PATIENT REPORTED OUTCOMES MEASUREMENT AFTER ARTHROSCOPIC PARTIAL MENISCECTOMY FOR CHRONIC MENISCAL TEARS

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ABSTRACT

Objective: To determine the patient reported outcomes in individuals undergoing arthroscopic partial meniscectomy for chronic meniscal tears.

Study Design: Cross sectional study.

Place and Duration of Study: Orthopedic Surgery Department, Combined Military Hospital Rawalpindi, 06 months from Jun 2018 to Nov 2018.

Methodology: A total of 41 patients of both genders between the ages of 15-50 years undergoing arthroscopic partial meniscectomy for chronic meniscal tears were included in the study. Patients with no meniscal tears on arthroscopy, patients having cruciate ligament injuries, infection of knee joint and history of previous surgery on the knee joint were excluded. Patient reported outcome measurement was done on the basis of knee injury and Osteoarthritis Outcomescore (KOOS) at the time of presentation and at 03 months after surgery. The patients' satisfaction rate was also determined. Data were analyzed by SPSS version 23.0.

Results: The mean age of patients was 28.32 ± 6.88 years with a range of 17-41 years. Out of total 41 patients, 35 patients (85.37%) were male and 6 patients (14.63%) were female. The difference in the preoperative KOOS and postoperative KOOS in patients undergoing arthroscopic partial meniscectomy after 03 months was found to be statistically significant (p<0.001). About 80.49% patients were satisfied with improvement in knee function after 3 months.

Conclusion: Arthroscopic partial meniscectomy was a highly efficient treatment modality for the management of chronic meniscal tears.

Keywords: Arthroscopic meniscectomy, Meniscal tears, Patient reported outcome measures.

INTRODUCTION

Minimally invasive surgery has revolutionized the practice of surgery in every subspecialty in the modern era. Arthroscopic surgery also known as minimally invasive joint surgery is regarded as one of the two major innovations of the 20th century in orthopedic surgery alongside joint replacements[1]. It was first reported by Nordentof, in 1912. Takagi in 1931 developed the first arthroscope while the first case of partial meniscectomy was performed by Watanabe in 1962[2]. Arthroscopy of knee joint was the precursor of minimally invasive joint surgery and evolved from a diagnostic to a therapeutic modality for the management of a wide array of joint problems[3].

Medial and lateral menisci in the knee joint are of paramount importance for their role as a shock absorber; for the effective transmission of body weight; stabilization, supply of nutrition, lubrication of knee joint and proprioception[4]. Meniscal tears result from sports injuries, twisting injury to the knee joint, osteoarthritis, traumatic tears, synovitis and in association with cruciate ligament injuries[5]. Meniscal tears are broadly classified into vertical longitudinal, vertical radial, oblique, horizontal, and complex degenerative tears. The treatment options include non-surgical management, partial or total meniscectomy and meniscal repair[6].

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Arthroscopy is being increasingly performed as an outpatient procedure nowadays. About 1 million patients undergo arthroscopic knee surgery annually with the main indication being meniscal tears in up to 500,000 cases in the United States[7]. It has been employed for the treatment of meniscal injuries and tears; for diagnostic evaluation of knee joint; biopsy of knee joint; for performing ligamental repair or reconstruction of ACL; total or partial synovectomy of knee joint; and for performing other surgical procedures involving ligaments, capsule, synovium of knee joint[8].

Arthroscopic partial meniscectomy (APM) is preferred over total meniscectomy because it preserves the peripheral non-damaged part of the meniscus which is vital for preservation of the biomechanics of knee joint leading to early mobility and prompt rehabilitation[9]. Patient reported outcomes measurement (PROM) is an effective assessment tool to analyze the disease progress and success of treatment administered. The Knee Injury and Osteoarthritis Outcome Score (KOOS) is an effective patient reported outcome scale that assesses the patients on five subscales. i.e. Pain, Activities of daily living, Sport and Recreation, Quality of life and Other symptoms. It was developed by Roos in 1995[10]. We used KOOS score to follow the outcomes of patients undergoing APM.

The objective of our study was to assess APM as an efficient treatment option for chronic meniscal tears on the basis of improvement in KOOS score and patients satisfaction rate. This study will prove the effectiveness of APM in terms of outcome and the findings of our study will pave the way for introduction of PROM and different scoring systems for the effective analysis of different orthopaedic diseases.

METHODOLOGY

This prospective study was carried out at the Department of Orthopedic Surgery, Combined Military Hospital Rawalpindi on 41 patients undergoing APM for chronic meniscal tears from 01 Jun 2018 to 30 Nov 2018 after approval from institutional ethical review board. Informed consent was taken from all patients included in the study. The sample size was calculated by the WHO sample size calculator as follows: (a) Confidence level = 95%, (b) Absolute precision required = 0.10, (c) Anticipated population proportion = 52% (patient satisfaction after APM)[11], (d) Sample size = 41 patients. The sampling method implemented was non-probability consecutive sampling. The inclusion criteria was patients of both genders with age between 20-50 years who were planned for arthroscopy and proceed and underwent unilateral partial meniscectomy for chronic meniscal tears. Exclusion criteria was patients with no meniscal injury on arthroscopy, patients with cruciate ligament injuries, infection of knee joint and history of previous surgery on the knee joint.

A detailed history followed by a thorough examination was carried out in all patients. Magnetic Resonance Imaging (MRI) was done to confirm meniscal tear. Patients having meniscal tears for more than 6 weeks duration are labelled as chronic meniscal tears. All the APM procedures were carried out on elective list by a consultant having minimum 10 years' experience of arthroscopic surgery.

PROM was done on the basis of KOOS score at the time of presentation and at 03 months after surgery. The five subsets of KOOS including pain, other symptoms, activities of daily living, sports and recreational activities and quality of life were scored on the basis of KOOS questionnaire from 0-100. (0 indicates maximum disability while 100 indicates no disability). The final KOOS score was calculated by taking average of the 5 variables[12,14]. The satisfaction rate of patients will also be determined at 03 months postoperatively. Patients were asked about whether they were satisfied with the given treatment. Data from all patients was collected on a predesigned proforma.

SPSS version 23.0 was used for data analysis. Mean and standard deviation was calculated for quantitative variables. Frequencies and percen-

tages were computed for quantitative variables. Paired sample t-test was applied to compare preoperative and postoperative KOOS scores taking $p \leq 0.05$ as significant.

RESULTS

The mean age of patients included in the study was 28.32 ± 6.88 years with a range of 17-47 years. Among the total of 41 patients, 35 patients (85.37%) were male and 6 patients (14.63%) were female. The mean duration of symptoms was 13.25 ± 11.5 months with a range of 6 months to 3 years. The mean BMI was 27.2 ± 3.5kg/m^2. The number of patients having different types of meniscal tears observed on arthroscopy are shown in table-I.

The KOOS scores at the time of presentation to our department and 3 months after APM were summarized in table-II. In our study, 80.49% patients were satisfied with improvement in knee function 03 months after undergoing APM.

Table-I: Type of meniscal tear.

Tear type	Frequency (%)
Longitudinal vertical	17 (41.46)
Horizontal	05 (12.19)
Radial	05 (12.19)
Oblique	09 (21.95)
Complex	05 (21.95)

Table-II: Knee injury and osteoarthritis outcome score (KOOS) at the time of presentation and 3 months follow-up after APM.

S. No.	Variables	At presentation (n=41)	After 3 months (n=41)	*p*-value
1	Pain	36.3 ± 9.1	77.8 ± 18.3	<0.001
2	Other symptoms	43.9 ± 10.0	68.9 ± 12.9	<0.001
3	Activities of daily living	46.6 ± 8.3	81.8 ± 13.4	<0.001
4	Sports and Recreation	25.3 ± 8.4	64.3 ± 16.2	<0.001
5	Quality of life	33.8 ± 9.2	78.4 ± 8.8	<0.001
6	KOOS	37.2 ± 9.0	74.2 ± 13.9	<0.001

Our study revealed that there was statistically significant improvement in the patient reported outcome measures according to KOOS score (p<0.001). The overall mean KOOS score improved by 37.0 ± 4.9 points.

DISCUSSION

Patient reported outcome measurements (PROM) are tools used to assess the health status, quality of life, symptoms, functional status of patients, and benefits of a treatment from a patient's own perspective. PROMs provide valuable insight in determining the efficacy of different treatment options in the management of patients[13]. The Knee Injury and Osteoarthritis Outcome Score (KOOS) is an invaluable patient reported measurement tool designed to evaluate the disorders of knee joint[14]. APM is preferred over conventional meniscectomy because of the benefits of early recovery, better cosmesis, high patient compliance and less complication rate[15].

Our patients mainly comprised of young soldiers of Pakistan Army. The mean age of patients was 28.32 ± 6.88 years which was comparable to the study by Umar *et al*[15] who reported a mean age of 31 years. The mean age was higher in European studies with mean age of 49 ± 6.4 years in a study by Stensrud *et al*[16] and 63 ± 6.9 years in another study by Demange *et al*[17].

85.37% patients in our study were male and 14.63% patients were female. Stensrud *et al*[16] reported a male and female percentage of 65% and 35% respectively, while Demange *et al*[17] reported that 57.75% patients were females and 42.25% patients were male.

The most common type of tear observed in our patients was of longitudinal vertical variety in 41.46% which was comparable to the findings by Chatain *et al*[18]. Thorlund *et al* also reported longitudinal vertical as the most common type of tear (26%)[7]. However a study by Jiang *et al* from China reported that complex variety of tear was the most common finding with a frequency of

39.9% and 54.6% for medial and lateral menisci respectively[6].

Our study reported that 80.49% patients were satisfied with improvement in their knee functions after 12 weeks of surgery which was comparable to the studies by Demange *et al*[17] (83.1%) and Shivonen *et al*[19] (78.1%). Thorlund *et al* reported a patient satisfaction rate of 52% and 63% for patients undergoing APM for traumatic and degenerative tears respectively[7].

KOOS score was found to be a reliable predictor of knee function. A study by Ebrahimi *et al*[20] reported a significant difference in the KOOS scores between healthy people (86.01 ± 13.44) and patients with meniscal tears (49.51 ± 17.13) with $p<0.001$. The average KOOS score at the time of presentation to our department was 37.2 ± 9.0 which improved to an average KOOS score of 74.2 ± 13.9 after 03 months of APM. The improvement in overall KOOS score was statistically significant ($p<0.001$). The improvement in all five subsets of KOOS were also significant ($p<0.001$).

Bisson *et al*[21] reported that KOOS score for pain ($p=0.02$) and activities of daily living ($p=0.04$) improved significantly over the first 3 months while for other variables of KOOS there was non-significant improvement ($p<0.05$). The results of our study are comparable to the studies by Thorlund *et al*[22], Naimark *et al*[23]. Roos *et al*[24] compared APM and skin incisions and reported that there was improvement in KOOS score after 2 years follow up with APM compared to skin incision. However the difference between the two groups was insignificant ($p=0.161$)[24]. A meta-analysis by van de Graaf *et al*[25] reported that there was significant improvement in KOOS score with APM at 6 months but there was no significant improvement between patients undergoing APM or conservative management in the long term follow up.

There was an increase in the number of arthroscopic surgeries over the turn of 21st century. However there are studies reporting no difference in the overall outcomes in patients undergoing APM and conservative management /placebo/sham surgery[19,26]. There is paucity of data about PROMs in young patients undergoing APM in literature. Our study found a statistically significant difference in the patient reported outcome measures according to the KOOS score after treatment of chronic meniscal tears with APM in young adults. The limitations of our study are that the sample size was small and we only evaluated the patient outcomes for up to 16 weeks duration in young adults with a mean age of 28.32 years. The results of this study cannot be generalized as sample size did not represent the whole population. Therefore further research is required on this topic with bigger sample size and addition of other PROM scales to help improve evidence based practices in our local population.

CONCLUSION

The findings of our study strongly recommend arthroscopic partial meniscectomy as an efficient treatment modality for the management of chronic meniscal tears. Patient reported outcome measurements are vital tools in the assessment of patients with knee injuries.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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