

Evaluation of Diagnostic and Therapeutic Arthroscopy of the Knee Joints

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Abstract: **Aim:** To evaluate the suspected cases of knee injuries and to rule out meniscal tears. & to perform diagnostic and therapeutic arthroscopy of knee joints after documenting the meniscal tears and on MRI and correlating these findings. **Methodology:** A prospective nonrandomized study was conducted on 30 traumatic meniscal injuries patients who had fulfilled the inclusion and exclusion criteria. Those who enrolled as said in inclusion criteria were all patients with history of injury of knee who underwent both MRI and arthroscopy. Arthroscopy was carried out under spinal anaesthesia under pneumatic tourniquet control under all aseptic precaution. **Results:** It was found that 9 cases had parrot beak tear, 7 cases had bucket handle tear, 7 cases had parrot beak and 6 had radial tear respectively. 4 cases had frayed edge and circumferential tear respectively. Meniscal balancing was done in 13 cases, meniscal repair was done in 11 cases and 6 cases had meniscectomy. **Conclusion:** Arthroscopy can be a useful tool in diagnosing the lesion and its type and can prove to be more beneficial in therapy.

Keywords: knee joints, meniscal tear, arthroscopy, meniscectomy

1. Introduction

The knee being the most superficial joint is more susceptible to traumatic injury. Meniscal tears are the most common knee injuries, comprising 75% or more of all internal derangements of the knee^{1,2} with the incidence³ of acute meniscal tears close to 60 in 100,000.

Meniscus has an important role in load transmission, shock absorption, stability, congruence, lubrication and proprioception of the knee joint. Meniscal injury may lead to long-term degenerative joint changes, such as osteophyte formation, articular cartilage degeneration, joint space narrowing, and symptomatic osteoarthritis⁴

Medial meniscal injuries are generally seen more frequently than injuries of the lateral meniscus, to a ratio of approximately 2:1⁵. Meniscal injuries may occur in acute knee injuries in younger patients or as part of a degenerative process in older individuals. The acute injuries frequently result from sport injuries where there is a twisting motion on the partially flexed, weight-bearing knee. Acute meniscal injuries may also occur as part of more major, combined injuries to the knee.

Clinical examination and Magnetic resonance imaging (MRI) are tools commonly used in the diagnosis of meniscus tears. Lee et al⁶ found that MRI is widely accepted as an accurate, non-invasive method in the evaluation of meniscal disorders⁷⁻¹¹. However, further publications by Rose et al¹² and others¹³⁻¹⁴ highlight the value of an adequate history and clinical examination. With studies proving that history, symptoms and clinical examination alone are effective in the diagnosis of these injuries; scanning is not always beneficial. Unnecessary MRI scanning increases the financial burden and delays patient treatment. However clinical examination is not always accurate because some menisci lesions do not produce characteristic symptoms and signs. For example, a

clinical sign depends on the displacement of a meniscal fragment may be negative either because the tear is too small to allow displacement in the clinical test or too large, so that the fragment is permanently displaced, which can be picked up on MRI. However, MRI scanning also gives false diagnosis¹⁵.

Arthroscopic procedures are carried out for the diagnosis and treatment of knee problems for many years. Arthroscopy has played an important role in diagnosis of meniscal tear which cannot be assessed either clinically or radiologically. Arthroscopy thus is useful in diagnosing the lesion, type and planning for its treatment in same sitting. Thus, it serves as a diagnostic as well as therapeutic tool¹⁵. So, aim of the study is to evaluate the suspected cases of knee injuries and to rule out meniscal tears. & to perform diagnostic and therapeutic arthroscopy of knee joints after documenting the meniscal tears and on MRI and correlating these findings

2. Materials and Methods

A total of thirty cases of traumatic meniscal injuries were identified and prospectively reviewed clinically, with MRI scan followed by arthroscopic surgery.

A total of thirty cases satisfying with the inclusion criteria were included in the study. The study was being approved by the institutional ethical committee and written informed consents were taken from the participants.

Inclusion criteria:

- Age >16 years
- Clinically diagnosed meniscal tear cases
- Patients willing to give informed consent

Exclusion criteria

- History of prior meniscal tear surgery
- History of prior knee diseases

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- Critically ill patients
- Patients with degenerative changes
- Patients with evidence of loose bodies or fractures in plain radiographs.
- Patients treated non-operatively for meniscus tear

The clinical criteria used were history, tender joint line and positive McMurray’s test for meniscal injury. Additionally Pain on hyper flexion, Pain on hyper extension, Steinmann 1 sign, Steinmann 2 sign, Childress test, Apley’s grinding test, Lachman test and Anterior drawer test were considered to be essential for clinical diagnosis of anterior cruciate ligament injury if associated with meniscus tear.

Prior giving anaesthesia, routine investigations were carried out. Arthroscopy was carried out under spinal anaesthesia under pneumatic tourniquet control under all aseptic precaution.

Two portals were made in the knee. One portal was to insert the arthroscope and the other portal was to insert the working tools. To improve the visibility and lubrication for insertion of instruments, saline was made to flow through the portal. The entire inside of the knee was inspected, including the knee cap, the ends of the thigh and leg bones that form the knee, the menisci, and the cruciate ligaments.

The meniscal tear was probed with small hook to identify its characteristics. The torn fragment was cut free and removed and the edges were smoothed. Saline was then flushed in to remove the remaining tiny particles, if any persisting in the contained zone. The vascular zone was also repaired. Stitching was done to close the portals and a prolonged acting analgesic was injected into the joint area.

3. Results

The demographic characteristics of the patients are presented in table 1. Maximum no of patients were in the age group of 21-30 years, followed by <20 years. And the least were in between 31-50 years. Males were predominantly involved constituting about 66.6% of the total population. Right knee was more commonly involved than the left knee. Owing to the cause of knee injury, twisting injury was seen in majority of the patients (86.6%). Equal number of patients had pain for more than 4 months and less than 4 months.

Occupation wise, students were predominantly involved, constituting about 40% of the total population and house wives were the least involved.

Age range	No of patients	Percentage
<20 years	10	33.3%
21-30 years	14	46.6%
31-40 years	03	10%
40-50 years	03	10%
Males	20	66.6%
Females	10	33.3%
Right knee	23	76.6%
Left knee	7	23.3%
Twisting injury	26	86.6%
Road traffic accidents	4	13.3%
>4 months	15	50%
<4 months	15	50%

Students	12	40%
Farmers	7	23.3%
Sports persons	5	16.6%
Company workers	4	13.3%
Housewives	2	6.6%

The table 2 shows the arthroscopic finding wise distribution among 30 cases in study group. 9 cases had parrot beak tear, 7 had bucket handle tear, 6 had radial tear, 4 cases had frayed edge and 4 cases had circumferential tear respectively

Table 2: Arthroscopic finding wise distribution of cases in study group

Arthroscopic findings	No of cases	Percentage
Parrot beak tear	9	30
Bucket handle tear	7	23.3
Radial tear	6	20
Frayed edged tear	4	13.3
Circumferential tear	4	13.3
Total	30	100

The table 3 shows the operative treatment wise distribution among 30 cases in study group. Meniscal balancing was done in 13 cases, meniscal repair was done in 11 cases and 6 cases have menisectomy.

Table 2: Operative treatment wise distribution of cases in study group

Operative treatment	No of cases	Percentage
Meniscal Balancing	13	43.3%
Meniscal Repair	11	36.6%
Menisectomy	06	20%
Total	30	100%

4. Discussion

The present study was carried out to evaluate the cases of knee injuries presenting with clinical and radiological finding and to rule out meniscal tears. Diagnostic and therapeutic arthroscopy of knee joints was performed and patients were followed up post operatively for 6 months. Maximum number of cases were in the age group of 21-30 years, followed by <20 years years. Majority of cases were males, with a male to female ratio being 2:1. Similar findings were noticed in a study by Taylor¹⁶ et al where 63% of males were involved. Also a study done by Kojiae¹⁷ et al defined the sensitivity and specificity of evaluation of meniscal lesions and cruciate ligament tears. The authors evaluated a total of 40 patients, 32 men and 8 women, aged 17-46, mean age 27±5 years. These observations from the literature points towards a male dominance for meniscal tears.

Right knee was commonly involved when compared to the left knee. However, a study by Taylor¹⁶ et al found that both knees were equally involved. Coming to the cause of injury, we found that majority of the cases had twisting injury (86.6%) and the rest were due to road traffic accidents (13.3%). Duration of the pain showed interesting results, where we found that half of the patients had pain for more than 4 months and rest half had for less than 4 months. Occupation wise distribution showed students (40%) were maximum among the cases, followed by farmers, (23.3%), sports persons (16.6%), company worker (13.3%) and house wife (6.6%).

Arthroscopic finding among the cases with knee injury showed that parrot beak tear (30%) was common among the cases followed by bucket handle tear (23.3%) and radial tear (20%) respectively, 4 cases with frayed edge tear and circumferential tear (13.3%) respectively. Ververidas¹⁸ et al evaluated the arthroscopic findings of meniscal bucket handle tears and correlated them with the proposed MR imaging signs. MRIs were retrospectively analysed and showed Locked types I and II fragment of medial meniscus and half-length, whole-width and whole length-half-width fragment of lateral meniscus and most common signs in MR images of meniscal bucket handle tears were the fragment in the notch sign and the absent bow tie sign.

Among the Operative treatment for knee injury meniscal balancing was done in 13 cases followed by meniscal repair in 11 cases and Meniscectomy in 6 cases. Thomas Stein¹⁹ et al studied long-term outcome after arthroscopic meniscal repair versus arthroscopic partial meniscectomy for traumatic meniscal tears. Among total eighty-one patients with an arthroscopy meniscal repair was done in 42 cases and meniscectomy was done in 39 cases.

5. Conclusion

Arthroscopy is a useful tool in diagnosing the lesion, and its type. Also, it serves as a diagnostic as well as therapeutic tool.

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