Scholars Journal of Applied Medical Sciences
Abbreviated Key Title: Sch J App Med Sci
ISSN 2347-954X (Print) | ISSN 2320-6691 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Orthopaedics

Evaluation of the Short-Term Results of Arthroscopic Partial Meniscectomy in Adults

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DOI: 10.36347/sjams.2022.v10i11.036 | **Received:** 09.10.2022 | **Accepted:** 23.11.2022 | **Published:** 29.11.2022

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Abstract **Original Research Article**

Background: Arthroscopic partial meniscectomy is one of the most common orthopedic procedures; yet enormous evidence of its efficacy is under trial in comparison to repair of the meniscal injury. Objective of this study is to confirm of the clinical findings arthroscopically in case of meniscal injury of the knee joint and find out the results of Arthroscopic partial meniscectomy among the adult people. ***Methods:*** This prospective interventional study was conducted from January 2013 to December 2014 at National Institute of Traumatology and Orthopaedic Rehabilitation (NITOR), Dhaka. Twenty (20) patients with meniscus injury were treated in the form of arthroscopic partial meniscectomy. Accelerated rehabilitation protocol was followed. Patients were visited routinely and final outcome evaluation done at 6 months. Lysholm knee scoring scale was used to compare preoperative and postoperative score and to evaluate final outcome. ***Results:*** This study was carried out on 20 Patients. Preoperatively all patient had significant knee pain with positive joint line tenderness, McMurrey test, Apley's grinding test, squat test and Thessaly test. Post operatively significant improvement was found ($p<0.05$). Mean preoperative Lysholm knee score was 52.8 with SD ± 2.97 and postoperative score was 93.8 with SD ± 4.24. According to Lysholm knee scoring scale, excellent results (95– 100 points) were obtained in 14 patients, good results (85–94 points) in 4 patients, fair in 2 (10%) patient. ***Conclusion:*** Arthroscopic partial meniscectomy shows excellent short-term result if the procedure performed early in the adult patients.

Keywords: Arthroscopy; Partial meniscectomy; Meniscus; Physical therapy.

INTRODUCTION

The knee joint is the largest and complex hinge joint formerly described as *ginglymus* (meaning hinge). The joint is inherently unstable because of its articular morphology but stability is provided by a number of structures that hold the joint together, i.e. the ligaments form the static stabilizers and the muscles acting across the joint in the form of dynamic stabilizers. The knee is one of the most frequently injured joints because of its anatomical position and structure, its exposure to external forces and the functional demands. Structurally, this is a weak joint, because the articular surfaces of the tibial condyles are not congruent and are too small and shallow to hold the large, convex, femoral condyles in place [1]. Incidence of knee injury among the adults is very much common due to their increased mobility and sporting activities. Beside the ligament's injury, the meniscal injury is a common burden in our society now a day. So advanced treatment methods with minimal soft tissue injury (like arthroscopic procedure) and rehabilitation program are suitable for their early return to the work place.

The knee is the joint in which arthroscopy has its greatest diagnostic and intraarticular surgical application. The usefulness of arthroscopic techniques in diagnosis and treatment of intraarticular pathology has been well documented. The structures around the knee have been classified into three broad categories: (a) Osseous structures, (b) extra-articular structures and (c) intra articular structures [1]. The principal intra-articular structures of importance are the medial and lateral menisci and anterior and posterior cruciate ligaments. The menisci are crescents, roughly triangular in cross section, that cover one half to two thirds of the articular surface of the corresponding tibial plateau.

They are composed of dense, tightly woven collagen fibers arranged in a pattern providing great elasticity and ability to withstand compression. The major orientation of collagen fibers in the meniscus is circumferential; radial fibers and perforating fibers also are present. The arrangement of these collagen fibers determines to some extent the characteristic patterns of meniscal tears [2].

The best clinical results were observed in patients who were operated within 3 months of injury (81.25% excellent and good result). The main aim of arthroscopic partial meniscectomy is to remove all ruptured and offending tissue and to save as much as functioning tissue with a peripheral tissue. Arthroscopic partial meniscectomy is highly successful at relieving pain and improving function of the joint. The ultimate effect of meniscectomy on the joint is controversial. The short- and long-term results of patients treated with partial meniscectomy are excellent [3].

METHODS

This is prospective interventional study. The study used to be carried out in the admitted patient's Department of Orthopaedic, National Institute of Traumatology and Orthopaedic Rehabilitation (NITOR), Sher-E-Bangla Nagar, Dhaka in Bangladesh for the duration of the period from January 2013 to December 2014. This study was carried out on 20 patients the find out about the population including male and female patients above 16 years of age in the Department of Orthopaedic, National Institute of Traumatology and Orthopaedic Rehabilitation (NITOR), Sher-E-Bangla Nagar, Dhaka. The medical Pediatricians, Neonatologist and the surgeon were primarily involved in the decision-making process. The choice of treatment was made by the patient after a full discussion with the multidisciplinary team consisting of pediatricians, neonatologists and pediatric endocrinologists and surgeons. The data for this study about had been accumulated from patients' medical information and radiographs. Statistical evaluation of the results used to be got via the use of a window-based computer software program devised with Statistical Packages for Social Sciences (SPSS-24).

RESULTS

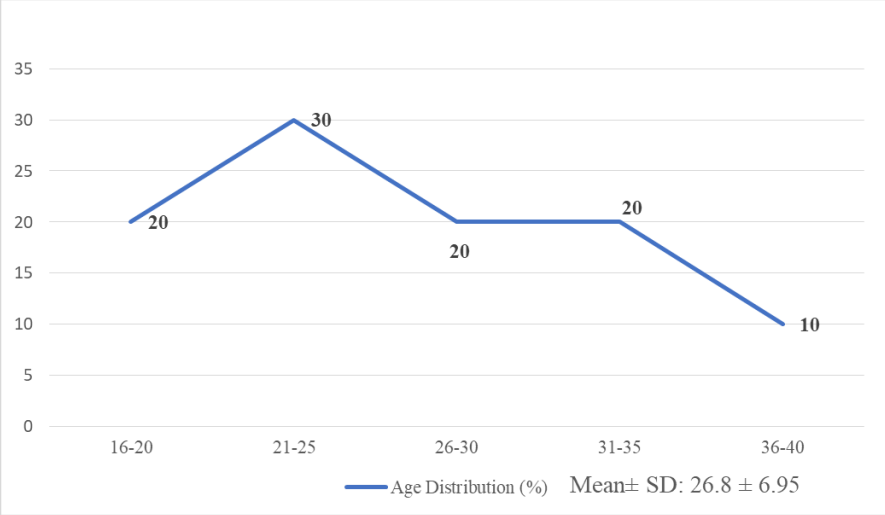

Figure-I: Distribution of patients by age (n=20)

Figure I demonstrated and distribution of the study of 20 patients aged 16 to 40 years. Here according to age distribution, 4(20%) were 16-20 years, 6(30%) were 21-25 years, 4(20%) were 26-30 years, 4(20%) were 31-35 years and 2(10%) were 36-40 years.

Table-I: Duration from injury to operation in months (n=20)

Duration of sufferings (months)	Number of patients	Percentage	Mean±SD
5 - 10	6	30	14±5.8
10 -15	6	30	
15 - 20	4	20	
20 - 25	4	20	
Total	**20**	**100**	

Table I demonstrated the duration from injury to operation in months (n=20). According to duration of sufferings of 5 – 10, 10 – 15, 15 – 20 and 20 - 25 were 6(30%), 6(30%), 4(20%) and 4(20%) respectfully.

Table- II: Postoperative hospital stay (in days) (n=20)

Hospital stays (days)	Number of patients	Percentage	Mean±SD
<5	4	20	7 ± 2.85
5-10	14	70	
10-15	2	10	
Total	**20**	**100**	

Table II demonstrated the postoperative hospital stay (in days) (n=20). According to Hospital stays, <5 were 4(20%), 5-10 were 14(70%) and 10-15 were 2(10%).

Table- III: Subjective functional outcome evaluation after at 6 months (n=20)

Subjective outcome		Number of patients		Percentage	
		Preoperative	Postoperative	Preoperative	Postoperative
Knee function	Normal	0	16	0	80
	Near normal	0	4	0	20
	Abnormal	20	0	100	0
Pain	Mild	6	14	30	70
	Moderate	14	6	70	30
	Severe	0	0	0	0
Giving way	No	0	20	0	100
	Occasional or more	20	0	100	0
Swelling	No swelling	0	18	0	90
	Mild swelling	20	2	100	10

Table III demonstrated the subjective functional outcome evaluation after at 6 months (n=20). According to subjective outcome of knee function in number of patients the normal, near normal, abnormal were 0(0%), 0(0%), 20(100%) in preoperative and 16(80%), 4(20%) and 0(0%) respectively postoperative. According to pain of patients the mild, moderate, severe were 6(30%), 14(70%), 0(0%) in preoperative and 14(70%), 6(30%) and 0(0%) respectively in postoperative period. Based on swelling the no swelling, mild swelling were 0(0%), 20(100%) in preoperative and 18(90%), 2(10%) respectively in postoperative period.

Table- IV: Objective functional outcome evaluation at six months (n=20)

Objective outcome		No. of patients		Percentage	
		Preoperative	Postoperative	Preoperative	Postoperative
Knee flexion/ Squatting	<130°	14	2	70	10
	>130°	6	18	30	90
Childress test/ Squat test	Positive	16	0	80	0
	Negative	4	20	20	100
Thessaly test	Positive	16	0	80	0
	Negative	4	20	20	100
McMurray test	Positive	14	2	70	10
	Negative	6	18	30	90

Table IV demonstrated the objective functional outcome evaluation at six months (n=20). According to objective outcome of knee flexion in number of patients <130° and >130° were 14(70%) and 6(30%) in preoperative and 2(10%) and 18(90%) respectively in postoperative period. According to Childress test of patients the positive and negative were 16(80%) and 4(20%) in preoperative and 0(0%) and 20(100%) respectively in postoperative period. According to Thessaly test of patients the positive and negative were 16(80%) and 0(0%) in preoperative period and 0(0%) and 20(100%) respectively postoperatively.

DISCUSSION

Successful clinical outcomes following arthroscopic partial meniscectomy was found in many works in different surgeons. Much debate continues in the current literature concerning the short- and long-term outcome. There is strong suggestion for arthroscopic partial meniscectomy following traumatic meniscal injury among the adult people. Here we evaluated the results of arthroscopic partial meniscectomy at National Institute of Traumatology and Orthopaedic Rehabilitation (NITOR), Sher-E-Bangla Nagar, Dhaka, from January 2013 to December 2014.

In this study, purposive sampling was done irrespective of sex. A total 20 cases were selected from the outpatient department who fulfilled the inclusion and exclusion criteria for the study. Although many more patients attended in OPD, they could not fulfill those criteria. During arthroscopic evaluation 4 patients were diagnosed as meniscal injury along with ACL injury, so they were not included in this study. The rest of the patients were diagnosed as isolated meniscus injury but due to some technical complexities 2 of them were operated by open procedure and another 2 patients did not continue follow-up after their first visit, so these 4 patients also were not included in the study. Finally 20 patients fulfilled all of the criteria and follow-up continued for 6 months to 12 months and final outcome was assessed at 6 months.

A number of articles have compared APM with conservative treatment, but they did not pay close attention to the differences in follow-up and the follow-up was relatively short [4, 5]. A study by Van de Graaf *et al.*, [6] concluded that at 3 months and he at 6 months after treatment there was a difference between the two groups, but not at 12 months.

Mean age was 26.8 years with SD ± 6.95, age range was 18-39 years. Majority of the patients (70 %) were from age 21 years to 35 years. Eriksson, *et al.*, 2001 studied over 164 patients, age ranges was between 15 and 45 years (Mean 25.7±6.9 years) which are comparable with this study. None of the patients was sportsman, 30 % were students, service holders 40 %, & 30 % were businessmen. Right side involvement was 40% and left side involvement was 60%. The cause of injury was sporting activity in 50%, RTA 20% and accidental fall and jumping 30 % cases. The ideal time for arthroscopic partial meniscectomy is at least 6-12 weeks of injury after subsidence of post-traumatic inflammatory response. Again too much delay do not bring good results. So, duration from injury to operation was studied. Mean duration was 14 months with SD (± 5.8).

In our series, 90 % patients stayed in the hospital after operation less than 10 days. Mean hospital stay was 7 days with SD ± 2.85. The study found that 90% patients had uneventful post-operative period whereas 2 (10 %) patient had significant knee swelling after arthroscopic partial meniscectomy following discharge from the hospital which was subsequently managed by rest, periodic exercise and medications. Preoperative clinical evaluation showed that all patients had abnormal knee function with mild to moderate pain. All patients complained of periodic swelling and giving way. Postoperatively 90 % patient's regained normal and 10% regained near normal knee function and knee stability. Significant improvement of pain and swelling also occurred.

Sihvonen *et al.*, [7] in contrast 146 patients present process APM versus sham APM. At 12- and 24-month follow-up no distinction used to be observed in Lysholm and Western Ontario Meniscal Evaluation Tool (WOMET), and in VAS after coaching. At 60-month follow-up, there used to be a consistent, barely higher danger for development of OA and mechanical signs in the APM group, though no applicable between-group variations in PROMs had been reported [8]. Similar entry standards had been used by means of Roos *et al.*, [9], which randomly allocated forty 44 patients aged 35–55 years to get APM or sham APM. At 24-month follow-up, the KOOS and all its subscales have been comparable between the two groups. Similarity used to be additionally observed in EQ5D, VAS, SF36, and Global Perceived Effect (GPE). Physical overall performance measures, such as the one-leg hop test (both legs), knee bending test (both legs), and the isometric knee extensor power (both legs) have been additionally comparable between APM and sham APM [9].

Childress test/ Squat test were positive in case of 80% patients. 80% patients had Thessaly test positive. Mc Murray test was positive in 70 % cases. 70% patients had $<130^{o}$ knee flexion and 30 % had more than 130^{o} flexion preoperatively. Preoperatively bucket handle tear found in 20 % patients, 30% had radial tear, tongue shaped flap was found in 40% cases and rest 10% had combined type injury. Post operatively Childress test/ squat test became negative in all patients, 100% patients showed Thessaly test negative, McMurray test was positive only in 10 % cases, 90% patients had more than 130^{o} knee flexion and only 10 % had less than 130^{o} flexion.

In Asian countries, people frequently kneel down, squat, and take a seat with legs crossed, ensuing in knee flexion >120° 18 [20] and as excessive as 157 to 165° 19 [10, 11]. Only three instances in our collection had clear records of ankle sprain whilst the purpose of meniscus tear in the majority of the cohort is unknown. We speculate that squatting or sitting with legs crossed would possibly be a contributor to meniscus injury, however scientific proof is required to help this hypothesis.

Preoperative versus postoperative Lysholm knee score in this series shows significant improvements ($p<0.05$). Preoperative and postoperative Lysholm scores were 52.8 with ± 2.97 SD and 93.8 with ± 4.24 SD respectively. Rao [3] showed significant improvement of the Lysholm score in his study ($P<0.05$). In Williams *et al.*, (2004) study preoperative mean Lysholm score was 55 and postoperative 91 points at 2 years follow-up over 120 patients. Regarding final outcome, out of 20 patients, 18 (90 %) had satisfactory (excellent + good), and only 2 (10%) had unsatisfactory (fair) outcome. Confidence interval (CI) at 95% confidence level is 71.38 % - 108.62 %

(100.00%). So among the population we would find 71.38 % - 108.62 % (100.00%) satisfactory result by this procedure. It is quite acceptable outcome.

Future research has to consider the efficacy and security of APM for every unique place, type, and degree of meniscal lesion. The presence of chondral defects used to be seldom viewed for patient eligibility. Chondral defects are common, mainly in middle aged adults [12]. Given the constrained restoration achievable of hyaline cartilage, these lesions are most possibly unable to regenerate [13, 14]. If left untreated, patients with chondral defects may additionally chronic instability, pain, and early onset osteoarthritis, alongside with enormous discount in the great of existence and participation to recreational activities [12, 15]. Most research investigated PROMs and imaging findings to examine knee degeneration. However, no different imaging methodology has been used to confirm whether or not extra adjustments to the meniscus occurred at the end of the follow-up. The description of surgical method was once now not properly stated in some studies, representing a in addition limitation. Moreover, the included research referred to distinct PROMs, which produce excessive variability in the endpoints. Given the lack of accessible pooling data, alongside with the heterogeneous PROMs used with the aid of the authors, in addition subgroup analyses have been no longer possible. Moreover, the use of PROMs used to be insufficient in most studies. PROMs which attention on meniscus (i.e., Western Ontario Meniscal Evaluation Tool, WOMET) has been used solely in one study. The degree of OA in accordance to the Kellgren–Lawrence scale was once barely variable; however, no study about protected patients with Kellgren–Lawrence IV. Similar concerns practice for the age of the patients. The rage of patients age was wide (from 35 to 70 years), which may additionally lead to extend the choice bias.

CONCLUSION

This study was carried on a very small sample and for a very short period of time which made the situation difficult to state an acceptable conclusion. It needs larger sample size and longer time to conclude a reasonable result. However, meniscus injury frequently occurs in young adult population who are very much active, which reduces their activity level and ultimately become an economic burden. So, early intervention and partial meniscectomy, which gives very good short-term result, is necessary to make them fit and return to their normal activity.

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