REVIEW

Quality of Life After Repair of Ruptured Abdominal Aortic Aneurysm

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Background. Ruptured abdominal aortic aneurysm (AAA) continues to be associated with high operative mortality. Though survivors can expect to return to a normal life expectancy, their postoperative health-related quality of life (HRQoL) remains uncertain. This review examines HRQoL following operative repair of ruptured AAA.

Methods. PreMedline, Medline and Embase databases were searched for clinical studies relating to quality of life following repair of ruptured AAA. Reference lists of relevant papers were also reviewed.

Results. Fourteen retrospective-observational studies of postoperative quality of life following repair of ruptured AAA were identified. Both validated and non-validated tools for generic HRQoL assessment were used. All but one study showed no significant difference in overall HRQoL following ruptured AAA repair when compared to both the normal age-adjusted population and patients undergoing elective repair of intact AAA. However, survivors of ruptured AAA did exhibit significant reductions in the isolated domains of physical function, social behaviour and general well-being.

Conclusions. There are few studies of HRQoL following repair of ruptured AAA. These reports are retrospective, have small sample sizes and use generic instruments for HRQoL assessment. The findings suggest that survivors of ruptured AAA may attain a similar functional outcome to patients undergoing elective AAA repair and the age-matched healthy population. However, these results must be interpreted with caution and further prospective study is required.

Key Words: Quality of life; Abdominal aortic aneurysm; Functional outcome.

Introduction

The traditional measures of surgical outcome have been in terms of perioperative morbidity and mortality. However, the importance of health-related quality of life (HRQoL) in the assessment of outcome has gained increased recognition. The rationalisation of health care finances has motivated the need to quantify outcomes of medical interventions and in the evaluation of cost, quality of life issues must be considered.

The prevalence of abdominal aortic aneurysm (AAA) is increasing in the United Kingdom and currently accounts for approximately 8000 deaths per annum. The efficacy and durability of elective AAA repair in terms of perioperative morbidity and mortality, long-term survival, quality of life and cost-effectiveness are well established. However, despite advances in perioperative care, repair of ruptured AAA continues to be associated with an operative mortality rate of 45% and high attendant financial cost and resource utilisation. Though survivors are reported to attain the same rates of survival as the normal population, functional outcome in terms of HRQoL is uncertain. Such data are essential to quantify the efficacy of current intervention for ruptured AAA.

Method

The Medline and PreMedline (January 1966 to July 2003) and Embase (January 1980 to July 2003) electronic databases were searched. The Ovid search engine (version 16.2.0; Ovid Technologies, New York, USA) was employed. The search strategy used the keywords ‘quality of life’ and ‘aneurysm’, with the Boolean operator ‘and’. Criteria for inclusion were studies assessing postoperative quality of life in...
Results

Fourteen studies investigating quality of life in patients who had survived operative repair of ruptured AAA were identified from computerized and manual searches.\(^{7–20}\) (Table 1). Three articles from the original searches were excluded, as they did not undertake quantitative HRQoL assessment.\(^{18–20}\) Of the 11 remaining papers, all were retrospective-observational studies. Publications dates ranged from 1976 to 2003, with study periods ranging from 1962 to 2003. Three papers reported quality of life specifically in selected groups of patients (octogenarians) but are included in the present review.\(^{8,9,12}\) Two studies combined patients with symptomatic, intact AAA undergoing emergency repair with patients with ruptured AAA.\(^{12,15}\) Three studies used non-validated instruments to assess quality of life while eight articles used validated, generic HRQoL instruments.

Non-validated health related quality of life assessment

Of these three studies, all utilised self designed questionnaires to assess quality of life.\(^{8,9,12}\) The mid-time point of all three reports was earlier than 1985. Two studies on survivors of ruptured AAA concluded that preoperative physical status was regained in the majority of patients within one-year.\(^{8,9}\) The remaining study analysed functional outcome in patients aged over 80 years who had survived emergency repair of both intact and ruptured AAA.\(^{12}\) Though it is concluded that octogenarians surviving emergency AAA surgery enjoy a reasonable quality of life, specific outcomes of patients undergoing ruptured AAA surgery are not extractable.

Validated health related quality of life assessment

Eight studies used validated instruments for HRQoL assessment. Rohrer and van Ramshorst applied modified versions of the Self-evaluation of function scale to their cohorts of ruptured AAA survivors.\(^{7,10}\) These reports used patients who had undergone elective AAA repair as controls. Both series failed to demonstrate differences in overall HRQoL between the ruptured and elective AAA groups. However, Rohrer reported a statistically significant reduction in the domain of general sense of well-being amongst patients with ruptured AAA. Similarly, van Ramshorst noted that patients undergoing elective AAA repair tended to be significantly more active in the domain of social behaviour than their counterparts with ruptured lesions.

Magee and co-workers used the York quality of life questionnaire with Rosser index classification on patients who underwent ruptured AAA repair and their counterparts undergoing elective repair.\(^{11}\) Patients undergoing elective repair were noted to have improved HRQoL scores after operation while those undergoing emergency repair reported a diminished quality of life.

Hennessy studied patients who survived ruptured AAA repair compared to matched patients undergoing elective repair.\(^{14}\) It is unclear whether this patient cohort represents a selected group of patients surviving ruptured AAA repair or a consecutive series. No significant differences, in terms of HRQoL, were elicited.

Four studies, reported between 1998 and 2003, used the generic Medical Outcomes Study Short Form 36 (SF36), or its derivative the RAND 36-Item Health Survey (RAND36), to assess quality of life.\(^{13,15–17}\) These instruments comprise 36 questions covering eight health domains.

Joseph and colleagues studied SF36 results from survivors of ruptured AAA compared to age-matched healthy controls.\(^{16}\) The majority of patients were reported to have the same quality of life compared to controls. No significant differences or trends between groups, in terms of physical functioning, were identified.

Eskandari’s and Bohmer’s comparisons of survivors of ruptured AAA and the age-matched general population also revealed no significant differences in SF 36 scores between the two groups.\(^{13,15}\) However, survivors of ruptured AAA trended towards lower functional outcome scores in six of the eight domains, including those of physical function, in Eskandari’s report and lower physical function scores in Bohmer’s series.

In the largest study to date, Korhonen and colleagues administered the RAND36 questionnaire to 82 survivors of ruptured AAA compared to the age and sex-matched general population.\(^{17}\) Again, significant differences in physical functioning were demonstrated between ruptured AAA patients and their healthy counterparts. No other differences, in terms of
Table 1. Studies quoting quality of life after ruptured abdominal aortic aneurysm repair in chronological order according to year of publication

<table>
<thead>
<tr>
<th>Reference</th>
<th>Year of publication</th>
<th>Study design</th>
<th>Age range (years)</th>
<th>Number of patients</th>
<th>HRQoL instrument</th>
<th>Follow-up period (months)</th>
<th>Control group</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>O’Donnell et al.</td>
<td>1976</td>
<td>Retrospective</td>
<td>≥ 80</td>
<td>5</td>
<td>Authors design</td>
<td>Unknown</td>
<td>Elective AAA repair</td>
<td>Regained or improved physical status</td>
</tr>
<tr>
<td>Treiman et al.</td>
<td>1982</td>
<td>Retrospective</td>
<td>≥ 80</td>
<td>7</td>
<td>Authors design</td>
<td>48–156</td>
<td>None</td>
<td>Regained physical status at six-months</td>
</tr>
<tr>
<td>Rohrer et al.</td>
<td>1988</td>
<td>Retrospective</td>
<td>59–84</td>
<td>26</td>
<td>Adapted from Self evaluation of life function scale</td>
<td>Unknown</td>
<td>Elective AAA repair</td>
<td>No difference in physical independence, psychological well-being and social interaction. Reduced sense of general well being after RAAA</td>
</tr>
<tr>
<td>Van Ramshorst et al.</td>
<td>1990</td>
<td>Retrospective</td>
<td>Unknown</td>
<td>55</td>
<td>Adapted from Self evaluation of life function scale and psychosocial adjustment to illness scale</td>
<td>20–57</td>
<td>Age and sex-matched elective AAA repair</td>
<td>No difference apart from reduced level of social behaviour</td>
</tr>
<tr>
<td>Magee et al.</td>
<td>1992</td>
<td>Retrospective</td>
<td>Unknown</td>
<td>45</td>
<td>York QoL questionnaire and Rosser index</td>
<td>18–42</td>
<td>Elective AAA repair</td>
<td>Deterioration in HRQoL</td>
</tr>
<tr>
<td>Currie et al.</td>
<td>1992</td>
<td>Retrospective</td>
<td>≥ 80†</td>
<td>9*</td>
<td>Authors design</td>
<td>Unknown</td>
<td>Elective AAA repair</td>
<td>No differences</td>
</tr>
<tr>
<td>Gefke et al.</td>
<td>1994</td>
<td>Retrospective</td>
<td>Unknown</td>
<td>41*</td>
<td>Authors design</td>
<td>Unknown</td>
<td>None</td>
<td>Unknown</td>
</tr>
<tr>
<td>Moriyama et al.</td>
<td>1994</td>
<td>Retrospective</td>
<td>71†</td>
<td>32</td>
<td>Unknown</td>
<td>5–101</td>
<td>Elective AAA repair</td>
<td>Unknown</td>
</tr>
<tr>
<td>Matsushita et al.</td>
<td>1997</td>
<td>Retrospective</td>
<td>Unknown</td>
<td>≤ 17</td>
<td>Authors design</td>
<td>49†</td>
<td>Elective AAA repair</td>
<td>Unknown</td>
</tr>
<tr>
<td>Hennessy et al.</td>
<td>1998</td>
<td>Retrospective</td>
<td>54–81</td>
<td>14</td>
<td>Hopkins symptom checklist, general Health questionnaire and Rosser index</td>
<td>4–29</td>
<td>Age and sex-matched elective AAA repair</td>
<td>No differences</td>
</tr>
<tr>
<td>Eskandari et al.</td>
<td>1998</td>
<td>Retrospective</td>
<td>70†</td>
<td>15</td>
<td>SF-36</td>
<td>9–48</td>
<td>Age-matched normal population</td>
<td>No differences</td>
</tr>
<tr>
<td>Bohmer et al.</td>
<td>1999</td>
<td>Retrospective</td>
<td>54–85</td>
<td>28*</td>
<td>SF-36</td>
<td>12–156</td>
<td>Age-matched normal population</td>
<td>No differences</td>
</tr>
<tr>
<td>Joseph et al.</td>
<td>2002</td>
<td>Retrospective</td>
<td>60–81</td>
<td>26</td>
<td>SF-36</td>
<td>Unknown</td>
<td>Age-matched normal population</td>
<td>No difference/better HRQoL</td>
</tr>
<tr>
<td>Korhonem et al.</td>
<td>2003</td>
<td>Retrospective</td>
<td>47–96</td>
<td>82</td>
<td>RAND-36</td>
<td>10–69</td>
<td>Age and sex-matched normal population</td>
<td>No difference apart from reduced physical function</td>
</tr>
</tbody>
</table>

HRQoL, health related quality of life.
*Includes patients undergoing emergency repair of symptomatic intact abdominal aortic aneurysm.
†Mean age.
HRQoL, were identified between the study and control populations.

Discussion

Despite an increase in the number of elective AAA repairs performed, an associated decline in the incidence of ruptured AAA has not been borne out.21 Furthermore, recent advances in perioperative care have failed to make a significant impact on survival following operative repair of ruptured aneurysm and mortality remains around 40%.5 Within the constraints of finite health care resource, there is a need to assess and compare the outcomes of medical interventions. Evaluation of a clinical intervention must not only take into account the traditional primary outcomes of death, disability or cure but also the patient’s perspective of outcome. To assess the benefit of an intervention, evidence for the impact on the patient in terms of health status and HRQoL is essential.22

Of the 11 studies presently reviewed, all have deficiencies in their design. The small number of studies, sample sizes, methodology and variation in follow-up period do not permit meaningful meta-analysis and render direct comparison awkward. In particular, studies that utilised non-validated HRQoL instruments and those that amalgamate data from patients with intact and ruptured AAA must be interpreted with caution. Furthermore, all series were retrospective in design and are susceptible to bias. With the progress of time following ruptured AAA repair, patients become increasingly selected in that they have survived to reach hospital, survived operative repair, survived their postoperative recovery and agreed to HRQoL assessment. It may be argued that this process specifically selects patients who are biologically more robust and predisposed to achieve good functional outcomes. Similarly, some patients with ruptured AAA will have been deemed unfit for elective repair and again are less likely to attain good functional recovery when compared to patients undergoing elective repair.

Of the seven studies that used validated HRQoL instruments and failed to establish a difference in HRQoL after ruptured AAA repair, all used generic HRQoL instruments. In particular, the reliability, validity and consistency of the SF36, and its derivative the RAND 36, have been confirmed. The SF36 is the most widely used quality of life instrument in the medical literature and its use, in the assessment of vascular disease, has been previously recommended.23 Generic tools require large sample sizes to demonstrate statistically significant HRQoL differences, due to the large standard deviations of health profiles.24 Of the four articles that used the SF36 or RAND 36 instruments, only one study included more than 30 patients. Interestingly, this report on 82 patients by Korhonen was the only one to detect significant reductions, in the isolated domain of physical functioning, amongst ruptured AAA survivors.

Overall perception of HRQoL, in the three studies that utilised generic instruments other than the SF36 or RAND 36, was not significantly different between patients undergoing emergency or elective AAA repair. However, the absence of differences may be attributable to small sample sizes and use of a generic HRQoL tool. It is noteworthy that significant reductions in the domains of general well-being and social behaviour were detected amongst ruptured AAA survivors.

Magee and colleagues demonstrated a significant deterioration in functional outcome following ruptured AAA repair when compared to elective repair. They noted a fall in HRQoL from near perfect health preoperatively to considerable disability at postoperative follow-up. Such a conclusive finding has not been reproduced in any other series reporting on ruptured AAA survivors. However, prospective studies in patients surviving intensive care admission have described similar reductions in HRQoL.25,26 If such a finding were true for survivors of ruptured AAA repair, arguments for aneurysm screening and elective repair would be further supported.

In the United Kingdom, the financial cost of ruptured AAA repair has been reported to be almost double that of elective repair.27 Nevertheless, cost analyses of surgical repair of ruptured AAA have shown that surgical treatment remains a cost-effective intervention.28 The attainment of normal life expectancy after successful repair of ruptured AAA versus the alternative of immediate death is the predominant reason for such a finding. However, these analyses fail to consider outcome in terms of HRQoL and functional outcome following repair of ruptured AAA remains largely uncertain. If survivors of ruptured AAA were returned to a significant level of functional disability despite a near-normal life expectancy, the efficacy of intervention becomes less apparent. Indeed, an intervention that encompasses a postoperative quality of life that will be unacceptable to the patient may even be regarded as futile.29 This concept has important implications where a selective policy in the management of ruptured AAA is employed; it might be argued that quality-adjusted survival rather than absolute survival should be used to guide operative selection.14 With the introduction of endovascular repair for ruptured AAA, any comparison of outcome
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with conventional repair should also consider postoperative functional status. The limited current evidence suggests that the majority of survivors of RAAA may expect to regain their preoperative quality of life. However, a proportion will experience postoperative deterioration of their functional status. No existing reports inform whether postoperative functional outcome can be correlated to preoperative risk factors. Further prospective studies are needed to clarify the HRQoL outcomes of survivors of ruptured AAA repair.

References


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