ORIGINAL RESEARCH

Quality of Life for Males With Abdominal Aortic Aneurysm

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Background: Abdominal aortic aneurysm (AAA), with rupture as the major consequence, is a life-threatening disease. Although screening programs for AAA reduce mortality, it is unclear how a diagnosis impacts quality of life (QoL) in males. This study sought to measure the change in QoL for males with AAA at baseline and after 12 months.

Methods: Between January 1, 2019, and February 28, 2022, males with AAA completed the 12-item short form health survey version 2 (SF-12v2) at baseline and after 12 months. SF-12v2 measures general health, physical functioning, role limitations, bodily pain, vitality, social functioning, role-emotional, and mental health. Clinical risk factors including age, race, body mass index, diabetes, hypertension, hyperlipidemia, coronary artery disease, cerebrovascular accident, myocardial infarction, and smoking status were also collected.

Results: Ninety-one patients with an AAA were followed in a vascular clinic and completed the SF-12v2. The mean (SD) age was 76.0 (5.6) years and body mass index was 29.7 (6.4). The change in SF-12v2 scores from baseline to 12 months showed statistically significant improvement in QoL for general health ($P < .05$) and bodily pain ($P < .05$) domains. No significant differences were observed in other domains.

Conclusions: After 12 months, males with AAA reported statistically significant higher QoL scores in general health and bodily pain. These results suggest the need for periodic QoL assessments to track changes over time for males with AAA.

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Abdominal aortic aneurysm (AAA) is a public health threat, with a global prevalence of 4.8% and a prevalence in males that increases with age, from 1.3% between ages 45 and 54 years to 12.5% between ages 75 and 84 years.[1] AAA is often asymptomatic until it ruptures and can become life-threatening, with mortality rates near 90% in the event of rupture with survival rates of about 50% to 70% for individuals with rupture who require urgent surgical intervention.[2,3] Males experience AAA at 4 times the rate of females.[4]

Previous research has found that the awareness of having an AAA causes anxiety that some have described as "living with a ticking time bomb."[5] Others reported worries and concerns about life's fragility and mortality due to an AAA diagnosis.[6] However, the psychological impact on the individuals' quality of life (QoL) remains unclear, especially for individuals with a small AAA (< 5.5 cm).[7] Factors such as age, male sex, smoking, family history, hypertension, carotid artery disease, and hypercholesterolemia have been strongly associated with increased growth rate and the risk of small AAA ruptures.[8,9]

Most patients with a small AAA enter surveillance awaiting future repair and not only have the anxiety of living with an AAA despite the low risk of rupture, but also a worse QoL than those who have undergone repair.[10,11] However, data are sparse regarding the effects on QoL of knowing they have an AAA, whether repaired or not. This study sought to examine the impact an AAA diagnosis had on male QoL at the initial investigation and after 12 months.

METHODS

This prospective study was examined and approved by the Veterans Affairs Northern California Health Care System (NCHCS) Institutional Review Board. It was conducted at the Sacramento US Department of Veterans Affairs (VA) Medical Center from January 1, 2019, to February 28, 2022. Patients were identified through the vascular clinic. One hundred sixteen patients with AAA were eligible and agreed to participate. Of these, 91 (78%) completed the survey at baseline and 12 months later. Participation was voluntary; written informed consent was obtained from every patient before completing the survey. This study included only male patients due to their higher prevalence than female patients.[4] Patients were also eligible if they were aged > 18 years and had a previously known AAA that was being followed with a recorded clinical imaging study in the NCHCS vascular clinic. Patients were excluded if they were unable to return for their 12-month follow-up investigation, were incapable of giving informed consent, were unable to complete the 12-item short form health survey version 2 (SF-12v2),

TABLE 1. Baseline Demographics (N = 91)

Characteristic	Result
Race, No. (%)	
White	77 (85)
Black	7 (8)
American Indian or Alaska Native	4 (4)
Native Hawaiian or other Pacific Islander	1 (1)
Unknown or declined to provide	2 (2)
Age, mean (SD), y	76 (5.6)
Body mass index, mean (SD)	29.7 (6.4)
Tobacco use, No. (%)	
Never	6 (7)
Former	65 (71)
Current	20 (22)
Comorbidities, No. (%)	
Diabetes	28 (31)
Hypertension	68 (75)
Hyperlipidemia	60 (66)
Coronary artery disease	11 (12)
Cerebrovascular accident	1 (1)
Myocardial infarction	1 (1)

had a documented history of psychiatric illness, or refused to participate. The SF-12v2, an abbreviated version of the 36-item short form health survey (SF-36), is a generic health-related quality-of-life survey that measures 8 domains of general health status: general health (GH), physical functioning (PF), role limitations due to physical problems (RP), bodily pain (BP), vitality (VT), social functioning (SF), role emotional (RE), and mental health (MH). A higher number on the QoL scale indicates better QoL. The GH, PF, RP, and BP scales yield a physical component score (PCS), and the VT, SF, RE, and MH scales generate a mental component score (MCS). Although SF-12v2 has not been validated for patients with AAA, it has been widely used and validated to measure health-related QoL in cohorts of healthy and chronically ill individuals.[12,13]

Analysis

Descriptive statistics, including means, SDs, frequency, percentages, 95% CIs, and correlations were calculated. The *t* test was used to analyze differences in mean scores. For continuous variables, such as SF-12v2 domains, PCS, and MCS, mean, SD, 95% CI, and range were determined. Comparisons were performed using χ^2 or *t* test. $P < .05$ was considered statistically significant. Clinical risk factors, including age, race, body mass index (BMI), diabetes, hypertension, hyperlipidemia, coronary artery disease, cerebrovascular accident, myocardial infarction, and smoking status, were also recorded.

RESULTS

Between January 1, 2019, and February 28, 2022, 91 patients were diagnosed with an AAA and completed the survey at the initial and 12-month investigations. Patients had a mean (SD) age of 76.0 (5.6) years (range, 64-93) and BMI of 29.7 (6.4). Comorbid diabetes was present in 31% of patients, hypertension in 75%, hyperlipidemia 66%, and coronary artery disease in 12% (Table 1). Most patients smoked tobacco: 71% indicated previous use and 22% were current users.

When comparing baseline vs 12-month follow-up, patients indicated a higher QoL in GH (3.2 vs 3.5, respectively; $P < .05$) and BP (3.1 vs 3.6, respectively; $P < .05$). No statistically significant difference was seen PF, RP, VT, SF, RE, MH, as well as PCS and MCS between baseline and follow-up with respect to QoL ($P < .05$). However, the 5 domains of SF-12v2: PF, RP, SF, RE, MH, and PCS had lower QoL scores at the 12-month follow-up when compared with baseline, but with no statistically significant difference between both investigations (Table 2).

DISCUSSION

Previous studies have characterized the results of QoL measures as subjective because they are based on patient perceptions of their physical and psychological condition.[14,15] However, SF-36 and SF-12v2 responses provide a multifaceted account that encompasses the physical, psychological, and social aspects of QoL. Despite being the most widely used generic instrument in many fields of medicine, SF-36 is time consuming for clinicians who may prefer simpler and more time-efficient instruments.[16-18] The SF-12v2 not only imposes less burden on respondents but also generates accurate summary scores for patients physical and mental health.[19]

The replicability of SF-12v2 PCS and MCS scores has been demonstrated. In the United Kingdom, Jenkinson and Layte constructed SF-12v2 summary measures from a large-

TABLE 2. Social Function-12v2 Quality of Life Scores (N = 91)

Measure[a]	Baseline	12 mo	*P* value
Physical component score, mean (SD)	16.5 (3.2)	16.7 (3.0)	.39
Mental component score, mean (SD)	21.3 (2.7)	20.6 (3.1)	.94
Subscale profile scores, mean (SD)			
Physical function	4.1 (1.4)	3.9 (1.3)	.84
Bodily pain	3.1 (1.0)	3.6 (0.8)	< .05
General health	3.2 (0.8)	3.5 (0.6)	< .05
Vitality	3.2 (1.0)	3.2 (0.9)	.33
Social function	4.0 (1.2)	3.8 (1.1)	.85
Mental health	6.4 (0.8)	6.3 (0.9)	.79
Role			
Physical	6.2 (2.4)	5.8 (2.2)	.92
Emotional	7.8 (2.3)	7.2 (2.4)	.95

[a]Lower scores denote poorer quality of life.

scale dataset by sending the SF-36 and other questions on health and lifestyles to 9332 individuals and compared the results of the SF-36 and SF-12v2 across diverse patient groups (eg, Parkinson disease, congestive heart failure, sleep apnea, benign prostatic hypertrophy). Results from SF-36 PCS, SF-36 MCS, and PCS-12v2 (ρ, 0.94; $P < .001$) and SF-12v2 MCS (ρ, 0.96; $P < .001$) were found to be highly correlated, and also produced similar results, both in the community sample and across a variety of disease-specific groups.[20]

The aim of this longitudinal observational study was to measure the QoL of males with an AAA ≥ 3.0 cm at baseline and 12 months later. The mean age of participants was 76 years, which aligns with previous research that found the prevalence of AAAs increased with age.[1] Study participants had a mean BMI of 29.7, which also supports previous research that indicated that obesity is independently associated with an AAA.[21] Patients with an AAA and a history of smoking (former or current), hypertension, or hyperlipidemia had lower mean scores for 3 of 8 SF-12v2 domains at the 12-month follow-up.

These findings support previous research that indicated smoking is not only a very strong risk factor for the presence of an AAA but also associated with increased rates of expansion and the risk of rupture in patients with an AAA.[22] Bath et al found that patients with an AAA compared to patients without an AAA were older (age 72.6 vs 69.8 years; $P < .001$), had a higher BMI (28.1 vs 27.0; $P < .001$), were more likely to be a current smoker (15.1% vs 5.2%; $P < .001$), and were more likely to have diabetes (18.8% vs 10.0%; $P < .001$), ischemic heart disease (12.2% vs 4.4%; $P < .001$), high cholesterol (53.2% vs 30.8%; $P <. 001$), previous stroke (6.1% vs 2.9%; $P < .001$), and a previous myocardial infarction (21.1% vs 5.8% $P < .001$).[23] Lesjak et al found that men with AAA reported significantly lower scores in the domains of social functioning, pain, and general health 6 months after ultrasound compared with men without AAA.[24]

Previous research indicates that patients with an AAA have a higher risk of cardiovascular diseases and comorbidities that may impact their perceived QoL. In a study assessing cardiovascular risk in 2323 patients with a small AAA, Bath et al found a high prevalence of coronary artery disease (44.9%), myocardial infarction (26.8%), heart failure (4.4%) and cerebrovascular accident (14.0%) which may have contributed to the decreased level of self-perceived QoL in these patients.[25]

This aligned with a study by Golledge et al, who found that participants diagnosed with an AAA and peripheral artery disease not only had significantly poorer QoL scores in 5 SF-36 domains (PF, RP, GH, VT, and PCS)when compared with participants diagnosed with an AAA alone. They also had significantly poorer QoL scores in 7 domains of the SF-36 (PF, RP, GH, VT, SF, RE, and PCS) when compared with controls without an AAA.[26]

Our analysis found that males with an AAA had a rise in SF-12v2 QoL scores from baseline to 12-month follow-up in the GH and BP domains. There was no statistically significant difference in QoL in the other 6 domains (PF, RP, VT, SF, RE, and MH) between the initial and 12-month investigations. Bath et al also found that men with an AAA had a transient reduction in mental QoL during the first year after the initial screening but returned to baseline.[23]

Strengths and Limitations

This study is notable for its sample of patients who previously had a diagnosed AAA that were followed with a recorded clinical imaging study and the use of a validated QoL measure (SF-12v2) that provided virtually identical summary scores (PCS and

MCS) as the SF-36.[27] However, this study was limited by the brevity of the SF-12v2 instrument which made it difficult to extract sufficient reliable information for the 8 domains.[28] Subjective perception of patients is another limitation inherent to any QoL study. QoL scores were not available before the initial investigation. Measuring QoL at baseline and 12 months later does not capture the potential fluctuations and changes in QoL that the patient may experience some months later. Another limitation arises from the fact that the AAA patient population in the study included patients under surveillance and patients who had undergone repair.

Fourteen patients (15%) had received AAA repair: 10 had endovascular reconstruction and 4 had open surgical repair. Including patients with a previous AAA repair may have influenced reported QoL levels. Suckow et al performed a 2-phase study on 1008 patients, 351 (35%) were under surveillance and 657 (65%) had undergone repair. In that study, patients under AAA surveillance had worse emotional impact scores compared with patients with repair (22 vs 13; $P < .001$).[11] Additionally, the size of the abdominal aorta at the time of survey was not addressed in the study, which could constitute explanatory variables.

CONCLUSIONS

This study found higher QoL at 12-month follow-up compared to baseline in both the GH and BP domains of the SF-12v2 health survey for male veterans with an AAA. Periodic QoL assessments for patients with an AAA may be helpful in tracking QoL course, minimizing their physical and psychological concerns, and improving overall care and support. However, further research is necessary to assess the QoL of patients with an AAA who are under surveillance compared with those who had an aneurysm repair to accurately measure the impact of an AAA on QoL.

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Désiré M. Kindarara, PhD, MSN, BSc, BC-ADM drafted the manuscript. All authors were involved in the study design and manuscript review. All authors read and approved the manuscript.

Author disclosures

The authors report no actual or potential conflicts of interest regarding this article.

Disclaimer

The opinions expressed herein are those of the authors and do not necessarily reflect those of *Federal Practitioner,* Frontline Medical Communications Inc., the US Government, or any of its agencies.

Ethics and consent

The protocol of this prospective study was examined and approved by the Veterans Affairs Northern California Health Care System Institutional Review Board (Protocol: 18-08-00809) on August 7, 2018. Written informed consent was obtained from all patients before completing the survey.

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