The Impact of Depression on Patient Outcomes in Hip Arthroscopic Surgery

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Background: Mental health impairments have been shown to negatively affect preoperative self-reported function in patients with various musculoskeletal disorders, including those with femoroacetabular impingement.

Hypothesis: Those with symptoms of depression will have lower self-reported function, more pain, and less satisfaction on initial assessment and at 2-year follow-up than those without symptoms of depression.

Study Design: Cohort study; Level of evidence, 3.

Methods: Patients who were enrolled in a multicenter hip arthroscopic surgery registry and had 2-year outcome data available were included in the study. Patients completed the 12-item International Hip Outcome Tool (iHOT-12), visual analog scale (VAS) for pain, and 12-item Short-Form Health Survey (SF-12) when consenting for surgery. At 2-year follow-up, patients were emailed the iHOT, the VAS, and a rating scale of surgical satisfaction. Initial SF-12 mental component summary (MCS) scores <46.5 and ≤ 36 were used to qualify symptoms of depression and severe depression, respectively, as previously described and validated. Repeated-measures analysis of variance was performed to compare preoperative and 2-year postoperative iHOT-12, VAS, and satisfaction scores between those with and without symptoms of depression.

Results: A total of 781 patients achieved the approximate 2-year milestone (mean follow-up, 735 ± 68 days), with 651 (83%) having 2-year outcome data available. There were 434 (67%) female and 217 (33%) male patients, with a mean age of 35.8 ± 13.0 years and a mean body mass index of 25.4 ± 8.8 kg/m^2. The most common procedures were femoroplasty (83%), followed by synovectomy (80%), labral repair (76%), acetabuloplasty (58%), acetabular chondroplasty (56%), femoral chondroplasty (23%), and labral reconstruction (19%). The mean initial SF-12 MCS score was 51.5 ± 10.3, with cutoff scores indicating symptoms of depression and severe depression in 181 (28%) and 71 (11%) patients, respectively. Patients with symptoms of depression scored significantly ($P < .05$) lower on the initial iHOT-12 and VAS and 2-year follow-up iHOT-12, VAS, and rating scale of surgical satisfaction.

Conclusion: A large number of patients who underwent hip arthroscopic surgery presented with symptoms of depression, which negatively affected self-reported function, pain levels, and satisfaction on initial assessment and at 2-year follow-up. Surgeons who perform hip arthroscopic surgery may need to identify the symptoms of depression and be aware of the impact that depression can have on surgical outcomes.

Keywords: mental health; patient satisfaction; hip arthroscopic surgery; outcome

Arthroscopic hip preservation surgery is commonly performed to address nonarthritic sources of hip pain in younger, active patients.[27] The outcomes of hip arthroscopic surgery may be attributed to many factors, including the technical aspects of surgery, extent of injury, coexisting abnormalities, patient demographics, and physical impairments. Mental health impairments have been related to lower preoperative self-reported function in patients with femoroacetabular impingement (FAI).[17,32] Furthermore, depression has been shown to negatively affect postoperative outcomes in several orthopaedic populations.[1-3,7,9,28,33,36,37] The effect of preoperative symptoms of depression on postoperative outcomes in a general hip arthroscopic surgery population has not been described.

Literature reviews have found hip arthroscopic surgery to be safe and effective, resulting in high levels of patient satisfaction.[12,19,25] The outcomes of hip arthroscopic surgery have specifically been linked to the extent of cartilage damage, age, body mass index (BMI), previous hip surgery, and workers' compensation status.[6,8,13,14,29,31,34] In patients with FAI, psychological distress was found to negatively correlate with initial self-reported functional status, with symptom

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severity being more related to mental health status than either the size of the labral tear or FAI deformity.[17,32] Specifically, patients with FAI and depression had higher pain levels and lower self-reported function compared with those without depression on initial assessment.[17] There is a need to investigate the potential role that depression may have on postoperative outcomes in hip arthroscopic surgery.

Patients with mental health impairments may be at risk for suboptimal surgical outcomes.[7] The purpose of this study was to describe the symptoms of depression and assess the effect of depression on patient-reported function, pain, and 2-year postoperative outcomes in a general hip arthroscopic surgery population. The hypothesis of this study was that those with symptoms of depression would report lower function, more pain, and less satisfaction on initial assessment and at 2-year follow-up than those without symptoms of depression.

METHODS

Data Collection

This was a retrospective review of prospectively collected data from 7 sites across the United States. Data were maintained in a cloud-based, secure electronic research registry. The registry consisted of patients who consented to undergo hip arthroscopic surgery at 1 of 7 centers, with all patients having musculoskeletal hip lesions appropriate for arthroscopic intervention. Exclusion criteria for the registry included those with primary lumbopelvic abnormalities, advanced hip arthrosis (Tönnis >1), or other conditions contraindicated for arthroscopic hip surgery. An inability to read or understand English was also an exclusion criterion for the registry. Inclusion criteria specific to this study included patients who had 2-year follow-up outcome data available. Institutional review board approval for the pre hoc collection and storage of agreed-upon deidentified clinical data was granted according to individual institutional requirements.

At the time of consenting for surgery, patients were given the 12-item International Hip Outcome Tool (iHOT-12), visual analog scale (VAS) for pain, and 12-item Short Form Health Survey (SF-12). At 2-year follow-up, patients were emailed the iHOT-12, the VAS, and a rating scale of surgical satisfaction. The VAS asked patients to rate their current level of pain on a 10-cm line, with "0" being no pain and "10" being the worst imaginable pain. Surgical satisfaction was also measured on a 10-cm line, with "0" being not satisfied at all and "100" being completely satisfied. The mental component summary (MCS) score was calculated from the SF-12. Demographic information was recorded from the electronic registry.

The SF-12 MCS has been found to be a valid measure of mental health, with evidence to support its ability in screening for symptoms of depression (specificity: 0.87; sensitivity: 0.83).[10,20,40] Previous studies determined the cutoff score using the SF-12 MCS to identify those with symptoms of depression as <46.5[21,36,40] and those with a more severe disorder as ≤ 36.[10] The iHOT-12 is an outcome instrument developed for hip arthroscopic surgery, with psychometric evidence to support its use.[11]

Statistical Analysis

Repeated-measures analysis of variance (ANOVA) was performed to compare preoperative and 2-year postoperative iHOT-12, VAS, and satisfaction scores between those with and without symptoms of depression (SF-12 MCS score <46.5) and symptoms of severe depression (≤ 36). One-way ANOVA was also used to determine if there was a difference in initial SF-12 MCS scores based on sex, age (≥ 50 years or <50 years), pain chronicity (symptoms ≥ 2 years or <2 years), and BMI (≥ 25 kg/m^2 or <25 kg/m^2).

RESULTS

At the time of the study, 781 patients achieved the approximate 2-year milestone, with 651 (83%) meeting inclusion

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TABLE 1
Repeated-Measures Analysis of Variance Comparing iHOT-12, VAS, and Surgical Satisfaction Scores Between Those With and Without Symptoms of Depression[a]

	Initial		2-Year Follow-up		
	iHOT-12	VAS	iHOT-12	VAS	Satisfaction
Without symptoms of depression	37.1 (35.4-38.8)	4.9 (4.7-5.1)	74.2 (72.1-76.3)	1.8 (1.7-2.0)	82.6 (80.5-84.7)
Symptoms of depression	29.5 (26.9-32.2)[b]	5.3 (5.0-5.7)[c]	64.4 (60.4-68.5)[b]	2.5 (2.1-2.9)[b]	74.4 (69.8-79.0)[b]
Symptoms of severe depression	23.7 (19.4-27.9)[b]	5.6 (5.1-6.2)[b]	60.8 (48.0-73.5)[b]	2.8 (1.8-3.9)[b]	75.4 (62.8-88.0)[b]

[a]Data are shown as mean (95% CI). iHOT-12, 12-item International Hip Outcome Tool; VAS, visual analog scale.
[b]$P < .0005$ compared with patients without symptoms of depression.
[c]$P = .025$ compared with patients without symptoms of depression.

criteria with data available for analysis. There were 434 (67%) female and 217 (33%) male patients, with a mean age of 35.8 ± 13.0 years and a mean BMI of 25.4 ± 8.8 kg/m^2. The following surgical procedures were performed: femoroplasty (83%), synovectomy (80%), labral repair (76%), acetabuloplasty (58%), acetabular chondroplasty (56%), femoral chondroplasty (23%), and labral reconstruction (19%).

The mean follow-up time for the 2-year patient-reported outcome measures was 735 ± 68 days. The mean initial SF-12 MCS score was 51.5 ± 10.3, with cutoff scores indicating symptoms of depression and severe depression in 181 (28%) and 71 (11%) patients, respectively. Initial SF-12 MCS scores were not different based on sex (51.5 [female] vs 51.4 [male]; $P = .88$), age (51.2 [≥50 years] vs 51.7 [<50 years]; $P = .51$), pain chronicity (51.0 [≥2 years] vs 51.9 [<2 years]; $P = .32$], or BMI (50.8 [≥25 kg/m^2] vs 51.8 [<25 kg/m^2]; $P = .27$).

The results of repeated-measures ANOVA comparing preoperative and 2-year postoperative iHOT-12, VAS, and surgical satisfaction scores between those with and without symptoms of depression and severe depression are presented in Table 1. At 2-year follow-up, all patients had improved iHOT-12 and VAS scores. Patients who were categorized as having symptoms of depression and severe depression scored significantly lower on the initial iHOT-12, 2-year follow-up iHOT-12, and 2-year follow-up rating scale of surgical satisfaction ($P < .05$ for each) as well as significantly higher on the initial and 2-year follow-up VAS ($P < .05$) compared with patients having no symptoms of depression.

DISCUSSION

A high number of patients who underwent hip arthroscopic surgery across multiple centers presented with symptoms of depression. Using the SF-12 MCS, this study identified symptoms of depression to be present in 28% of patients undergoing hip arthroscopic surgery for nonarthritic hip lesions. All patients had improved iHOT-12 and VAS scores at 2-year follow-up. The hypothesis of this study was supported, as those with symptoms of depression reported lower function, more pain, and less satisfaction on initial assessment and at 2-year follow-up than those without symptoms of depression.

Surgeons who perform hip arthroscopic surgery may need to screen for symptoms of depression and recognize the potential negative impact that this condition can have on function, pain levels, and postoperative outcomes. The importance of considering mental health in the evaluation process is also supported by Jacobs et al,[17] who found that symptom severity was significantly more related to mental health status than either the size of the labral tear or FAI deformity.

The current study used a common general health questionnaire, the SF-12 MCS, with previously validated cutoff scores to screen for symptoms of depression. Depression as identified using the SF-12 MCS was also found to affect 2-year outcomes in patients who underwent surgical hallux valgus correction.[36] In clinical practice, if patients are identified as potentially having depression, patient education regarding the importance of their psychological health to postoperative outcomes should be considered. Referral to a mental health care provider to evaluate and provide intervention may also be indicated. The potential benefit of including mental health intervention as part of a comprehensive surgical plan is an area for future study, as it is unknown if preoperative or postoperative mental health intervention would improve patient-reported outcomes, VAS scores, and satisfaction in patients with depression.

There are several factors that have been shown to negatively affect the outcomes of hip arthroscopic surgery. Some of these factors include cartilage damage, sex, age, and BMI.[6,8,13,14,29,31,34] The current study found that initial SF-12 MCS scores were not different based on sex, age (≥50 or <50 years), pain chronicity (symptoms ≥2 or <2 years), and BMI (≥25 or <25 kg/m^2). The 2-year outcomes of this study showed an overall high level of surgical satisfaction. Although patients with symptoms of depression had initial and 2-year iHOT-12 scores that were lower and had higher pain levels when compared with those without such symptoms, the absolute improvements on the iHOT-12 and VAS (ie, change from preoperative to 2-year postoperative) were similar between those with and without symptoms of depression. Hip arthroscopic surgery appears to still provide significant clinical benefit to patients with symptoms of depression, which is not, in itself, a surgical

contraindication, as the amount of improvement was similar.

The findings of absolute improvements being similar between those with and without mental health impairments have also been observed in outcomes for anterior cruciate ligament reconstruction (ACLR),[9] hand injuries,[23] disc surgery,[22] and knee replacement.[15,18] It should be noted that symptoms of depression may not universally be associated with lower functional scores at all assessment time intervals. Studies after ACLR found that functional scores were not different between those with and without depression when looking at time intervals between 3 and 24 weeks.[9] Garcia et al[9] proposed that during these early rehabilitation phases, patients are usually undergoing physical therapy. Counseling may occur as the patient interacts with the physical therapist, depending on the comfort level of the patient and clinical ability of the therapist to address mental health concerns. The impact of direct rehabilitation participation and the inclusion of mental health treatment in that process are poorly described for patients undergoing hip arthroscopic surgery and are beyond the scope of the current study.

Recovery and return to a desired level of activity can be influenced by environmental, personal, and psychological factors.[33] Unaddressed and unresolved psychological responses to an injury are thought to potentially impede rehabilitation and delay return to activity.[16] A meta-analysis of the general surgical literature found treatment that included psychological intervention to have improved postoperative outcomes.[4] Treatments addressing psychological factors have also been successful in those with low back pain,[39,41] chronic musculoskeletal pain,[24] and knee arthritis.[5] For rehabilitation after ACLR, a biopsychosocial rehabilitative model has been used, with potential interventions including guided imagery, relaxation techniques, self-advocacy goal setting, positive self-talking, development of a social support network, and professional psychological counseling.[7,16,26,35] Higher rates of exercise compliance and effort were found when interventions included self-advocacy goal setting and positive self-talking.[35] Interventions aimed at allowing the patient to express emotions may help to reduce stress levels and improve mood.[7] Relaxation and guided imagery interventions were associated with less anxiety and pain as well as greater improvements in strength.[26] Similar to ACLR, hip preservation surgery requires not only a physical commitment but also an emotional commitment throughout the postoperative rehabilitative process to achieve the goals of returning to a high level of activity. Therefore, interventions described in the biopsychosocial model of ACLR rehabilitation may prove to be beneficial for patients after hip arthroscopic surgery for nonarthritic abnormalities.

A high prevalence of mental health impairments was found to exist in patients with orthopaedic conditions,[3,28,33,37] being as high as 42% in those undergoing ACLR.[9] In the current study, symptoms of depression were found to be present in 28% of patients undergoing hip arthroscopic surgery for nonarthritic hip lesions. Despite the high prevalence of mental health issues and the known impact of these mental health issues on surgical outcomes, this area has not been extensively studied in hip arthroscopic surgery. A study by Nabavi et al[30] did not identify preoperative anxiety level as a predictor for outcomes at 1-year follow-up. However, the authors did not clearly describe how anxiety was defined.[30] A study by Tjong et al[38] found that in a small group of participants (N = 23), self-motivation, optimism, strong social support, and appropriate goal setting positively affected return to sport after hip arthroscopic surgery for FAI. It is possible that these coping mechanisms could be used by patients with mental health impairments to avoid maladaptive behaviors that may negatively affect outcomes. The cause-and-effect relationship between mental health impairments and surgical outcomes is unknown. Do depressed patients seek care earlier because of symptom magnification, or do musculoskeletal pain and loss of function lead to depression symptoms?

The advantage of this study was that it was a large multicenter study with a broad range of nonarthritic hip disorders. There are a number of limitations of this study that need to be acknowledged. A more comprehensive assessment of mental health could have been conducted to include verification of the mental health status by an appropriately trained professional. Although the method used to identify the symptoms of depression was supported by evidence,[10,17,21,32,36,40] alternative depression-specific mental health instruments could have been employed. Also, this study was not able to identify whether hip pain and functional limitations preceded or contributed to the symptoms of depression. Without objective measures, we are unsure if the patients with depression are actually doing worse because they are depressed or think they are doing worse because they are depressed. Another limitation is that 2-year follow-up SF-12 scores were not reported. This could assist in delineating whether initial symptoms of depression were related to preoperative hip pain and if, along with postoperative hip pain improvement, the symptoms of depression also improved. Although some of the factors that have been shown to affect postoperative outcomes, such as sex and age, were investigated in relation to SF-12 MCS scores, others such as dysplasia or high-grade chondral damage merit further investigation. Future studies could also examine if multidisciplinary management including mental health treatment may improve outcomes in patients identified with mental health impairments.

CONCLUSION

A high number of patients who underwent hip arthroscopic surgery presented with symptoms of depression, which negatively affected self-reported function, pain levels, and satisfaction on initial assessment and at 2-year follow-up. Surgeons who perform hip arthroscopic surgery may need to identify the symptoms of depression and be aware of the impact that depression can have on surgical outcomes.

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