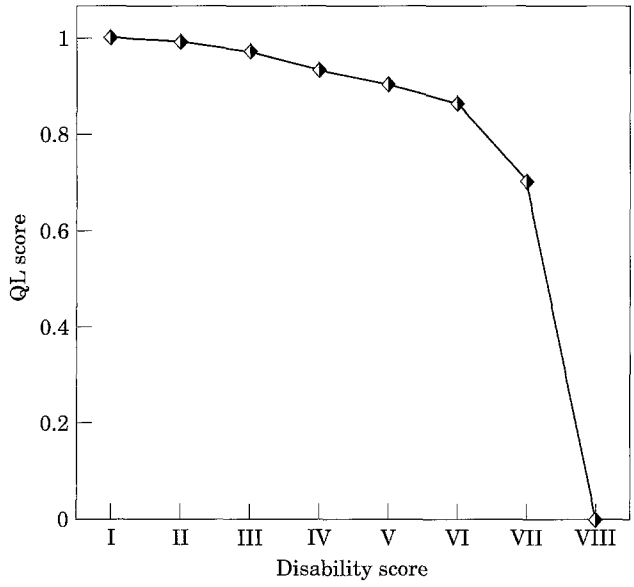

Fig. 1. Changing Rosser QL with increasing disability scores in patients with no distress.

information to calculate the Rosser index. Both questionnaires are designed for self-completion. The SF 36 evaluates QL in eight dimensions, plus a single item scoring the patient's overall change in health in the last year. The eight dimensions studied are physical functioning, social functioning, physical role limitation, mental role limitation, mental health, energy/vitality, pain, and general health perception.

The York QL questionnaire was developed as a self-completion questionnaire that allows calculation of the Rosser index. This allocates each patient a health status score based on a level of disability (scored I–VIII) and a level of distress (graded A–D).[6] The matrix outlined in Table 2 is used to translate these gradings into a quality of life value, with 1 representing perfect health, and 0 death. This transition from 1 to 0 is logarithmic as shown in Fig. 1.

The study was approved by the local ethics committee in both hospitals.

Table 3. Perioperative mortality and morbidity.

Complication	*n*
Death	2
Myocardial infarction	1
Cardiac failure	5
Pneumonia	4
Transient arrhythmia	4
Toe amputation	1
Rupture common iliac aneurysm	1
Lymph leak (groin)	1
Severe depression	1
Urinary tract infection	1
Pacemaker dysfunction	1

Results

Patient outcome and surgical complications

The complications of surgery are listed in Table 3. Overall perioperative mortality was 2/59 (3.4%), with complications (major and minor) affecting 22/59 patients (37%). The two perioperative deaths occurred at 5 and 22 days following operation, and were from cardiac causes. One further patient died during the study period at 5 months after surgery. This death was also cardiac related. Patients were routinely managed on the intensive care unit (ITU) postoperatively. Median length of ITU stay was 24 h (range 6–120 h).

Fifty-one patients (86%) were well enough to be discharged directly home, while eight patients required further convalescence in a community hospital. Median length of hospital stay was 9 days (range 5–42 days).

Quality of life measurements

Rosser index values, shown in Fig. 2, improved from a preoperative median value of 0.972 to 0.976 at 6 weeks, and 0.98 at 3 and 6 months postoperatively ($H=9.38$, d.f. $=3$, $p=0.02$ Kruskal–Wallis ANOVA (KW)). QL did not improve at 6 weeks compared with preop, but there was a trend to improvement at 3 months ($p=0.08$ Mann–Whitney (MW)), which reached significance at 6 months postoperatively ($p=0.05$ MW). This improvement occurred predominantly in the period from 6 weeks to 3 months ($p=0.02$ MW). No further significant improvement was noted from 3 months to 6 months.

Significant changes were seen in the SF 36 dimensions of social function ($H=13.84$, d.f. $=3$, $p=0.003$ KW), pain ($H=14.11$, d.f. $=3$, $p=0.003$ KW), mental health ($H=7.94$, d.f. $=3$, $p=0.05$ KW), physical function ($H=8.32$, d.f. $=3$, $p=0.04$ KW), and physical

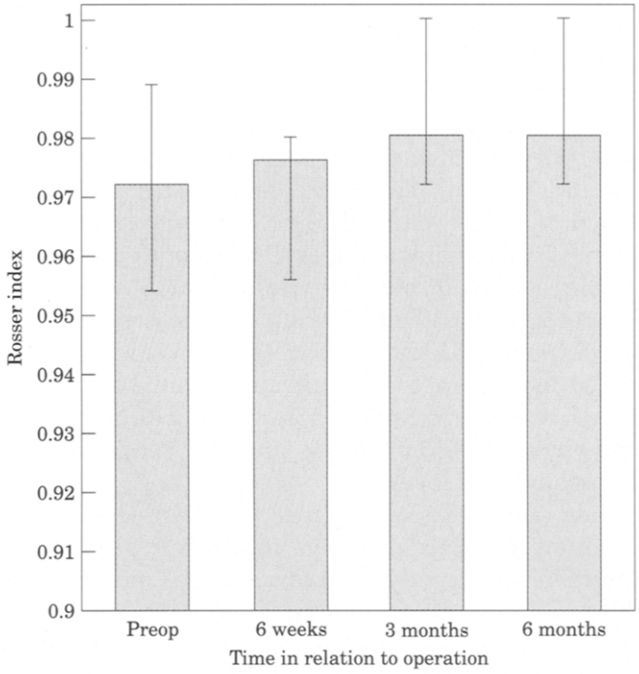

Fig. 2. Median Rosser index values (interquartile range) following aortic aneurysm repair.

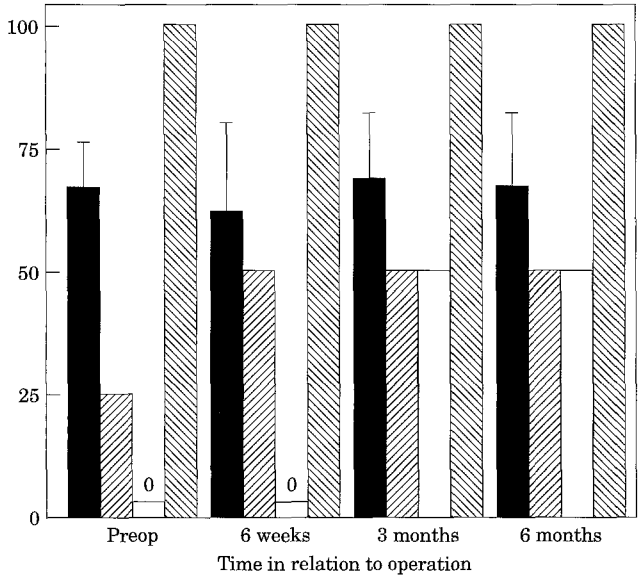

Fig. 3. Change in SF 36 dimensions of general health perception, change in health, and mental role limitation (median values with interquartile range for general health perception). (■) General health perception; (▨) change in health; (□) role limitation, physical; (▧) role limitation, mental.

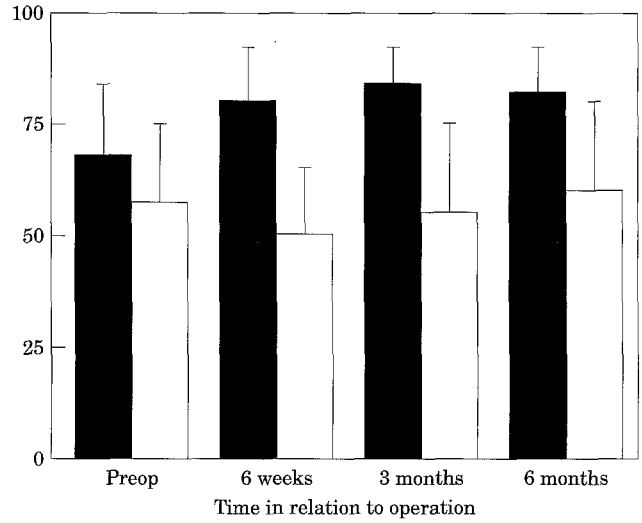

Fig. 4. Change in median mental health and energy values (interquartile range). (■) Mental health; (□) energy.

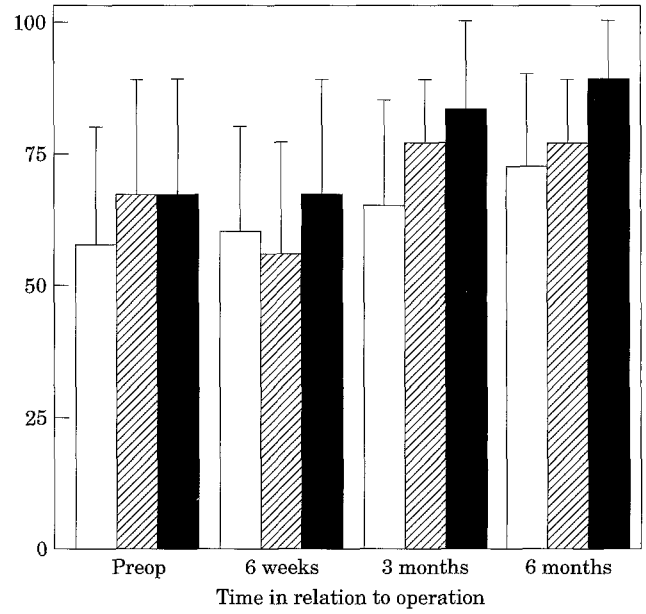

Fig. 5. Change in median values for pain, social function and physical function (interquartile range). (□) Physical function; (▨) social function; (■) pain.

role limitation. The overall results for the changes in SF 36 dimensions are summarised in Figs 3–5.

Social function deteriorated from preoperative levels to 6 weeks ($p=0.01$ MW). This deterioration resolved in the period from 6 weeks to 3 months ($p=0.003$ MW) and the median values at 3 months and 6 months were similar to preoperative values.

Pain scores were significantly improved at 6 months compared to preoperatively ($p=0.05$ MW), and there was a trend towards a deterioration in pain scores at 6 weeks after operation ($p=0.07$ MW). No change from preop levels was noted at 3 months. Improvement was observed from the 6 week score at 3 months ($p=0.004$ MW) and 6 months ($p=0.0002$ MW). Similar changes were noted even when patients with an established painful condition preoperatively ($n=10$),

which could not expect to be resolved by aneurysm repair, were excluded from the analysis.

Mental health scores improved steadily following aortic aneurysm repair at 6 weeks ($p=0.04$ MW), 3 months ($p=0.02$ MW), and 6 months ($p=0.02$ MW) compared with preoperative values.

Median values for physical role limitation are not continuous data as the scoring system for the SF 36 allocates each patient a score of 0, 25, 50, 75 or 100 according to their response. Overall the proportion of patients scoring 0 increased at 6 weeks after operation, and then decreased at 3 and 6 months postoperatively (Chi-squared test with Yates correction = 20.2, d.f. = 3, $p=0.002$). The proportion of patients scoring a maximum of 100 also decreased at 6 weeks, before returning to the preoperative level at 3 and 6 months after operation (Chi-squared = 9.6, d.f. = 3, $p=0.02$). This change was most marked from the 6 week to 3 month period after surgery (score 0, Chi-squared = 11.5, d.f. = 1, $p=0.0007$; score 100, $\chi^2=7.8$, d.f. = 1, $p=0.005$ Chi-squared).

Discussion

Repairing abdominal aortic aneurysms electively aims to remove the risk of aneurysm rupture, and this is the major benefit for the patient. Patients surviving more than 30 days after elective or emergency aneurysm surgery have been shown to have a similar life expectancy to an age and sex-matched population.[2,3,7] If operation were to return patients to a near normal life expectancy with reduction in their quality of life, then the risk/benefit analysis for this operation would become more complex.

This study, although involving small numbers, has prospectively evaluated patients undergoing aortic aneurysm repair using one measure that gives an overall figure for quality of life (Rosser index), and a second well-validated questionnaire that investigates changes in quality of life in a number of different aspects (SF 36). Overall assessment of quality of life using the Rosser index shows that QL remains unchanged from preoperative levels at 6 weeks after operation, but then improves slightly by 3 months, and improves further thereafter to reach a value at 6 months that is significantly improved from the preoperative value. A significant improvement in quality of life is demonstrated during the period from 6 weeks to 3 months after operation.

Previous studies assessing quality of life after abdominal aortic aneurysm repair have not followed the longitudinal changes in lifestyle during the postoperative period, but have measured QL at one time point only after operation.[1-4] No "gold standard" therefore exists with which we can compare the results of this study.

Social function falls significantly at 6 weeks following aortic aneurysm repair, and then rises again significantly from 6 weeks to 3 months such that social functioning has returned to preoperative levels by 3 months and remains at this level to 6 months. A similar pattern is seen in physical role limitation, where the proportion of patients scoring 0 increases, and the proportion of patients recording the maximum score of 100 decreases at 6 weeks after operation. This change is then reversed by 3 months as quality of life improves, and physical role limitation is similar at 3 and 6 months to preoperative levels.

Pain scores also fall (i.e. pain worsens) when measured 6 weeks after aneurysm repair. Pain scores then improve significantly from 6 weeks to 3 months, and from 6 weeks to 6 months, so that by 6 months pain scores are improved as compared to preoperative values. This seems a surprising finding given that the majority of aneurysms repaired electively are asymptomatic. It may be that the pain experienced in the first 6 weeks is so severe that subsequent pain scores once the pain has settled are exaggerated, or that the fear of rupture preoperatively leads patients to attribute an exaggerated significance to minor aches and pains, and that after aneurysm repair these minor pains assume a lesser significance for the patient.

Changes in dimensions of the SF 36 suggest that one of the major benefits derives from improvement in mental health. Mental health and anxiety improve steadily following aneurysm repair from 6 weeks to 6 months. This is assumed to result from the removal of the fear of sudden death following repair of the aneurysm. Newer endovascular methods of aneurysm repair require diligent surveillance to assess the efficacy of the graft, and this repeated examination may provoke continuing anxiety in patients.

This small, prospective study has observed the longitudinal changes in quality of life that occur over the 6-month period after repair of an abdominal aortic aneurysm. Aspects of quality of life such as social functioning, physical role limitation, and pain scores deteriorate by 6 weeks after operation when compared to preoperative levels. Overall quality of life is improved by 6 months, with the majority of this improvement occurring in the period from 6 weeks to 3 months. Much of the overall improvement is related to changes in mental health and anxiety, and an altered perception of pain. The study confirms the clinical impression that a full 3 months is required to regain quality of life.

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