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Patients with depression and anxiety symptoms from adjustment disorder related to their shoulder may be ideal patients for arthroscopic rotator cuff repair

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Background: Mood symptoms may be due to shoulder-related depression or anxiety or clinical anxiety/depression. The objective of this study was to evaluate the relationship of shoulder-related and pre-existing diagnosis of depression or anxiety with changes in American Shoulder and Elbow Surgeons (ASES) score after rotator cuff repair.

Methods: A retrospective review of prospectively collected data on subjects undergoing arthroscopic rotator cuff repair was reviewed. Preoperative and postoperative ASES, questions from the Western Ontario Rotator Cuff index questions directed to feelings of depression/anxiety related to the shoulder, and pre-existing diagnoses of depression and/or anxiety were recorded. The Wilcoxon rank sum test was used to compare changes, and Spearman's correlation was used to correlate changes in mood and ASES between male and female subjects and those with and without anxiety and/or depression.

Results: One hundred seventy-one subjects (53 female; mean age, 58.0 years; standard deviation [SD], 8.5) who underwent arthroscopic rotator cuff repair were evaluated with the mean follow-up of 36.6 months (SD, 17.5). Forty-six subjects (mean age, 58.8 years; SD, 8.2) had pre-existing diagnoses of depression and/or anxiety and 125 subjects (mean age, 57.7 years; SD, 8.7) did not. Patients showed improvement in Western Ontario Rotator Cuff shoulder-related depression (Δ 22.3) and anxiety (Δ 24.7). There was a strong correlation between the change in mood symptoms and the change in ASES score, for depression ($r = 0.74$) and anxiety ($r = 0.71$). Patients with and without clinical diagnosis of anxiety or depression experienced similar changes in mood symptoms related to the shoulder and ASES scores ($P = .65$, $P = .39$). Patients' ASES scores were less correlated with changes in shoulder-related mood symptoms; however, if patients had clinical depression/anxiety compared with those without ($r = 0.68$ vs. 0.75, $P < .0001$ for depression; $r = 0.56$ vs. $r = 0.74$, $P < .0001$ for anxiety).

Conclusions: After rotator cuff repair, symptoms of depression/anxiety related to the shoulder improved dramatically with or without pre-existing clinical diagnosis of depression or anxiety. As the patient-reported functional outcomes of those with pre-existing clinical diagnosis of anxiety/depression improved, they did not experience as strong as an improvement in their mood symptoms as those without prior diagnoses and may benefit from directed treatment of these symptoms. Patients with shoulder-related mood symptoms only, conversely, experience a strong relationship between their improvement in function with their mood symptoms and may be ideal candidates for rotator cuff surgery. It is important for clinicians to separate mood symptoms related to adjustment disorder from the rotator cuff injury from clinical depression and anxiety.

Level of evidence: Level III; Retrospective Cohort Comparison; Treatment Study

Keywords: Rotator cuff repair; depression; anxiety; adjustment disorder; outcomes; WORC; ASES

Study performed at Bassett HealthCare Network.
Institutional review board approval was received from the Mary Imogene Bassett Hospital (Project ID: 1075).

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Rotator cuff disease is the most common cause of shoulder pain and disability.[9,14] The standard of care after conservative treatment is surgical repair to improve the quality of life of patients. One of the factors that have been found to affect surgical outcomes is the coexistence of mood disorders.[4,5,11,12,19] Importantly, there is a high prevalence of depression or anxiety in the age range of patients who are most likely to suffer a rotator cuff tear.[3,6] As such, several reports advocate the importance of mood evaluation as part of the preoperative assessment.[4-7,15]

Cho et al[5] evaluated patients using the Hospital Anxiety and Depression Scale, which is used as a screening tool for clinical anxiety and depression. The study assessed 107 consecutive patients and found that patients with preoperative depression and anxiety had a negative impact on the American Shoulder and Elbow Surgeons (ASES) scale, Korean Shoulder Scale, and World Health Organization Quality of Life Scale.[5] Furthermore, the Hospital Anxiety and Depression Scale depression score was found to be an independent predictor of functional disability and poor health-related quality of life.[5]

A recent study sought to determine whether patients with depression or anxiety symptoms associated with adjustment disorder rather than clinical diagnosis of depression or anxiety had different outcomes.[11] Adjustment disorder is a disease associated with life stressors or changes in health such as rotator cuff disease in which feelings of depression or anxiety may be directly related to adjusting to the symptoms and limitations secondary to a diagnosis of rotator cuff tears.[1]The clinical presentation of depression vs. adjustment disorder can be difficult to separate, but the key difference is that adjustment disorder is related to a specific cause, and once the cause is resolved, then mood symptoms should improve accordingly. In fact, a prior report found that stronger feelings of depression or anxiety directly related to the shoulder correlated with lower preoperative outcome scores but had greater improvement in scores after surgery.[11] Shoulder-specific depression and anxiety was akin to adjustment disorder to the life changes from rotator cuff disease.

The purpose of this study was to evaluate whether changes in shoulder-specific depression and anxiety corresponded to changes in patient-reported outcomes from preoperatively to postoperatively. Secondarily, we sought to determine whether rotator cuff repair resulted in a similar reduction in shoulder-specific depression and anxiety in those with and without clinical diagnoses of depression and/or anxiety. It was hypothesized that changes in shoulder-specific depression and anxiety would be strongly correlated with changes in patient-reported outcomes. In addition, it was hypothesized that because shoulder-specific depression and anxiety, adjustment disorder, are separate from the clinical diagnosis of anxiety and depression, these would act independently on patient-reported outcomes.

Methods

Patient selection

Institutional review board approval was obtained before the initiation of the study. Inclusion criteria were subjects who underwent rotator cuff repair between January 2011 and June 2017 and had at least 1 year of follow-up data on patient-reported outcomes. Exclusion criteria included a history of prior shoulder surgery, associated glenohumeral arthritis, associated fracture, or incomplete preoperative and/or at a minimum 1-year postoperative questionnaires. Magnetic resonance imaging of the affected shoulder was obtained preoperatively and confirmed the diagnosis of a rotator cuff tear. Surgery was performed by a single surgeon who is a fellowship-trained sports medicine surgeon.

Patient evaluation

Preoperative evaluation included complete documentation of the patient demographics including age, gender, smoking status, history of diabetes, and worker's compensation status. In addition, a pre-existing diagnosis of clinical depression or anxiety was specifically asked and recorded for each patient. The charts were also reviewed for pre-existing diagnosis by a primary care provider or mental health specialist. Patients were specifically asked to differentiate between pre-existing diagnosis of anxiety or depression and not just a transient feeling on the day of the visit. Clinically, tear size, atrophy, and fatty infiltration were recorded. Muscle atrophy of the rotator cuff was graded according to the criteria proposed by Warner et al[17] and based on an oblique sagittal magnetic resonance image where the coracoid and scapular spine meet the scapular body. Fatty infiltration of the rotator cuff was evaluated by the criteria established by Goutallier et al[8] and based on fatty streaks within the muscle belly shown on an oblique sagittal magnetic resonance image.

Patient surveys including the ASES shoulder score and 2 questions on the Western Ontario Rotator Cuff Index (WORC) related to depression and anxiety from the shoulder were administered preoperatively, 1 year postoperatively, and mailed annually postoperatively.

ASES scale

The ASES score gives equal weight to a subjective functional scale measuring activity of daily living (0-3 for each of 10 tasks, with a total of 0-30) and a subjective pain scale (0-10, with 10 being the worst). The ASES is a reliable and valid shoulder outcome measure.[13]

WORC index

The WORC index was designed to measure health-related quality of life in patients with conditions related to the rotator cuff. Its design had 5 domains: (1) pain and physical symptoms, (2) sports and recreation, (3) work, (4) lifestyle, and (5) emotions. The WORC index contains 21-item questions, and each question is graded on a 100-mm visual analog scale with higher numbers indicating worse scores. The WORC total is obtained by adding the scores on all the items and dividing by the maximum total raw

score 2100 and multiplying by 100 to get a percentage. The emotion domain score consists of questions specific to depression and anxiety. These questions are "How down in the dumps or depressed do you feel because of your shoulder?" and "How worried or concerned are you about the effect of your shoulder on your occupation?" The WORC is a reliable and valid outcome measure;[10,18] however, the emotional domain alone was not validated separately. For the purpose of this study, we are reporting on these responses as an indicator of depression or anxiety specifically related to the shoulder condition, not as an outcome measure for the procedure. They are therefore referred to as "depression score" and "anxiety score" in the subsequent sections. In addition, WORC questions were not designed to specifically determine whether patients are suffering from adjustment disorder. However, because it does relate mood symptoms to shoulder function, it may be a harbinger of adjustment disorder.

Operative treatment

Preoperative evaluation, examination under anesthesia, intraoperative findings, and surgeon experience dictated the specifics of the surgical intervention. All patients underwent arthroscopic rotator cuff repair in the beach chair position. Single-row repairs were performed on 80% of subjects, whereas 20% had double-row repairs.

Postoperative protocol

Subjects were immobilized in a sling for 6 weeks, with limited assisted range of motion during that time, followed by structured physical therapy (PT) to progress active motion starting at 6 weeks postoperatively, and then gradual progression of strengthening beginning at 10 weeks postoperatively with PT guidance until 4 months postoperatively typically.

Statistical analysis

SAS statistical software (version 9.3) was used for all statistical analysis. $P < .05$ was considered statistically significant. Subjects were divided into 2 groups, those with a pre-existing diagnosis of depression and/or anxiety and those with no diagnosis of anxiety or depression. Confounders including distribution of age, gender, smoking status, history of diabetes, worker's compensation, tear size, muscle atrophy, and fatty infiltration were tested between groups by independent t-tests, χ^2 tests, or Fisher's exact tests as appropriate.

The preoperative and postoperative ASES scores and change in pre- to postoperative ASES scores were calculated. The change in pre- and postoperative shoulder-specific (WORC-reported) depression and anxiety were also calculated. Spearman's correlations were evaluated between the change in shoulder-specific (WORC-reported) depression and anxiety and the change in ASES and stratified by gender. Spearman's correlations were also evaluated between the change in shoulder-specific (WORC-reported) depression and anxiety and the change in ASES and stratified by clinical diagnosis of anxiety or depression.

Those with depression/anxiety were compared with those without depression/anxiety via the Wilcoxon rank sum test for preoperative ASES, postoperative ASES, and change between pre- to postoperative ASES, preoperative shoulder-related depression/anxiety (WORC), postoperative shoulder-related depression/anxiety (WORC), and change in shoulder-related depression/anxiety (WORC).

A subgroup analysis stratified by gender was performed using the Wilcoxon rank sum test to determine whether the association between preoperative ASES, postoperative ASES, and change between pre- to postoperative ASES, preoperative shoulder-related depression/anxiety (WORC), postoperative shoulder-related depression/anxiety (WORC), and change in shoulder-related depression/anxiety (WORC) differed between males and females. The association between the change in shoulder-related depression/anxiety (WORC) and the change in ASES was tested using Spearman's correlation stratified by gender.

Results

There were 296 subjects who underwent rotator cuff repairs during this time period. One hundred and five (35.5%) did not complete minimum of 1-year postoperative surveys and 4 (1.3%) did not complete preoperative surveys. Sixteen subjects (5.4%) had missing values for pre- or postoperative shoulder-related depression or anxiety WORC questionnaire items. The remaining 171 subjects were enrolled between January 2011 and June 2017 who underwent arthroscopic rotator cuff repair and were evaluated preoperatively with minimum 1-year follow-up (57.8% of all rotator cuff repair subjects). There were no statistically significant differences between the preoperative characteristics of those who did not follow up and those who were included in the study (age $P = .67$; gender $P = .32$; diabetes $P = .37$; worker's compensation $P = .13$; high atrophy $P = .68$; tear >2.5 cm $P = .97$; clinically documented anxiety/depression $P = .50$). The mean follow-up for the postoperative scores was 36.6 months (standard deviation, 17.5; range, 12-77). There were 118 males and 53 females with an average age of 58.0 years (range, 37-79 years, $P = .45$). There were 46 (26.9%) patients with and 125 (73.1%) patients without a pre-existing history of depression and/or anxiety. Depression alone was diagnosed in 16 (9.4%) of subjects, whereas anxiety alone was diagnosed in 11 (6.4%) of subjects; 19 (11.1%) subjects were diagnosed with both depression and anxiety. The average age, tear size, atrophy, and fatty infiltration, smoking status, history of diabetes, or worker's compensation did not significantly differ between groups, see Table I. There were a significantly higher proportion of females diagnosed with anxiety or depression (39.6%) as compared with males (21.2%; $P = .0119$). Specifically, females were more often diagnosed than males with anxiety alone (7.6% vs. 5.9% for females and males, respectively), depression alone (17.0% of females vs. 5.9% of males), and concomitant diagnoses of anxiety and depression (15.1% of females vs. 9.3% of males).

A comparison of preoperative, postoperative scores for depression and anxiety related to the shoulder, and ASES scores stratified by gender are shown in Table II. Females

Table I Patient demographics

	Total sample (N = 171)	Anxiety/depression (N = 46)	No anxiety/depression (N = 125)	*P*
	n (%)	n (%)	n (%)	
Males	118 (69.0)	25 (21.2)	93 (78.8)	.01
Females	53 (31.0)	21 (39.6)	32 (60.4)	
Smoker	19 (11.2)	5 (11.1)	14 (11.3)	.97
Worker's compensation	24 (14.0)	5 (10.9)	19 (15.2)	.47
Diabetes	26 (15.2)	9 (19.6)	17 (13.6)	.34
Tear >2.5 cm	10 (6.1)	2 (4.7)	8 (6.6)	.64
High atrophy*	28 (19.1)	7 (18.9)	21 (19.1)	.98
	Mean (SD)	Mean (SD)	Mean (SD)	
Age	58.0 (8.5)	58.8 (8.2)	57.7 (8.7)	.45
Fatty atrophy grade	1.4 (1.1)	1.4 (1.1)	1.4 (1.2)	.95
Tear size (cm)	1.6 (0.8)	1.5 (0.8)	1.6 (0.8)	.58

SD, standard deviation.
* @High atrophy includes classifications of moderate and severe as described by Warner et al.[17]

demonstrated greater improvements in depression (36.2 vs. 16.0; $P = .0009$) and anxiety (36.6 vs. 19.4; $P = .003$) related to the shoulder compared with male patients. Female and male patients had similar improvements in ASES scores (25.4 vs. 14.7; $P = .09$). A high correlation was identified between the change in depression and anxiety scores and the change in ASES from preoperatively to postoperatively, $r = 0.735$ and $r = 0.708$, respectively (Table III). A greater change in depression/anxiety scores related to the shoulder demonstrated a greater improvement in ASES scores. This pattern was seen for males and females for depression related to the shoulder ($r = 0.64$, $r = 0.85$, respectively) and anxiety ($r = 0.64$, $r = 0.78$, respectively), but there was a stronger relationship among females.

A comparison of preoperative, postoperative scores for depression and anxiety related to the shoulder, and ASES scores stratified by those with or without a history of a clinical diagnosis of anxiety or depression is shown in Table IV. Patients with or without a history of a clinical diagnosis of depression or anxiety had similar improvements in shoulder-related depression or anxiety (21.5 vs. 22.5, $P = .65$; 20.9 vs. 26.1, $P = .40$, respectively). In addition, regardless of a history of with or without a clinical diagnosis depression, there was a strong association between improvement in ASES scores and changes in shoulder-related depression ($r = 0.68$, $r = 0.75$, respectively, for depression, Table V). In patients with clinically diagnosed anxiety, there was only a moderate association, $r = 0.56$, with the change in anxiety related to the shoulder and change in ASES, compared with $r = 0.74$ for those without diagnosed anxiety/depression. Overall, patients with clinically diagnosed anxiety/depression had changes in ASES less correlated with changes in depression ($r = 0.680$, $r = 0.753$) and anxiety ($r = 0.559$ vs. $r = 0.739$) compared with those without clinically diagnosed anxiety or depression.

Discussion

The main findings in this study support that shoulder-related depression or anxiety symptoms, adjustment disorder, should be considered separately from clinical depression or anxiety

Table II Wilcoxon rank sum test between gender

	Full sample (N = 171)	Male (N = 118)	Female (N = 53)	*P*
		Mean	Mean	
Preoperative depression related to the shoulder (WORC Q20)	37.8	34.0	46.3	.04
Postoperative depression related to the shoulder (WORC Q20)	15.6	18.0	10.1	.03
Change in WORC Q20 (pre minus post)	22.3	16.0	36.2	<.001
Preoperative anxiety related to the shoulder (WORC Q21)	44.0	42.0	48.5	.31
Postoperative anxiety related to the shoulder (WORC Q21)	19.3	22.6	11.9	.01
Change in WORC Q21 (pre minus post)	24.7	19.4	36.6	.003
Preoperative ASES	66.0	68.7	59.1	.06
Postoperative ASES	85.1	83.8	88.1	.21
Change in ASES	17.6	14.7	25.4	.09

WORC, Western Ontario Rotator Cuff Index; *ASES*, American Shoulder and Elbow Surgeons score.

Table III Spearman's correlation between change in shoulder-related depression/anxiety and change in ASES score stratified by gender

		Full sample (N = 171)	*P*	Male (N = 118)	*P*	Female (N = 53)	*P*
		r		*r*		*r*	
Change in depression related to the shoulder (WORC Q20)	Change in ASES	0.735	<.0001	0.641	<.0001	0.853	<.0001
Change in anxiety related to the shoulder (WORC Q21)	Change in ASES	0.708	<.0001	0.638	<.0001	0.784	<.0001

ASES, American Shoulder and Elbow Surgeons score; *WORC*, Western Ontario Rotator Cuff Index.

Table IV Wilcoxon rank sum test between clinical diagnosis of anxiety or depression

	Full sample (N = 171)	Clinical diagnosis of anxiety or depression (N = 46)	No clinical diagnosis of anxiety or depression (N = 125)	*P*
	Mean	Mean	Mean	
Preoperative depression related to the shoulder (WORC Q20)	37.8	48.0	34.1	.03
Postoperative depression related to the shoulder (WORC Q20)	15.6	26.5	11.5	.09
Change in WORC Q20 (pre minus post)	22.3	21.5	22.5	.65
Preoperative anxiety related to the shoulder (WORC Q21)	44.0	50.3	41.7	.24
Postoperative anxiety related to the shoulder (WORC Q21)	19.3	29.4	15.6	.11
Change in WORC Q21 (pre minus post)	24.7	20.9	26.1	.39
Preoperative ASES	66.0	61.5	67.7	.180
Postoperative ASES	85.1	78.0	87.4	.04
Change in ASES	17.6	15.9	18.2	.54

WORC, Western Ontario Rotator Cuff Index; *ASES*, American Shoulder and Elbow Surgeons score.
Summary of scores preoperatively, postoperatively, and the change from preop to postop. Comparison between those with and those without clinical diagnosis of anxiety/depression using the Wilcoxon rank sum test.

when assessing rotator cuff patients. Adjustment disorder is a disease associated with changes in health, such as a rotator cuff tear, in which patients may display symptoms of anxiety or depression.[1] It may be difficult to discern adjustment disorder from clinical depression and anxiety, but the former is related specifically to a life stressor or health condition and the latter requires specific symptomatology that is sustained over a length of time that can be up to 6 months.[1] In this study, patients who had depression and anxiety symptoms related to the shoulder were defined as suffering from adjustment disorder and demonstrated significantly improved functional and mood symptoms without further intervention other than repair. There was also a strong association between improvements in ASES scores and improvements in adjustment disorder–related mood symptoms. In other words, functional and emotional improvements after rotator cuff repair are closely inter-related. Patients who had pre-existing clinical anxiety or depression demonstrated similar improvements in mood symptoms related to the shoulder; however, their ASES scores were less strongly correlated. As such, it appears that the presence of pre-existing clinical anxiety or depression appears to have a lasting impact on patient-

Table V Spearman's correlation between change in shoulder-related depression/anxiety and change in ASES score stratified by clinical diagnosis anxiety/depression

		Clinically diagnosed anxiety/depression (N = 46)	*P*	No clinically diagnosed anxiety/depression (N = 125)	*P*
		r		*r*	
Change in depression related to the shoulder (WORC Q20)	Change in ASES	0.680	<.0001	0.753	<.0001
Change in anxiety related to the shoulder (WORC Q21)	Change in ASES	0.558	.0020	0.739	<.0001

ASES, American Shoulder and Elbow Surgeons score; *WORC*, Western Ontario Rotator Cuff Index.

reported outcomes and may benefit from perioperative optimization to improve outcomes.

There have been several reports on depression and its negative effect on rotator cuff surgery outcomes; however, these studies focused on symptoms at the time of preoperative assessment.[4-7,15-19] However, the symptoms at the time of preoperative assessment may represent clinical depression/anxiety or adjustment disorder as a response to the pain or limitations from a rotator cuff tear or from pre-existing clinical depression or anxiety. Interpretation of prior studies may lead clinicians to believe that patients presenting with symptoms of depression or anxiety may have poorer outcomes after surgery; however, a recent study demonstrated that although patients with clinical diagnosis of anxiety or depression had lower pre- and postoperative ASES scores, they demonstrated the same degree of ASES improvement after arthroscopic rotator cuff repair compared with those without prior diagnoses.[11] The current study found that similar improvements in mood symptoms were also seen in patients with and without pre-existing clinical diagnosis of depression or anxiety. Although intuitive, it reinforces the notion that mood and function are related and that by decreasing pain and improving function, rotator cuff repair can improve the quality of life of our patients.

The important distinction between adjustment disorder and depression or anxiety symptoms vs. clinical depression/anxiety is due to differences in treatment. The optimal treatment for adjustment disorder is removal of the stressor. In the case of adjustment disorder related to a rotator cuff disease, it is improvement in pain or return of the ability to use one's shoulder for activities of daily living or recreational activities. The treatment of clinical depression or anxiety is a multifaceted approach that may include various forms of psychotherapy and medications. In light of these differences, it may explain why patients with adjustment disorder–type symptoms have significant improvement in their mood and functional scores regardless of gender or clinical diagnosis of depression/anxiety after arthroscopic rotator cuff repair. As such patients who have mood symptoms related to adjustment disorder may actually be ideal patients for rotator cuff surgery with significant potential for improvement.

Interestingly, however, in this study, patients with clinical depression and anxiety also demonstrated improvements in patient-reported mood related to the shoulder. In addition, as previously identified, they experienced the same amount of improvement in patient-reported functional scores.[11] The current study also found a moderate correlation of mood symptoms with patient-reported functional outcomes even in patients with clinical depression/anxiety, albeit less than those without. If the treatments of adjustment disorder and clinical depression/anxiety are different, then why is there any improvement or correlation? One explanation may be that the increase in physical activity after rotator cuff surgery. The interplay between mood and physical activity is well understood, and exercise is often prescribed as a treatment modality for clinical depression.[2] Therefore, the improvement in pain may allow patients to engage in rehabilitation and physical activities that can also improve their mood symptoms. It is important to emphasize that although patients with clinical depression or anxiety had mood improvements, they were not as strongly related to their patient-reported functional outcomes as those without prior diagnoses. This highlights a possible underlying effect of a patient's clinical depression or anxiety that may limit the full emotional benefit after rotator cuff surgery. This underlying effect may be a target for optimization with directed treatment for clinical depression/anxiety before surgery.

The current study also evaluated whether gender played a role in mood disorders and outcomes. Females reported greater shoulder-related depression/anxiety than males but also demonstrated a greater improvement over time than males. In other words, despite having greater preoperative shoulder-related depression/anxiety, females actually had better postoperative shoulder-related mood symptoms. Both genders experienced high correlations between the change in shoulder-related mood symptoms and the change in ASES; however, the pattern was more strongly seen in females. These findings suggest that although females may be affected more by adjustment disorder, they are also more likely to experience a greater improvement in their mood symptoms after rotator cuff surgery.

This study has a number of limitations. This study was performed with data from a surgical registry; as such there was no control group of patients who had only nonoperative management of their rotator cuff tears. Second, in this study, the history of a pre-existing diagnosis of depression or anxiety was dependent on self-reported history or diagnosis by a primary care provider. It is possible that patients did not accurately report their mood disorders; however, this is reflective of a typical practice in which diagnosis is predicated on a patient's self-reported history or prior documentation by a previous provider. The specific questions on the WORC index related to depression and anxiety to rotator cuff disease have not been validated as independent questions apart from the rest of the WORC index, although they are part of the emotional domain that was validated.[10,18] There are currently no validated specific surveys or questionnaires to determine adjustment disorder or feelings of depression and anxiety specifically related to rotator cuff disease. These questions represent the best alternative as they are part of a validated emotional domain within the WORC index that is designed and validated specifically for rotator cuff disease.

Another limitation of this study is that there is no measure of severity of or optimization of treatment of pre-existing anxiety and depression at the time of surgery and during the postoperative course. It is of course extremely simplistic to study the presence of anxiety or depression as a binary yes or no variable. Rather, future research should focus on optimizing management of pre-existing anxiety and depression to improve surgical outcomes for our patients afflicted by these conditions as well as rotator cuff tears. Shoulder-

specific anxiety and depression symptoms seem to be largely correctable with rotator cuff repair, yet pre-existing diagnoses of anxiety and depression are associated with lower postop ASES scores. Therefore, a better understanding of the severity of and perioperative management of these conditions could improve the methodology of future studies seeking to improve postoperative outcomes of rotator cuff repair in patients with anxiety and depression.

Conclusions

After rotator cuff repair, symptoms of depression/anxiety related to the shoulder improved dramatically in patients with and without clinical diagnosis of depression or anxiety. Patient-reported mood and functional outcomes are highly correlated after rotator cuff repair but more strongly correlated in females. However, as the patient-reported functional outcomes of those with pre-existing clinical diagnosis of anxiety/depression improved, they did not experience as strong as an improvement in their mood symptoms as those without prior diagnoses and may benefit from directed treatment of these symptoms. Physicians should counsel patients with pre-existing mood disorders that they will likely experience improved outcomes after rotator cuff surgery, but may experience further improvement with concomitant directed treatment of their mood disorders. Patients with mood symptoms related to their shoulder disorder only, conversely, experience a strong relationship between their improvement in function and their mood symptoms and may be ideal candidates for rotator cuff surgery. As such, it is important for clinicians to separate mood symptoms related to the rotator cuff injury from clinical depression and anxiety.

Disclaimer

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