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ORIGINAL ARTICLE

Advances in Basic Medical Sciences

Short-term Functional Outcomes of Partial Meniscectomy Among Middle-aged Patients

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ABSTRACT

OBJECTIVE: The focus of this investigation was examine the functional recovery patterns in middle-aged individuals following arthroscopic partial meniscectomy, a minimally invasive surgical procedure involving partial excision of the knee meniscus in the early postoperative period.

METHODS: The current prospective interventional study was conducted at Afridi Medical Complex and Teaching Hospital Peshawar from August 2023 to July 2024, including 87 patients with knee meniscal tears and undergone arthroscopic partial meniscectomy. Visual Analogue Scale score and Lysholm Knee Functional Score were used to evaluate improvement postoperative pain and the functional outcome respectively. Data analysis was done through excel software version 2003.

RESULTS: The VAS score for knee pain improved from 7.023±0.816 preoperatively to 2.518±1.065 at 12th weeks postoperatively (P-value < 0.00001). Lysholm knee score for functional outcomes improved from 48.41±6.327 preoperatively to 81.8±10 at 12th week postoperatively (P-value < 0.00001). Functional outcome of partial meniscectomy was excellent, good, fair and poor outcomes were noted in 9.42%, 60%, 20% and 10.59% patients respectively. Gender, BMI status and type of meniscal tears had no effect on functional outcome of partial meniscectomy for meniscal tears.

CONCLUSION: Meniscal tears in adults afflict male gender more than female gender, and they are more likely to be degenerative than traumatic. Most of the patients had less knee discomfort at 12 weeks after an arthroscopic partial meniscectomy. At 12 weeks, over fifty percent of the patients demonstrated better short-term functional results following arthroscopic partial meniscectomy. Gender, body mass index and meniscal tear type had no significant impact on outcome.

KEY WORDS: Arthroscopic partial meniscectomy, Meniscal tear, Middle-aged patients

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INTRODUCTION

Knee injuries are commonly manifested as meniscal tears which in statistic equate to about 172 incidences per 100,000 individuals per year.[1] These types of injuries have various distribution by age and cause. In the young population, meniscal tears are probably caused by acute trauma such as a rapid turn or charge which is typical of sports and accidents. However, as age progress, the meniscus may deteriorate which predisposes individuals to more degenerative tears. This type of degenerative change is most prevalent in middle aged individuals and older adults.[2] Because of its high incidence among athletes, traumatic meniscus tears are often treated by means of arthroscopic partial meniscectomy. In this minimally invasive surgical procedure, the torn part of the meniscus is either excised or shaped to provide relief of pain and restore some functioning. This method helps in off-loading the joint thereby reducing pain on weight bearing surfaces of the knee. However, studies have also indicated a potential adverse effect of this procedure. Namely, that it may accelerate future osteoarthritis due to the impact on the structural foundation of the knee. This is due to the fact in consequence of the less meniscus available to protect the joint, there is greater loading on the knee cartilage and bones which can result in arthritis.[3]

Knee Arthroscopy development has advanced in most countries

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around the globe in the management of knee problems. In the beginning, knee arthroscopy was predominantly used for diagnostic purposes allowing easier visual access into knee joint for examining pathologies. But changing times, it also transitioned into a method of treatment for a range of surgical interventions repair of meniscal tears, reconstructions of torn ligaments among others. The rise in the number of patients opting for arthroscopy as a method of treatment for the knee joint is due to the advantages that this method has over the standard open surgeries. Since it usually entails a small cut hence it is less invasive, it typically leads to quicker healing rates, fewer risks, and better end results for the patients. This change in trends further illustrates how the development of technology and new surgical techniques turned arthroscopy into an efficient and accurate method of treatment for knee injuries anywhere in the world.[4] Meniscectomy is an example of an arthroscopic procedure that is carried out in the presence of lesions in the meniscus, a rubber-like cartilage in a human knee. Meniscectomy performed arthroscopically is much more advanced than ordinary open surgery meniscectomy that requires the use of only small cuts, which enables surgeons to perform the excision of the damaged meniscus with the meniscus details without removing the entire joint. The objective of meniscal surgeries is to maintain/maximize the amount of healthy meniscus tissue and to excise/ablate only the pathological tissue. This kind of a strategy is aimed at preserving the intact meniscus and the articular cartilage of the knee joint and reducing the chances of further joint damage while also ensuring better functionality of the joint in the long run.[5,6]

The treatment outcome of arthroscopic partial meniscectomy includes not only reduced knee pain but also enhanced knee function and mobility. Patients often experience significant improvements in their ability to perform daily activities, such as walking, climbing stairs, and engaging in physical exercise. Additionally, the procedure contributes to an overall improved quality of life by enabling patients to return to their normal routines with greater comfort and confidence, ultimately leading to higher levels of physical and mental well-being.[7] However, latest research put into question this therapeutic technique, as knee arthroscopy has been shown to have little benefit in improving the pain in the knee and its functional result following the procedure for middle-aged individuals due to the significant rate of accompanying degenerative changes in the joint. Despite of such observations there are some patients in these age group who get benefit by decreasing knee pain and preserving a functional knee after arthroscopic meniscectomy avoiding open surgeries and total knee replacements.[8] Some middle age patients with meniscal tears may be treated conservatively through non-operative treatment hence it is critical to assess the success of arthroscopic partial meniscectomy.9 Literature search shows that gender, age, body mass index, and even type of meniscal tear influence the post-meniscectomy functional outcomes.10 The focus of this investigation was examining functional recovery patterns in middle-aged individuals following arthroscopic partial meniscectomy, a minimally invasive surgical procedure involving partial excision of the knee meniscus in the early postoperative period in our setup.

METHODOLOGY

The current prospective interventional study was conducted at Afridi Medical Complex and Teaching Hospital Peshawar from August 2023 to July 2024. Ethical approval of the study was obtained from IREB of Afridi Medical Complex and Teaching Hospital Peshawar (No. AMC/ 010). Sample size was 88 patients, calculated through the WHO sample size calculator using the following parameters: excellent results after partial meniscectomy being 6%11, confidence interval 95% and absolute precision being 5%. All the included patients were admitted and scheduled for surgery. All cases were examined and selected based on the inclusion and exclusion criteria established for the current study, which are listed below. Inclusion criteria: Patients of both gender, aged 40 to 65 years with arthroscopically proven meniscal tears for which partial meniscectomy was performed arthroscopically. Exclusion criteria: All patients with past operative procedure on the ipsilateral knee, ipsilateral intra-articular knee fracture, ipsilateral intraarticular ligamentous injury, and patients not giving consent to participate in the research. Data collection process:87 patients with meniscal tears who satisfied the inclusion/ exclusion criteria and had partial meniscectomy were assessed. The researcher shared information about the research with the patients and received written consent from those who agreed to participate. Data were gathered using a standardized questionnaire. The researcher interviewed the participants on the day of admission, prior to surgery. The patient's history and physical examination, their demographic details like age, gender, BMI and clinical details like the type of meniscal tear, VAS score and Lysholm knee score were obtained. Body Mass Index (BMI) was calculated, then recorded. BMI < 25 was considered normal, >25-30 as overweight, and >30 as obese.

In order to identify the degree of pain in the knee, the patients were asked to assess their pain on a numeric rating scale known as Visual Analogue Scale (VAS) of 0-10, where 0 represented no pain and 10 represented the worst imaginable pain. The general knee function was then assessed using the Lysholm Knee Score which incorporates the knee user's pain, swelling and stiffness levels, and activities including walking, stair climbing, and sitting. Maximum score of each item is as following; instability= 25, pain= 25, locking= 15, swelling= 10, stair climbing= 10, limp= 5, using support= 5 and squatting= 5. The Lysholm functional knee scoring scale has four categories of outcome measurement: excellent (level 1), good (level 2), fair (level 3), and poor (level 4). The final score was the sum of all responses to the eight items. The scale of measurement of the Lysholm knee score ranges from 0-100, where the higher scores the better knee function. There were four score levels: >95 was excellently; x 84-94 was good; 65-83 was fair and less than 65 was poorly. The pain scale and Lysholm score were also assessed before surgery 2 weeks 6 weeks and 12 weeks following the partial

meniscectomy in order to monitor the patient's progress and recovery. All included patients with meniscal tears underwent arthroscopic partial meniscectomy, under spinal anaesthesia, tourniquet control and aseptic conditions.

In all patients prior diagnostic arthroscopy was performed and diagnosis of meniscal tear was ascertained. Those not needing partial meniscectomy were excluded from the study. The probe was used to examine the meniscal tear, its stability and pattern. While performing this procedure, the torn meniscus has been excised in order to relieve pain and restore the function of the joint. The surgeon then assessed the remaining healthy meniscus to confirm that there was no additional injury. The joint was then cleared of cleanout material and a small drain was placed for drainage purposes. Also, they prescribed pain killers and antibiotics after the operation to ease discomfort and help in avoiding any possible infections.

The next day, walking exercises began as part of physical therapy rehabilitation to help the patient recover to full weight-bearing status. Last, further visitations were booked for the second, sixth, and twelfth weeks after reaching the surgical results, in order to examine the changes and solve any issues. Two, six, and twelve weeks post-operatively, patients were to come back for follow-up visits. At two weeks, the stitches were removed and the wound checked for signs of infection. At every visit, the patients were asked to indicate their knee pain on the visual pain scale (VAS) and functional ability of knee on Lysholm knee score. These metrics were collected to help track their change over time. Instructions were provided for patients to do knee flexibility exercises at home. Patients who had range of motion problems were sent to a physical therapist for management.

Data analysis was done by Excel statistical software (version 2003). Continuous variables were presented as mean and standard deviation. Categorical variables were presented as frequency and percentages. Chi square test was applied. P value of ≤ 0.05 was considered to be statistically significant.

RESULTS

We included 87 patients with meniscal tears who undergone knee arthroscopy and partial meniscectomy were performed in all of them. Among these patients two patients lost follow up and hence excluded from the study. In this study the age ranged from 40 to 65 years with mean age of 55.23±6.79 years. Most of the patients i.e. 59 (69.41%) were male while 26 (30.59%) patients were female. Most of the patients i.e. 49 (57.65%) were either overweight or obese. Degenerative tears were found in 65 (76.47%) patients while remaining 20 (23.53%) patients presented with traumatic tears. Table 1.

The VAS score at presentation was7.023±0.816 which significantly decreased postoperatively to 5.023±0.771, 4.2±0.703 and 2.518±1.065 at 2nd week, 6th week and 12th postoperative weeks respectively (P-value < 0.00001). Fig.1.

Variable	Number	Percentage
Gender		
Male	59	69.41
Female	26	30.59
BMI		
Normal weight	36	42.35
Overweight/ Obese	49	57.65
Meniscal tear type		
Degenerative	65	76.47
Traumatic	20	23.53

Table. 1. Demographic characteristics of the participants

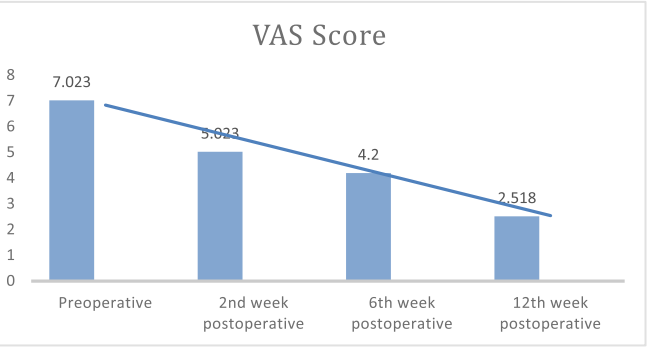

Fig. 1. VAS Score pattern

The Lysholm knee scoring at presentation was 48.41±6.327 which significantly improved postoperatively to 56.58±5.59, 69.81±5.245 and 81.8±10 at 2nd week, 6th week and 12th postoperative weeks respectively (P-value < 0.00001). Fig.2.

Regarding functional outcome of partial meniscectomy, excellent, good, fair and poor outcomes were noted in 8 (9.42%), 51 (60%), 17 (20%) and 9 (10.59%) patients respectively. Fig. 2.

Functional outcome of partial meniscectomy was poor, fair, good and excellent in 8 (12.307%), 15 (23.076%), 4 (6.153%) and 38 (58.464%) respectively in patients with degenerative meniscal tears while it was poor, fair, good and excellent in 1 (5%), 1 (5%), 4 (20%) and 14 (70%) respectively in patients with traumatic meniscal tears (p value= 0.076003, not significant). Functional outcome of partial meniscectomy was poor, fair, good and excellent in 4 (11.11%), 9 (25%), 4 (11.11%) and 19 (52.78%) respectively in normal weight patients while it was poor, fair, good and excellent in 5 (10.2%), 8 (16.33%), 4 (8.17%) and 32 (65.3%) respectively in overweight/obese patients (p value= 0.675079, not significant). Table 2.

DISCUSSION

Most of the participants in our study were male. Some other studies also presented the same observations of male preponderance.[12-14] However, on literature search we also found some studies where female predominate the male gender in having meniscal tears.[11,15] In this regard our observations were more solid as compared to other

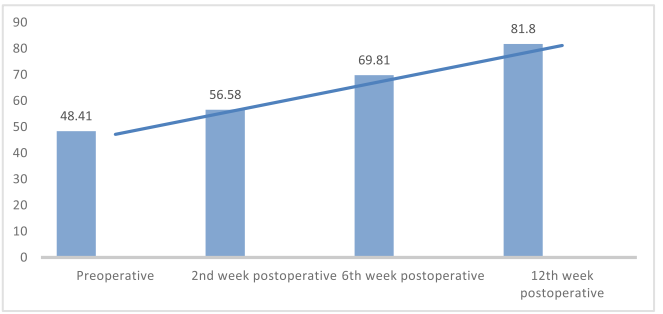

Fig. 2. Lysholm knee score pattern

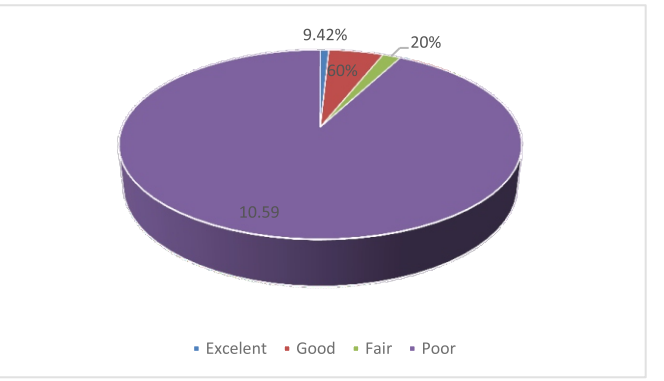

Fig. 2. Distribution of patients according to functional outcome of partial meniscectomy

Variable		Fair	Good	Excellent	P value
		No. (%)	No. (%)	No. (%)	
Gender	Male	12 (20.34%)	36 (61.02)	5 (8.47%)	0.968031
	Female	5 (19.23%)	15 (57.69%)	3 (11.54%)	
Meniscal tear	Degenerative	15 (23.076%)	4 (6.153%)	38 (58.464%)	0.076003
	Traumatic	1 (5%)	4 (20%)	14 (70%)	
BMI	Normal weight	9 (25%)	4 (11.11%)	19 (52.78%)	0.675079
	Obese/overweight	8 (16.33%)	4 (8.17%)	32 (65.3%)	

Table. 2. Functional outcome according to different characteristics of patients

researchers as in overall, males are more likely to suffer from high degree contact injuries, resulting in complex knee injuries. So male gender is more prone to meniscal injuries as well as compared to female gender. Majority of the participants (57.65%) of our study were suffering from obesity or they were overweight. Our results were comparable to the results presented by Hussein et al, Meredith et al. and Fabricant et al.[11,16,17] 76.47% patients in our study were suffering from degenerative meniscal tears and remaining 23.53% presented with traumatic meniscal tears. This indicated that degenerative meniscal tears were more prevalent than traumatic ones. The results of our study in this regard were comparable to the results of the studies conducted by Matsusue et al. and Ghislain et al.[13,18]

We observed that knee pain experienced by patients due to meniscal tear preoperatively (VAS Score 7.023±0.816) significantly decreased (VAS Score 2.518±1.065) at of 12th week post arthroscopic partial meniscectomy with p vale of < 0.00001, which is statistically significant. Similar observations were observed by Hussein et al. in their study where the preoperative knee pain due to meniscal tears was 7.26 ± 1.17 on VAS scale to 2.32±1.34 after partial meniscectomy at 12th week. Their results were also statistically significant.11 Our results were also similar to those of Sofu et al. and El-ghazaly et al.[15,19]

In our study the Lysholm knee scoring for functional outcome at presentation was 48.41±6.327 which significantly improved to 81.8±10 at 12th postoperative weeks with P-value < 0.00001 which was statistically significant. Similar observations were noted by Hussein et al and found that LKSS increased from 48.88 ± 11.08 to 80.04 ± 11.63 12th week postoperative (P<0.001).11 Similarly Liu et al. observed that LKSS was 63.95±5.45 in their study preoperatively and it improved to 87.84±5.16 post partial meniscectomy.[20] This shows the efficacy of partial meniscectomy in meniscal knee tears. Moreover, we found that more than half of the patients were graded as having excellent to good functional outcome on Lysholm knee functional score. In this regard our results were similar to the results presented by Ferkel et al. who found 58% excellent to good outcome.[12] Gauffin et al. also had similar findings.[21] On the other hand, Meredith et al. observed that partial meniscectomy was not so much beneficial in middle-aged patients with the most of the patients in their study scored unsatisfactory results.[16] The variation seen with disappointing results could be related to poor preoperative functional state, associated ligamentous injuries, and the existence of pre-existing osteoarthritis.

In the current study, male gender showed no statistically significant predominance over female regarding functional outcome (P= 0.968031). Comparable results were noted by other researchers in their studies.[12-14] We noted that there was no significant difference in functional outcome between normal BMI and obese/ overweight patients postoperatively (P= 0.675079). in this regard also our results were similar to other similar studies.[16,17,22] In addition, there had been no statistically significant distinction in functional

outcome between the two types of meniscal tears post partial meniscectomy (P=0.076003). These findings agreed with those reported by Matsusue et al.[13] and Ghislain et al.[18] However, Salata et al.[23] discovered a statistically significant difference in functional outcomes for traumatic meniscal tears, which likely to have better functional outcomes than degenerative meniscal tears. The observed discrepancy could be attributed to the fact that most procedures were performed on middle-aged patients with degenerative meniscal tears and pre-existing knee osteoarthritis, and the traumatic tear had a high chance of healing.

LIMITATION & RECOMMENDATIONS: The follow-up period was restricted to twelve weeks, which was insufficient to thoroughly evaluate the functional outcome of partial meniscectomy. The study was conducted at two different locations and all the procedures were performed by different surgeons, so its results cannot be generalized. Arthroscopic partial meniscectomy is a surgical procedure that involves removing a damaged portion of the meniscus, a cartilage pad in the knee joint. This study indicates that this procedure is effective in improving knee function and reducing pain in middle-aged patients with meniscal tears. While the short-term results are promising, further research is needed to assess the long-term outcomes and potential complications associated with this procedure.

CONCLUSION

Meniscal tears in adults afflict male gender more than female gender, and they are more likely to be degenerative than traumatic. Most of the patients had less knee discomfort at 12 weeks after an arthroscopic partial meniscectomy. At 12 weeks, over fifty percent of the patients demonstrated better short-term functional results following arthroscopic partial meniscectomy. Gender, body mass index and meniscal tear type had no significant impact on outcome.

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CONFLICT OF INTEREST

Author declare no conflict of interest.

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AUTHORS CONTRIBUTIONS

AH: Conception, Design of the work, Data collection, and Drafting, Reviewed, Final approval, Agreement to be accountable.

SA: Conception, Design of the work, Acquistion, Data Analysis, and Drafting, Reviewed, Final approval, Agreement to be accountable.

FK: Conception, Design of the work, Interpretation of data for the work, and Drafting, Reviewed, Final approval, Agreement to be accountable.

DATA SHARING POLICY

The data that support the findings of this study are available from the corresponding author upon reasonable request

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