A STUDY ON POST OPERATIVE EVALUATION IN MENISCAL INJURIES TREATED WITH ARTHROSCOPIC PARTIAL MENISCECTOMY

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ABSTRACT

BACKGROUND

Arthroscopic partial meniscectomy is the most common orthopedic procedure performed in the United States.^{1,2} The aim of the procedure is to relieve symptoms attributed to a meniscal tear by removing torn meniscal fragments and trimming the meniscus back to a stable rim. Meniscal injuries are common as a result of sports related injuries and road traffic accidents. Current arthroscopic partial meniscectomy is indicated for management of meniscal tears because of early rehabilitation and return to work with minimal complications.

MATERIALS AND METHODS

In this hospital-based study, twenty adult patients (16 male and 4 female) who underwent arthroscopic partial meniscectomy for acute or chronic meniscal injuries and internal derangement of knee at our Institute were included.

Statistical methods- Surgery was performed at an average of 1 month after meniscal tear. Mean operative time for meniscectomy was 70 minutes. Duration of hospital stay was average 3.2 days with a range of 3-7 days. Mean time for earliest return to work was 17.5 days with range from 10-21 days. The results of the prospective study are evaluated using Lysholm knee scoring and Tapper & Hoover scoring system.

RESULTS

Excellent to good results were seen in 90 % of cases.

CONCLUSION

Arthroscopic partial meniscectomy is the treatment of choice for management of meniscal injuries in younger age group.

KEY WORDS

Meniscal Injury; Arthroscopy; Partial Meniscectomy.

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BACKGROUND

Meniscal tears are common orthopaedic injuries and affect individuals of all ages and activity levels. The meniscus is a highly innervated structure,^{3,4} and, thus, meniscal tears can result in significant pain and disability.

Meniscal injuries of the knee joint are common in sportsperson and athletes. In other individuals also, meniscal injuries can occur as a result of road traffic accident involving rotational injuries of knee joint.

Non-operative treatment of meniscal tears can improve symptoms especially in patients with degenerative tears^{5,6} and patients with peripheral vertical longitudinal tears which have a high likelihood of healing on their own.⁷ However, many patients with meniscal tears have persistent pain following conservative therapy and elect to undergo arthroscopic partial meniscectomy (APM)

Low morbidity and early rehabilitation associated with arthroscopy makes management of meniscal injuries by arthroscopic meniscectomy, a highly acceptable procedure.

Arthroscopic procedure of knee joint also improves thoroughness of the diagnosis of meniscal injuries, reduces hospital stay, minimizes complications and improves the quality of life.

The objective of the present study is to confirm the types of meniscal injuries in clinically suspected cases and to determine the results of arthroscopic partial meniscectomy and to assess the post-operative results.

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MATERIALS AND METHODS

Study Design

A hospital-based case series. This is a descriptive type of statistical study to evaluate the post-operative results.

Aims and Objectives of the Study

1. To determine the type of Meniscal injury that occurs in clinically suspected cases of Meniscal injuries.
2. To evaluate effectiveness of partial meniscectomy procedure using Lysholm knee scoring and Tapper & Hoover scoring system.

Results will be compared with other similar studies.

Diagnosis & Modalities of Treatment

Meniscal injuries are easily diagnosed with careful history and physical examination of the knee. Patients present with history of twisting injury to knee in motion complain of pain, mild to moderate swelling, locking/catching/click of the knee, inability to bend or straighten the knee, difficulty in squatting/climbing upstairs, limp, instability.

Evaluation of Meniscal Injury by Clinical Test.

- Localised joint line tenderness.
- Mc Murrays test.
- Apley grinding test.
- Parrys test.
- Squat test.
- Thessaly test.

Associated Injuries are Evaluated by

- Drawers test.
- Pivot shift test.
- Lachman's test.
- Varus/Valgus stress test.

Investigations

Plain Radiography of the knee AP and lateral view were taken to rule out associated fracture/ ligamentous avulsion, loose bodies, arthritic changes.

Magnetic resonance imaging on sagittal images, the menisci appear as dark triangles in central portion of joint and assume a "bow tie" configuration at the periphery of the joint.

Meniscal Tears Should be Defined as to

1. location (Anterior horn, body, posterior horn, free edge, periphery)
2. orientation (Horizontal, vertical, radial, complex)

Sensitivity and specificity if MRI in detecting meniscal tears exceed 90%. Routine preoperative investigations done to assess the fitness of the patient for the procedure.

Management of Meniscal Injuries

- Conservative management
- Operative management – Partial/Total meniscectomy
- Meniscal repair.

20 patients aged between 18-40 year that underwent arthroscopic partial meniscectomy from 2013 to 2015 at our institution were the subjects of the study.

Inclusion Criteria

1. Patients aged between 18-40 years.
2. Patients with clinically suspected meniscal injuries.

Exclusion Criteria

1. Patients with infective condition in and around the knee joint
2. Meniscal injuries with tibial plateau fractures and distal femoral fractures.

Selection of the Patients

Patients with clinically suspected meniscal injury were admitted, thoroughly Examined clinically, routine preoperative investigation were done and documented. These cases were posted for diagnostic and therapeutic arthroscopy.

Anaesthesia

All patients were administered spinal anaesthesia.

Tourniquet

Esmarch tourniquet was used.

Instrumentation

Following instruments are used for procedure-

1. 30° 4 mm arthroscopic and its sheath.
2. Cannula with its trocar.
3. Conical and blunt tipped obturator.
4. Probe.
5. Grasping forceps.
6. Basket forceps.
7. Motorised shaving system.
8. Light source and light cable.
9. Camera and television set.
10. Scissors.
11. Knife with blade No. 11

The disinfection of the instruments was done by keeping them in a chamber along with formalin tablets for a minimum period of 30 minutes or by immersing in Cidex solution.

Surgical Technique

After giving anaesthesia, tourniquet was applied with pressure of 250 mm of Hg. The affected knee was scrubbed and draped. Anterolateral (Viewing portal) and anteromedial (Working Portal) portals made respectively.

Initially we distended the joint with normal saline by placing an inflow cannula through the antero-lateral portal and then inserted the arthroscopy. Joint distention is maintained by hydrostatic pressure 3 liter bags of normal saline solution are hung approximately 1 meter above the level of the knee to provide continuous inflow, a suction out flow system is connected to a tissue trap.

When the effluent is clear, the 30° scope was locked in to the sheath. Camera and light source were connected to the scope and knee joint was visualized methodically.

Examination of the knee begins in the supra patellar pouch. Then the scope is swept down across the medial compartment. Meniscus is examined for tear using the probe. Probe was passed through antero-medial portal and by withdrawing the scope a few millimeter. The inter condylar notch comes into view and ACL and part of PCL could be seen

with synovium and ligamentum mucosum covering it. By keeping the scope in that position ACL was palpated with the probe and looked for any laxity or tear.

The scope was slightly withdrawn, the leg was kept in figure of four position for opening the lateral joint space. In this position the lateral meniscus comes in to view which was also probed. Then the knee is extended, and scope is run along the lateral gutter in to supra patellar pouch to complete the examination.

Then depending on the type of meniscal lesion appropriate technique was chosen and excision was performed in same sitting.

Excision of pathological meniscal tissue can be carried out either with En bloc resection of the mobile fragment or by morselization of the fragments and subsequent removal. Sharp excision of the major mobile fragments minimizes the potential debris within the joint, once the tear has been removed compared to morselization. The remaining peripheral rim is carefully probed to assure that there were no additional tears.

Once a contoured balanced stable peripheral rim was obtained, the joint was thoroughly irrigated to remove all small meniscal fragments or debris.

Postoperative Care

1. Jones type padded cotton dressing was applied from mid-thigh to ankle for 24-48 hours to gives better compression and haemostasis.
2. During preoperative period isometric quadriceps Exercises are thought to the patients and are begun as soon as the patients recovered from anaesthesia.
3. Patients were allowed to bear full weight on second postoperative day onwards.
4. Early active range of motion was also started on second day onwards.

Statistics of Surgery

After the patient's admission preop investigations done, pre-anaesthetic checkup done and surgery was done on next day. All the 20 patients underwent partial meniscectomy, in one patient meniscal injury was associated with cyst in lateral meniscus and loose bodies, cyst was excised, and loose bodies were removed arthroscopically. Average duration of surgery was around 65 minutes with range of 50 to 90 minutes.

Intraoperative Complications

No complication was encountered.

Post-Operative Complication

No complication as such haemarthrosis, infection, deep vein thrombosis, joint effusion were encountered.

Time of Discharge

Patients were discharged at an average of 3.2 days with range from 2 to 6 days

Follow Up Period

Patients were followed up in the outpatient department at an interval of 1 week, 2nd weeks, 4th week. After that every month for 6 months. And post-operative evaluation is done using Lysholm knee scoring and Tapper & Hoover scoring system.

RESULTS

The prospective study consists of 20 cases of meniscal injuries with partial tear of ACL or intact ACL treated surgically by partial meniscectomy.

Age Distribution

The age ranges from 18- 40 years with mean age of 27.5 years in our series of meniscal injuries. Maximum incidence of meniscal injuries was found to be between 20-30 years age group. Most of the patients were sportsperson and manual workers.

Sex Distribution

16 patients were male (80 %) 4 patients were female (20 %) in our series of meniscal injuries. Meniscal injuries are more common in males which may be reflection of male being more involved in aggressive sporting and manual activities that predispose to rotational injuries of the knee.

Age in Years	Male	Female	Total
10-20	3	2	5
21-30	8	1	9
31-40	5	1	6
Side involvement			
Right knee	10	3	13
Left knee	6	1	7

Table 1. Age and Sex Distribution and Side Involvement

9 patients (45 %) had Meniscal injuries due to sports related injuries and 8 patients (40%) due to road traffic accident, 3 patients (15 %) due to other causes.

Meniscal Tears	Isolated Meniscal tear	Associated with partial ACL Injury	Other cyst/ Loose bodies	Total
Medial Meniscus	6	6	0	12
Lateral Meniscus	7	1	1	8
Total	13	7	1	20

Table 2. Meniscal Injuries Associated with Partial Tear of A.C.L.

13 isolated Meniscal injuries found in our series of study and 7 meniscal injuries associated with partial ACL tear, one patient Meniscal injury associated with cyst, in lateral meniscus and loose bodies.

Sl. No.	Type of Meniscal Tear	No	Associated ACL	Isolated Meniscal Tear	%
1	Longitudinal tear (Bucket handle)	12	5	7	60 %
2	Oblique tear	6	2	4	30 %
3	Radial tear	1	-	-1	5 %
4	Horizontal tear	-	-	-	-
5	Complex (others like cyst/ flaps)	1	-	1	5 %

Table 3. Types of Meniscal Injuries

Out of 20 cases in our series of Meniscal injuries were 12 cases of longitudinal tear (60 %) 6 cases of oblique tear (30 %) 1 case of radial tear (5 %) and one case of complex tear other tear like cyst flaps were 5 %.

Functional outcome was assessed based on Lysholm score and Tapper and Hoover grade.⁸ Based on patients' complaints and physical examination finding were calculated according to Lysholm knee scoring system and graded according to Tapper and Hoover system.

Score	Lysholm Knee Score	No. of Patients	%
Excellent	81-100	12	60 %
Good	71-80	7	30 %
Fair	61-70	1	10 %
Poor	< 60	0	0

Table 4. Post-Operative Evaluation

DISCUSSION

Treatment of Meniscal injuries has evolved from conservative management, open meniscectomy to closed partial arthroscopic meniscectomy and meniscal repair.

Arthroscopic partial meniscectomy allows the detection and removal of multiple unstable fragments by probing the meniscal remnant under direct vision.^{9,10}

The aim of arthroscopic meniscectomy is to remove all ruptured and offending tissue and to save as much as functioning meniscal tissue with a peripheral rim.^{11,10}

Dandy et al¹² claimed that the arthroscopic meniscectomy gave relief of mechanical symptoms, was associated with a short stay in hospital, few visits for outpatient physiotherapy, and that time off work was markedly reduced in comparison with open meniscectomy.

Simpson D A et al,¹³ in his study stated Arthroscopic partial meniscectomy resulted in a significant reduction of inpatient stay and earlier return to work and sport compared to open meniscectomy.

Study	Min Age	Max Age	Mean Age
Tregonning RSA et al	15 years	54 years	27 years
Dandy et al	10 years	78 years	38.4 years
Simpson et al	7 years	67 years	30.7 years
Present study	18 years	40 years	27.5

Table 5. Age Group Comparison between Different Studies

In our study population, age group is from 18-40 years with mean age 27.5 years which is in correlation with

Tregonning RSA et al and Simpson et al. Raine Sihvonem et al¹⁴ stated patients without knee osteoarthritis but with symptoms of a degenerative medial meniscus tear, the outcomes after arthroscopic partial meniscectomy were no better than those after a sham surgical procedure that's why our age population is 18-40 years.

Study Group	Males	Females
Rao P S et al ¹⁰	127	13
Tregonning RSA et al	40	4
Simpson et al.	90%	10%
Our study	16	4

Table 6. Sex Distribution Comparison between Different Studies

Majority of our patients were males in range of 20-30 years which may be reflection of male being more involved aggressively in sporting and manual activities which are common to cause meniscal injuries.

Study Group	Left Knee	Right Knee
Rao PS et al	55	82
Tregonning RSA et al	23	22
Our study	7	13
Simpson et al	Left =right	

Table 7. Side comparison between different studies

Study Group	Medial Meniscus	Lateral Meniscus
Tregonning RSA et al	35	10
Rao PS et al	70	51
Our study	12	8

Table 8. Side of Meniscus- Comparison between Different Studies

In our study, medial meniscus injuries are more common than lateral meniscus injuries which is in correlation with Rao PSet al and Tregonning RSA et al.

Study Group	Sports Related	Road Traffic Accidents	Other Injuries
Rao PS et al	47 (32.9%)	23 (16.1%)	73 (51%)
Our study	9 (45%)	8 (40%)	3 (15%)

Table 9. Mechanism of Injury- Comparison between Different Studies

In our series 45% of cases were sports related injuries, 40 % included road traffic accidents and other injuries were 15%. Thus, sports related injuries and road traffic accident are the common cause of Meniscal injuries.

Study Group		Mean Hospital Stay
Tregonning RSA et al		1.0 days
Jan Gillquist et al ⁴		1-7 days
Simpson et al	Arthroscopic partial meniscectomy	2.5 days
	Open partial meniscectomy	6.7 days
Our study		3.2 days
Table 10. Mean Hospital Stay Comparison between Different Studies		

Mean duration of hospital stay in our study of arthroscopic meniscectomy was average of 3.2 days compared to 2.4 days (range 1 to 7 days) as reported by Simpson D.A,¹³ 1 day as reported by Tregonning RSA, 1 to 7 days as reported by Gillquist J and Oretorp N.⁴

Study Group		Mean Return to Work
Simpson et al	Arthroscopic partial meniscectomy	13 days (3 days-6 weeks)
	Open partial meniscectomy	34 days (7 days – 84 days)
Russel et al		12.9 days
Dandy et al		10.5 days
Schimmer et al 1998 ¹⁵		6.2 days
Present study		17.5 days
Table 11. Mean Return to Work Comparison between Different Studies		

In our study of longitudinal (Bucket handle) tear 12 cases (60%), oblique tear 6 cases (30 %), Radial tear one case (5 %), complex tear (Like cyst! flaps) one case (5 %) were found.

Whereas in series of Rao et al, longitudinal (bucket handle) tear 63.72%, Radial tear 7.87%, degenerative tear 7%, other type 21.15% were found.

In series of D.J DANDY¹⁶ vertical (Longitudinal) tear was common than the other type of Meniscal tear. Mean operative time in our series was 70 minutes as compared to 45 minutes by Tregonning RJA. Northmore-Ball et al.¹⁷ states that arthroscopic partial meniscectomy causes less morbidity than the more traditional techniques of complete or partial, open meniscectomy.

Some failures may be accounted for by inaccurate assessment of the extent of the meniscal damage. It is important to remember the possibility of second tears and both menisci must be explored carefully, even in the presence of one obvious tear (Chana and Tubbs, 1981).¹⁸

Hence arthroscopic partial meniscectomy is preferred treatment of choice for management of Meniscal injuries in younger age group.

Sl. No.	Name of Series	No. of Patients	Excellent & Good Result	Fair & Poor Results
1	Simpson D.A et al 1986	72	80.56%	10.44%
2	Rao P.S 1997	50	90%	10%
3	Umar M 1997 ¹⁹	139	93%	7%
4	Schimmer R.C et al 1998 ¹⁵	119	94.8%	5.2%
5	Our Study	20	90%	10%
Table 12. Functional Outcome Results Compared with Other Studies				

CONCLUSION

The most common cause for meniscal injury is sports related injury and second commonest cause is road traffic accident. Arthroscopic meniscectomy is a minimally invasive technique; advantages of which include early return to work, minimal complications, early post-operative rehabilitation, and short duration of hospital stay. Hence this is the preferred technique for treatment of meniscal injuries.

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