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Hip Arthroplasty or Medical Management: A Challenging Treatment Decision for Younger Patients

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ABSTRACT

The two main treatment options for total hip arthroplasty (THA), medical management and surgical intervention, have advantages and disadvantages, creating a challenging decision. Treatment decisions are further complicated in a younger population (≤50) as the potential need for revision surgery is probable. We examined the relationship of selected variables to the decision-making process for younger patients with symptomatic OA. Thirty-five participants chose surgical intervention and 36 selected medical management for their current treatment. Pain, activity restrictions, and total WOMAC scores were statistically significant ($P < .05$) for patients selecting surgical intervention. No difference in quality of life was shown between groups. Pain was the only predictor variable identified, however, activity restrictions were also influential variables as these were highly correlated with pain.

Osteoarthritis (OA) of the hip can cause symptomatic disability and can negatively affect an individual's physical and psychosocial health [1–3]. In most patients suffering from OA of the hip, pain and quality of life are the biggest indicators for total hip arthroplasty (THA) [2,4]. Based on the clinical course of OA and radiographic evidence, consensus does not exist on the appropriate time for performing THA [5]. Additionally, discrepancies exist between medical recommendations and patient preference for THA as a treatment option [1].

The decision-making process involves consideration of both external and internal factors, such as psychosocial considerations [2]. Because the two main treatment options, medical management and surgical intervention, have both disadvantages and advantages, the options present a challenging medical decision. Physicians often take a greater role in the decision-making process and patients experience feelings of helplessness and lack of control in the decision to treat hip OA [2].

Studies have demonstrated an increasing rate of surgical intervention, primarily THA, as a treatment option for patients suffering from symptomatic OA [6–8]. Increases for THA are present in all groups, with the younger age groups (20–49) growing with the greatest proportion. In the 20–49 age group, crude rate of THA procedures increased 30% from 2001 to 2007 [9]. Additionally, the rates for patients under the age of 60 choosing THA have steadily increased, accounting for almost 40% of THA procedures completed in the United States [10,11].

The CDC reported the OA prevalence increased significantly at age 45 [12]. Younger patients with OA potentially present with a more symptomatic and progressive form of the condition, often accompanied by poorer functionality. Age is the primary contraindication to THA for younger patients because they have the potential to undergo a second THA or revision surgery in their lifetime [13,14]. However, younger patients demonstrate increased interest in pursuing THA as a treatment option as the importance assigned to age as a contraindication decreases [10,15].

In a study by Martin et al physicians reported factors important to patients were symptoms, limitations, and negative effects on employment [16]. Research studying the decision-making process of hip OA patients is minimal, specifically in younger populations [17]. Increased knowledge of what factors are important for patients under the age of 50 with symptomatic OA may improve communication when discussing factors that may be assigned varying levels of importance between patients and physicians [16]. The purpose of the study was to examine the relationship of selected variables to the decision-making process for patients under the age of 50 with symptomatic OA.

Methods

Inclusion criteria included patients who had symptomatic hip OA, were under the age of 50 and candidates for surgical intervention. No gold standard of when THA should be recommended was discovered in the literature. Therefore, the guidelines from Gossec et al were used, which defined the gold standard for recommending surgical

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intervention as when an individual surgeon recommends THA, often because of a patient's pain and loss of functionality [18]. Participating physicians contributed to the design and process to select patients to provide increased consistency for included patients.

Enrollment of patients occurred at a large orthopedic practice at an academic medical center and an orthopedic private practice clinic, both located in the Midwestern United States. Exclusion criteria included patients with traumatic injuries or those who were not able to read or understand the related documents because of language or cognitive barriers. The dependent variable was the rate of selection of surgical intervention as the primary treatment decision. Independent variables included pain levels, activity restrictions, and quality of life.

Collection of the independent variable data was collected using the WOMAC and SF-12, both validated survey instruments, consistently used in OA research studies [19–22]. Permission to use both surveys was secured before research began. Demographic information and patient choices of treatment plans collected included age, gender, insurance status, and level of education completed. Participants also answered questions about current treatments, pain levels, and plans related to pursuing surgical intervention at the 6 month and one-year time points. Survey instruments had a self-administered format and participants completed the instruments on paper. Involvement in the study was limited to completing the surveys, and no follow-up component or further participation was necessary. No personal health information or any unique identifiers linked the participant to the survey.

Use of a power analysis determined the number of participants necessary to achieve statistical significance. The SF-12 mental component score represented the effects of pain, physical function, and quality of life. From a previous research study, the mean and SD of the SF-12 mental component score of 54.40 ± 11.70 was representative of patients who choose surgery [23]. A higher mental component score of at least 15%, or the equivalent of a score of 62.56, was the predicted score for patients who did not choose surgery. With a two-tailed test, a significance level of 0.05 and 80% power, each group contained 34 to detect a mean difference of 8.16. Sample size calculations were conducted using nQuery software that calculated a sample size of 68.

All variables underwent evaluation for co-linearity and if variables were co-linear, the strongest relationship of the two variables was included in the regression model. Results were considered significant with a two-tailed test and P-value < .05. Statistical analysis was completed using Microsoft Excel and SPSS software version 22 (IBM, 2013).

Results

A total of 71 patients participated in the study, with 56 (79%) from the private practice and 15 (21%) from the academic medical center. Thirty-five participants chose surgical intervention and 36 selected medical management for their symptomatic OA. Within the total study sample of 71 patients, 45 (63%) were male and 26 were (37%) female. The majority of participants were in the 41–50 age group, 25 (35%) being in the category 41–45 and 25 (35%) in the 46– 50 category. For the other age categories, two (3%) were 26–30, seven (10%) 31–35 and 12 (17%) were 36–40. Demographic information is provided in Table 1.

The majority of patients reported an education level of some college or higher (Fig. 1). The majority of participants (80%) had private insurance provided by their employer. Fig. 2 shows a breakdown of insurance coverage by group. There were no significant differences between groups related to insurance or education status.

The participant information survey also queried participants on current treatments used to manage their symptomatic OA. Table 2 shows current treatments for each group. Use of aggregate numbers represents the selected treatment modalities because many participants used more than one. The three most common interventions for the surgical group were medication, physical therapy, and no current treatment, compared to exercise, medication, and no current treatment in the group selecting medical management.

Table 1
Patient Demographics.

Variable	Total Sample ($N = 71$) n	%	Surgical Patients ($n = 35$) n	%	Medical Management Patients ($n = 36$) n	%
Gender						
Male	45	63	26	72	19	54
Female	26	37	10	28	16	46
Age group						
26–30	2	3	1	3	1	3
31–35	7	10	6	16.5	1	3
36–40	12	17	6	16.5	6	17
41–45	25	35	13	36	12	34
46–50	25	35	10	28	15	43

Twenty participants (28%) from the total study sample currently used no treatments to manage their symptomatic OA. Treatments in the "other" group included cortisone shots and acupuncture.

Fig. 3 shows the responses for the medical management group related to the likelihood of pursuing surgery in the next 6 months and in 1 year. Responses were similar at both ends of the spectrum, with 11 (30.5%) stating the likelihood of having surgery in the next 6 months was *not at all likely*, compared to 11 (30.5%) who selected *very likely* to pursue surgery in the next 6 months. However, when examining the same categories at the 1-year mark, the response rate for *very unlikely* dropped to eight (22%) compared to 13 (36%) for the *very likely* to pursue surgery response. For patients in the *undecided* category, responses remained similar between the 6-month and 1-year period, eight (22%) to seven (19%), respectively.

Group comparison took place using the scores from the pain subscale of the WOMAC. A significant difference between total WOMAC scores was present for patients selecting surgery compared to patients choosing medical management ($P = .012$).

The scores from the difficulty performing daily activities/physical function subscale of the WOMAC were used to compare groups. A significant difference emerged for the independent variable of activity restrictions for patients selecting surgery compared to patients choosing medical management ($P = .027$). The results were not statistically significant for stiffness between the two groups ($P = .15$).

The mental component score (MCS) and physical component score (PCS) scores from the SF-12 were used to compare groups to assess all three variables. The mean (standard deviation) for surgical patients and medical management patients for MCS scores was 46.7 (11.8) and 51 (10.1) respectively. The mean (standard deviation) for surgical patients and medical management patients for PCS scores was 36 (10.1) and 39.7 (10.9) respectively. No significant difference was present in MCS or PCS scores for patients selecting surgery compared to patients choosing medical management.

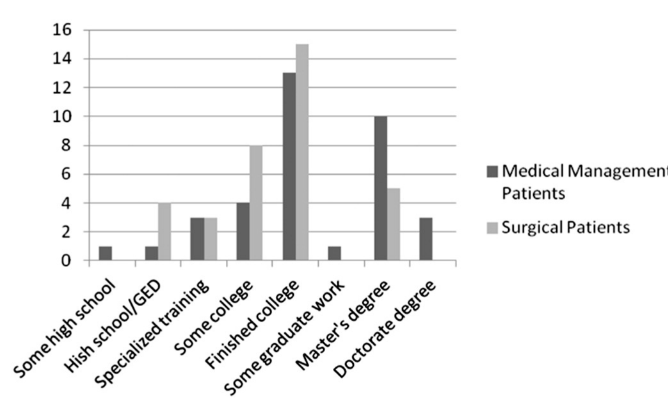

Fig. 1. Education levels by group.

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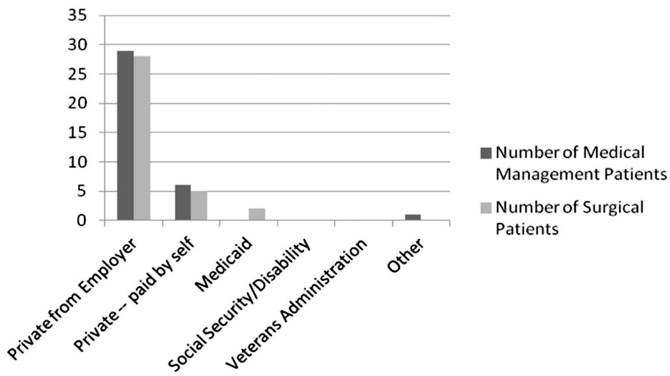

Fig. 2. Insurance status by group.

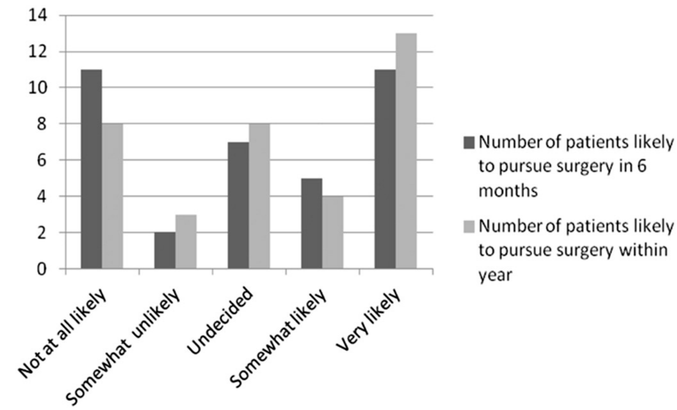

Fig. 3. Likelihood to pursue surgery at 6-month and 1-year timepoints.

All variables underwent checks for co-linearity. Because pain and activity restrictions had high correlations, only one of the two variables could be used in the regression analysis. Pain was the variable selected because it had a higher level of significance. Additional independent variables tested included gender, quality of life (SF-12 MCS score), age, and levels of education. Collapsing levels of education from eight groups into four were necessary for the analysis. The regression equation included only statistically significant variables. A stepwise forward regression analysis using a chi-square model identified potential predictor variables. Of the independent variables tested, only pain provided predictive power for the variance of treatment decisions ($\beta = .148$, $P = .017$; see Table 3). The model is significant ($\chi^2 = 6.42$, $df = 1$, $P = .011$). As pain increases, so does the likelihood of surgery (odds ratio [OR] = 1.16; 95% CI = 1.027 to 1.309).

The equation demonstrates a predictive value of 61.1 and 62.9% for medical management and surgical groups respectively (Table 3). An estimated 38% of the model was influenced by additional or confounding variables. The results warrant additional examination or analysis of independent variables and their relationship to the dependent variable, selection of surgical intervention.

Discussion

Results of the WOMAC, subscales assessing pain, activity restrictions, and total WOMAC scores demonstrated more severe and statistically significant scores when compared to patients selecting surgical intervention to patients choosing continued medical management. No statistical difference was present between groups for age, stiffness subscale and SF-12, PCS and MCS when comparing groups. Pain was the only predictor variable, based on the regression analysis. However, as activity restrictions were also highly correlated with pain, it must also be considered as a contributing predictive factor. Gender, quality of life, and levels of education did not demonstrate statistical significance between groups.

From a health care provider perspective, pain and increased function are often the leading indicators for surgical intervention, primarily THA [24,25]. The study results supported the influence of these factors from a patient's perspective. Despite the importance of relieving pain and increasing function in a younger patient, weighing these factors against the need for future revision surgery and longer-term outcomes is essential [13,14,26]. Secondary goals of surgical intervention include meeting individual functional demands of patients and preserving bone and muscle in case a revision is necessary in the future [25].

Aspects of medical management can benefit the majority of patients in terms of symptom control, but cannot halt the progression of the disease process. Many patients with severe OA will consider surgical intervention. However, one of the difficulties is balancing timing of integration of individual physical and psychosocial factors with an expectation of outcomes and the potential need for future revisions [26]. For example, patients may experience increased pain but have employment or caregiving responsibilities that preclude the opportunity to pursue surgical intervention. Expectations of the younger population differ greatly from older patients and present unique challenges [15]. Most researchers assessed an older population, making results not generalizable to a broader population. A younger, more active population has pursued surgical intervention with a focus on increasing mobility and activity levels with reduced pain to gain a higher quality of life. Findings of this study demonstrated that even in a younger population, selection of surgery had no relationship to increased age and was not a significant variable between treatment groups.

The study results demonstrated that the variable of age did not demonstrate significant difference related to treatment decisions. These results question the level of importance patients placed on age, compared to physicians, in regards to treatment decisions and recommendations. Because age is often the leading contraindication against recommending surgery, this gap between patients and providers supports the need for shared decision-making (SDM) to help weigh individual factors to make the best decision for each patient [27].

Pain and quality of life are often the biggest indicators for total hip THA [2,4]. The current study findings supported the research indicating pain as a large indicator for surgical intervention, but did not support quality of life as an influential factor. Further research may identify the role quality of life and additional factors play in the treatment decision process in a younger population. Additional factors such as the influence of activity restrictions on employment and potential parenting and caregiving roles also require further examination. Whereas most research has addressed an older population, minimal research has assessed which factors are important in a younger population.

Table 2
Current Treatments.

Treatment Option	Surgical Patients	Medical Management Patients
	($n = 35$)	($n = 36$)
Physical therapy	9	7
Medication	21	13
Exercise	7	17
Chiropractic care	1	6
Supplements (glucosamine)	4	4
No current treatment	10	10
Other	1	3

Table 3
Omnibus Tests of Model Coefficients.

	B	S.E.	Wald	*df*	Sig.	Exp(*B*)	95% CI	
							Lower	Upper
Pain	.148	.062	5.747	1	.017	1.160	1.027	1.309
Constant	−1.373	.617	4.955	1	.026	.253		

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The Agency for Healthcare Research and Quality (AHRQ) published results which reported descriptive statistics for a nationally representative sample of the U.S. for two widely used quality of life survey instruments, one being the SF-12 [28]. The average responses for the MCS were 51.5, which is close to the average score of 50. The present study used the SF-12 as one component to measure quality of life status. In the medical management group, the average score was 50.1 and average score of the surgical group was 46.7, almost four points lower, which indicated a lower quality of life score for this group, although not statistically significant.

However, no significant difference emerged between groups related to the MCS score component of the SF-12. Further complicating the assessment of quality of life, age-related differences in mental health status demonstrated no distinct trend among age, with older populations (55–74) reporting higher MCS than much younger (18–24) populations [28]. This is in direct conflict with the PCS, which steadily declines as age increases [28]. Fleischman reported the average PCS score as 50, equal to the average, and a SD of 10.0. For the surgical group, average PCS was 35.9 and the medical management group 39.7, both markedly lower than the average population, demonstrating lower physical functioning when compared to a normative population. Fleischman also assessed quality of life standards for populations with three conditions: hypertension, diabetes, and asthma. The average PCS scores for hypertension, diabetes, and asthma, were 44.2, 41.65, and 47.07 respectively, higher than the scores of the sample in this study.

The distinctly lower PCS scores of this study's sample (surgical group = 35.9, medical management = 39.7) demonstrated a physical burden of OA on participants. The lower scores also raised the question of how much activity restrictions influenced quality of life and how influential this factor was in decision-making related to hip OA, especially compared to the variable of pain. Although pain is often the strongest indicator for surgical intervention, findings of the present study suggested activity restrictions played a significant role in the decision-making process.

Collaborative treatment decisions can lead to increased patient satisfaction and improved outcomes and provision of optimal care to patients with symptomatic hip OA may help mitigate monetary and resource concerns [29,30]. Pain, as well as activity restrictions (a variable highly correlated to pain), were the only significant variables related to the dependent variable of surgical intervention. However, pain accounted for only 62% of the regression model, identifying other variables or confounding factors responsible for the remaining 38% of the model. Previous research demonstrated physicians and patients often reported varying priorities and indications for treatment thereby supporting the need for further research to identify other factors influencing treatment decisions for a younger population with hip OA [16,24,31].

Further complicating the decision-making process is the reality of the often-varying expectations and perceptions of surgical intervention options between physicians and patients [24]. Jourdan et al reported both physician and patient expectations were higher when considering a younger age [24]. Conflicting expectations occurred in patients with higher disability who had higher expectations, compared to lower expectations of physicians, and patients often had higher exercise and sports expectations than did physicians [24]. Because a return to exercise and sports can be of greater importance to a younger population, this issue warrants further study.

Reinforcing the applicability of this study, Jourdan et al (2012) concluded physicians based their expectations and decisions more on clinical data, in contrast to patients who based expectations on psychosocial and non-hip related factors [24]. Because a discrepancy between outcomes and expectations can lead to dissatisfaction, pre-surgical discussions need to address individual patient factors, challenges, and expectations. A limitation of the Jourdan et al study was that expectations were not separated in different age categories and the results reflected 132 patients with a wide age range (19–87). The lack of separation limited the generalizability of results, but reinforced the importance of individual variables.

Additional physician guidance and input play an important role in the decision-making process [32]. SDM offers the conceptual framework to improve the process for patients and physicians when developing a treatment plan for symptomatic hip OA. Benefits of SDM include increased autonomy and patient empowerment, improved informed consent, and higher levels of patient satisfaction [32,33]. Because medical decisions influence a patient's psychosocial as well as physical health, treatment decisions need to encompass examination of more than just medical beneficence [32,33].

Obstacles to implementation include the challenge of balancing physician responsibilities of beneficence and patient autonomy as well as physician motivation to incorporate SDM into practice, because reimbursement is not dependent on time spent with patients, but instead, on procedures and treatments completed [31,32].

Limitations

Recruitment of patients from only two selected clinics represented a limitation of the study. This design captured only patients who chose to seek additional care and reflected potential influence by their choice of provider because of insurance, location, preference, or other factors. Because a lack of consensus exists when various treatment options are optimal an additional limitation was the subjectivity present in physician recommendations. Clinical staff, not involved in treatment recommendations, asked patients under 50 to participate in the study with an aim of reducing potential bias. However, because participation was voluntary, data collected reflected responses only of the patients who agreed to participate.

Conclusion

Hip OA is a challenging medical condition and treatment is further complicated in a younger population as the potential need for revision surgery is probable in an individual's lifetime. Pain and decreased activity restrictions were related to a higher rate of surgical intervention. No differences in age or quality of life emerged between patients selecting surgical intervention compared to patients selecting medical management. Gaining insight into factors influencing treatment decisions can enhance shared-decision-making for a challenging treatment decision with the ultimate goal of improving outcomes.

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