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Anxiety and depression scores in patients subjected to aortic and iliac aneurysm repair procedures

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SUMMARY

OBJECTIVE: This study examines the changes in anxiety and depression scores of 84 patients subjected to aortic or iliac aneurysm correction with no previous psychiatric history.

METHODS: Patients were referred to the evaluation using the Beck Anxiety and Depression Inventories no more than 3 days before surgery (i.e., preoperative [Pre-Op]), 30 days after revascularization (i.e., Early postoperative [PO]), and at least 6 months after revascularization (i.e., Late PO).

RESULTS: Mean anxiety scores declined from baseline at both the Early (mean difference: 2.75, p<0.001) and Late PO (mean difference: 2.74, p=0.001). The depression levels showed no significant variation in either evaluation (Early PO; mean difference: –0.84, p>0.05, Late PO: 0.87, p=0.05). A more severe degree of anxiety at baseline was related to better anxiety results both in the Early PO (p=0.041) and Late PO (p=0.008). An endovascular technique was related to the improvement in depression symptoms in the Early PO (p=0.01) but the worsening of the symptoms in the Late PO (p=0.033).

CONCLUSIONS: Patients subjected to aortoiliac aneurysm corrections have a higher incidence of anxiety and depressive symptoms. Anxiety symptoms, but not the depressive ones, improved considerably following the successful treatment. The formal psychiatric evaluation may be beneficial for patients with less improvement in the symptom.

KEYWORDS: Anxiety. Depression. Aortic aneurysm. Iliac aneurysm.

INTRODUCTION

Anxiety and depression are common ailments of patients hospitalized for surgery, especially those of more complex nature[1]. Incidence may be heightened by previous mood disorders, underlying diseases, longer hospital stays, postoperative (PO) complications, and lack of familial support[2].

Regardless of the technique employed for aneurysm correction, the mortality and morbidity rates are not negligible, and these patients are often elderly with multiple comorbidities[3,4]. These aspects alone may generate certain anxiety, possibly leading to more severe mood alterations both preoperatively and postoperatively.

The preoperative (Pre-Op) levels of anxiety and depression were assessed in 150 patients subjected to the abdominal aortic aneurysm (AAA) repair[5]. Although several independent risk factors for Pre-Op anxiety were determined, authors did not evaluate PO anxiety or depression[5].

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The development of depressive symptoms was compared between 109 surgical and nonsurgical patients with aortic diseases (i.e., aneurysms or occlusive disease)[1]. The rates of PO psychiatric morbidity were high (32%). Surgical patients were over four times more likely to develop the psychiatric disorders (odds ratio: 4.8, p=0.02)[1].

The studies evaluated the levels of anxiety and depression before and after surgery for several diseases. An improvement of psychiatric symptoms was noted after the implantation of left ventricular assist device in patients with advanced heart failure[6] as well as in patients treated for cerebral aneurysms[7].

Although earlier studies have established an increased prevalence of mood disorders among patients with AAA undergoing surgical correction[1,8], none have examined the variation on the degree of symptoms in the short- and long-term after surgery.

The aim of this study was to compare the changes in anxiety and depression symptoms and to assess the factors associated with these changes, in the Early- and long-term PO period after the surgical correction of AAA.

METHODS

Eighty-four patients subjected to the elective AAA correction were prospectively evaluated between June 2015 and November 2019. Patients had no history of anxiety or depression and underwent aneurysm repair either by conventional open surgery or endovascular repair surgery at the Hospital Israelita Albert Einstein – Vila Santa Catarina Unit or at the Santa Casa de Misericórdia Hospital, São Paulo, Brazil. This study was approved by the institutional review boards in both centers, and all patients provided written informed consent.

Table 1 shows the clinical and operative characteristics of the patients. Patients were evaluated on three occasions, namely, preoperatively (Pre-Op), no earlier than 3 days before surgery; 1 month after treatment (Early PO); and at least 6 months after treatment (Late PO). Patients were followed-up for 629 days.

The anxiety and depression scores were assessed by the validated Portuguese version of Beck Depression and Anxiety Inventories[9]. Symptoms were graded according to the Beck's scales in the four established levels, namely, minimum, mild, moderate, and severe[9].

STATISTICAL ANALYSIS

The quantitative characteristics were presented as means with standard deviations, whereas qualitative attributes were presented as absolute and relative frequencies.

Table 1. Clinical and surgical characteristics.

	No. of patients	Percentage (%)
Sex		
Male	57	69.50
Female	25	30.50
Age		
Range	57–84	
Average±standard deviation	69.83±6.47	
Median	70	
Hypertension	69	84.10
Diabetes	23	70.70
Active smoking	56	68.30
Previous myocardial infarction	14	17.1
Previous stroke	8	9.90
ASA classification		
I	1	1.30
II	36	46.80
III	40	51.90
Aneurysm diameter	6.39±1.35	
Type of aneurysm		
Infrarenal AAA/ juxtarenal AAA	69	84.10
Thoracic aorta aneurysm	5	6.10
Iliac aneurysm	4	4.90
Thoracoabdominal aneurysm		4.90
Type of treatment		
Endovascular	47	57.30
Conventional	35	42.70
Reoperation	12	14.60
ICU length of stay (days)	3.76±5.20	
Overall length of stay (days)	7.41±8.63	
Length of follow-up (days)	629±403	
Mortality	11	13.40

ASA: American Society of Anesthesiologists; AAA: abdominal aortic aneurysm; ICU: intensive care unit.

The anxiety and depression scores were presented according to the Beck's scales[9] and summarized as means with standard deviations or absolute and relative frequencies. The incidence of symptoms was compared between treatment period and technique groups by the generalized estimating equations with marginal normal distribution and identity link function, assuming a first-order auto-regressive correlation matrix between assessment intervals[10]. For the models that presented statistical significance, the analysis was complemented by using the Bonferroni multiple analysis[11] to discern between which techniques or intervals the scoring differences occurred.

The Wilcoxon signed-rank test was used for comparing the Pre-Op anxiety and depression grading with the following evaluation intervals[12]. The differences were calculated between the anxiety and depression rating of each assessment time and the baseline, and these were tested against the qualitative characteristics of the patient by using the likelihood-ratio test[12], whereas the quantitative characteristics were assessed by using the ANOVA analysis[11].

All analyses were performed using the SPSS Statistics software for Windows version 22.0 (IBM Corp., Armonk, NY, USA). All tests were performed using the significance level of 5%.

RESULTS

Anxiety evaluation

Patient distribution according to anxiety degree in each assessment is shown in Figure 1.

Most patients presented minimal or mild anxiety levels in all three assessments. Table 2 shows the overtime variation in the anxiety levels per patient.

In the Early-PO assessment, a significant decrease in the levels of anxiety was observed when compared with the Pre-OP (p=0.004). In the long-term evaluation (Late PO), the anxiety levels remained significantly better than baseline (p=0.039).

The mean anxiety degrees overtime also demonstrated improvement after treatment both in the Early PO (i.e., mean difference of 2.75 and p<0.001) and Late PO (i.e., mean difference of 2.74, p=0.001) in relation to baseline (Pre-Op). There was no significant difference in anxiety levels when the Early- and Late-PO assessments were compared (i.e., mean difference: -0.01, p>0.999).

The only variable related to a significant change in anxiety levels was the baseline degree of anxiety (Pre-Op), in which a more severe degree at Pre-Op was related to better results both in the Early PO (p=0.041) and Late PO (p=0.008).

Depression evaluation

Patient distribution according to the degree of depression symptoms in all three assessments is demonstrated in Figure 1.

The majority of the patients presented with minimal or mild depression in all three assessments.

Overtime variation of depression levels per patient is demonstrated in Table 2.

The depression levels showed no significant variation in either the early or the long-term evaluations. This was maintained even when patients were separately evaluated with regard to the surgical technique.

Mean depression degrees overtime also demonstrated no change in symptom severity after treatment, both in the Early PO (i.e., mean difference: -0.84, p>0.05) and Late PO (i.e., mean difference: 0.87, p=0.05) in relation to the Pre-Op baseline. There was no significant difference in depression levels when the Early- and Late-PO assessments were compared (mean difference: -0.03, p>0.999).

The only variable related to a significant change in depression levels was the surgical technique, with the endovascular technique related to the improvement in depression symptoms in the short-term (Early PO; p=0.01) but the worsening of the symptoms in the long-term (Late PO; p=0.033).

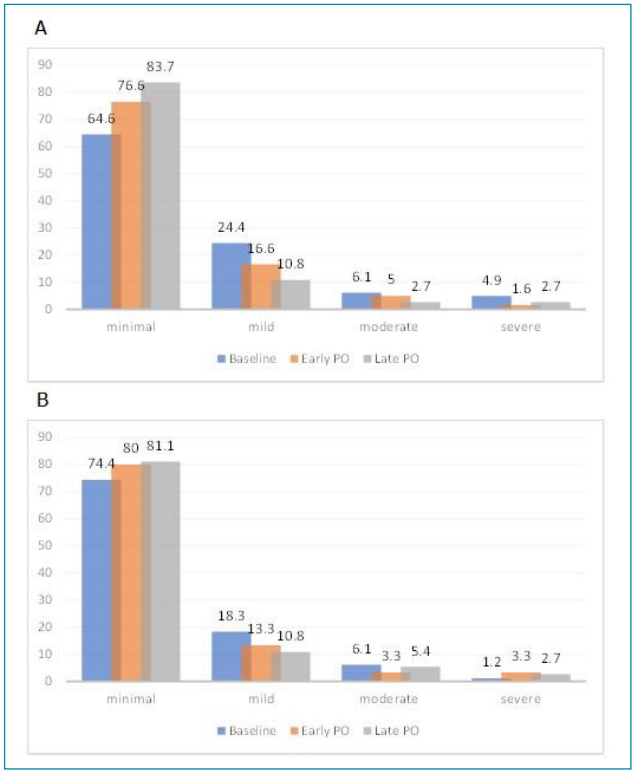

Figure 1. Patient distribution according to anxiety (A) and depression (B) degrees in each assessment.

Table 2. Overtime variation in patient distribution by severity level of anxiety and depression symptoms.

Variable	Pre-Op anxiety levels					
	Minimal	Mild	Moderate	Severe	Total	p*
	n (%)	n (%)	n (%)	n (%)	n (%)	
Early-PO anxiety level						
Minimal	34 (56.7)	10 (16.7)	1 (1.7)	1 (1.7)	46 (76.7)	0.004
Mild	3 (5.0)	5 (8.3)	2 (3.3)	0 (0.0)	10 (16.7)	
Moderate	0 (0.0)	0 (0.0)	2 (3.3)	1 (1.7)	3 (5.0)	
Severe	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.7)	1 (1.7)	
Total	37 (61.7)	15 (25.0)	5 (8.3)	3 (5.0)	60 (100)	
Late-PO anxiety level						
Minimal	24 (64.9)	4 (10.8)	1 (2.7)	2 (5.4)	31 (83.8)	0.039
Mild	1 (2.7)	2 (5.4)	1 (2.7)	0 (0.0)	4 (10.8)	
Moderate	0 (0.0)	1 (2.7)	0 (0.0)	0 (0.0)	1 (2.7)	
Severe	0 (0.0)	0 (0.0)	0 (0.0)	1 (2.7)	1 (2.7)	
Total	25 (67.6)	7 (18.9)	2 (5.4)	3 (8.1)	37 (100)	
Variable	Pre-Op depression levels					
	Minimal	Mild	Moderate	Severe	Total	p*
	n (%)	n (%)	n (%)	n (%)	n (%)	
Early/Early-PO depression level						
Minimal	43 (71.7)	5 (8.3)	0	0	48 (80.0)	0.366
Mild	2 (3.3)	4 (6.7)	2 (3.3)	0	8 (13.3)	
Moderate	0	1 (1.7)	1(1.7)	0	2 (3.3)	
Severe	0	0	1 (1.7)	1 (1.7)	2 (3.3)	
Total	45 (75.0)	10 (16.7)	4 (6.7)	1 (1.7)	60 (100.0)	
Early/Late-PO depression level						
Minimal	29 (78.4)	0	1 (2.7)	0	30 (81.1)	0.408
Mild	3 (8.1)	1 (2.7)	0	0	4 (10.8)	
Moderate	1 (2.7)	0	1 (2.7)	0	2 (5.4)	
Severe	0	0	0	1 (2.7)	1 (2.7)	
Total	33 (89.2)	1 (2.7)	2 (5.4)	1 (2.7)	37 (100.0)	

*Wilcoxon signed-rank test; Pre-Op: preoperative; PO: postoperative.

DISCUSSION

All patients were selected for treatment by the same criteria and underwent the treatment following the same protocols. Patients' questions pertaining to their disease, treatment options, possible complications, mortality risk, and PO expected recovery are routinely discussed. Patients presenting with known mental illness were not included in this study. The sample was predominantly of male patients between 70 and 80 years of age, as expected[13].

Few studies have analyzed the development of anxiety and depressive symptoms in patients with aortic aneurysm[1,5]; however, to the best of our knowledge, none have evaluated the overtime evolution of symptoms in the same pool of patients.

Although anxiety and depression are highly prevalent mood disorders in the general population[14], reported prevalence rates of these disorders vary in accordance with the instruments used for diagnosis and the heterogeneity of studied populations[15]. The use of questionnaires allows better quality of the data collection in screening and the follow-up evaluation of patients[15].

Several studies have associated anxiety and depressive symptoms with cardiovascular disease[2,6,7,16,17]. Some cerebral structural

abnormalities have also been attributed to vascular disease, predisposing especially the elderly to what is referred to as "vascular depression"[18]. This population superposes with the higher incidence of arterial aneurysms[14]. Aneurysm risks of rupture and death are well established, and the mere knowledge of the disease may lead patients to concerning thoughts, possibly causing mood disorders[5].

Until this study, the correlation in variation of anxiety and depression levels and surgical correction of arterial of aneurysms was unknown.

A decline in the anxiety levels was found in both the Early PO (6.6%) and Late PO (5.4%), which may be secondary to the adequate correction of the disease. Patients with aortic aneurysms are often aware of the severity and potentially fatal nature of their condition[5]. When the treatment is successful, well-instructed patients understand that they may return to normal routine and that their risks have been lowered to average standards, although not entirely risk-free. This improvement in anxious symptoms provides significance especially because anxious patients have been shown to have higher rates of emergency department visits and hospitalization[17].

All included patients were given a Pre-Op informed consent form, which detailed risks and complications of the proposed procedure. Although this may represent an anxiety-raising factor, this anxiety seems to be resolved after treatment, regardless of the surgical technique employed.

Other studies demonstrated this same improvement in anxiety and depression scores following surgical treatment[6,7].

Few medical conditions represent a global-level epidemiological impact such as depression. This multifactorial and heterogeneous disorder is often associated with poor general clinical condition and may lead to negative consequences such as misdiagnosis of symptoms[19].

No statistically significant change from the baseline levels of depression was observed at either the Early PO (6.6%) or the Late PO (8.1%).

The only statistically significant difference regarding the overtime variation in depression symptoms concerned the surgical technique that was employed. Patients subjected to endovascular procedures presented better levels of depression in the Early PO than those subjected to conventional repair. The endovascular approach correlates with lower in-hospital morbidity and diminished hospital stay, which could explain why depression was lower in the short-term evaluation for these patients. In the long-term, however, patients subjected to the endovascular procedures showed the higher levels of depression. These findings correlate with those of an earlier study that attributed a worsening of quality-of-life scores in endovascularly treated patients[20]. A possible explanation for this score inversion is the fact that, although an initially more invasive technique, patients may consider the conventional open repair a more definite treatment alternative, whereas the endovascular procedures require virtually unending annual control.

It may be surmised that the continuance of depressive symptoms as opposed to an observed improvement in anxiety following aneurysm correction surgery is due to the different nature of symptoms; while anxiety is often associated with the patients' impression of future events, depressive symptoms correlate to immediate events[21].

Most patients underwent endovascular treatment, being therefore required to maintain a rigid control follow-up, which may cause mood changes at the time of reassessment.

Patients were not undergoing any psychological treatment at the moment of inclusion; however, at a 6-month follow-up, four patients were under psychological or psychiatric care. One of these had the highest Pre-Op anxiety and depression scores in the sample and maintained the highest scores at the 6-month follow-up, despite proper specialized care.

Our study is limited by the relatively small sample and the possibility of bias due to questionnaires being filled by the patients without supervision of a trained psychology professional. Additionally, none of the included patients underwent formal psychiatric evaluation before treatment.

The use of the Beck's scale may represent a screening tool for the identification of patients with severe anxious or depressive symptoms, and a formal psychiatric evaluation should be suggested for patients with persistent symptoms after treatment.

Proper screening and treatment of anxiety and depression are of great importance among patients with aortic aneurysm, both before and after treatment, incurring positive change in the patients' condition for self-care, control of risk factors, and follow-up adherence.

CONCLUSIONS

Patients present an improvement in the levels of anxiety both in the short- and long-term following aortic aneurysm correction, maintaining, however, unchanged levels of depression.

The psychiatric evaluations may be beneficial for the patients with surgical aneurysm, especially those with the increased and unimproved levels of anxiety or depression.

ETHICAL ASPECTS

The authors declare to have no relations, professional or otherwise, that could be construed as conflict of interest for the publication of this study. This study was duly approved by the Ethics Committee of the Hospital Israelita Albert Einstein under the protocol number (CAAE) 47459515.8.1001.0071 on February 12, 2016.

AUTHORS' CONTRIBUTIONS

CAM: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Supervision, Validation, Writing – original draft, Writing – review & editing. **NW:** Conceptualization, Formal analysis, Investigation, Methodology, Project administration, Supervision, Validation, Writing – original draft, Writing – review & editing. **AF:** Conceptualization, Formal analysis, Investigation, Methodology, Validation. **RAFM:** Data curation, Resources, Software. **MFCP:** Data curation, Formal analysis, Resources, Software, Project administration, Writing – original draft, Writing – review & editing. **MFAS:** Data curation, Formal analysis, Resources, Software, Project administration. **RAC:** Conceptualization, Formal analysis, Investigation, Methodology, Validation. **LLP:** Data curation, Formal analysis, Resources, Software, Project administration. **MPT:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

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