

EVALUATION OF CLINICAL DIAGNOSIS BY KNEE ARTHROSCOPY.

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ABSTRACT: This prospective study was carried out in the orthopaedic department of a medical college to evaluate the accuracy of clinical diagnosis by knee arthroscopy. The reliability of clinical assessment (history and physical examination) was determined by comparing the initial pre-operative diagnosis with the post-operative diagnosis as determined by arthroscopy. The study group included 50 patients (50 knees) scheduled for arthroscopic surgery for suspected internal derangements of knees. The primary preoperative diagnosis was fully correct in 16 cases (32%), partially correct in 16 cases (32%), and incorrect in 18 cases (36%), with an overall accuracy of 81%, sensitivity 82% and specificity 62%. The most common preoperative diagnosis was Medial Meniscal tear and Anterior Cruciate Ligament tear. The results of clinical assessment were comparable to the published reports. Though the present study suggests that the diagnostic value of arthroscopy is higher than clinical examination but it also makes it apparent that the two techniques complement each other and are more accurate when taken together than individually.

KEYWORDS: Arthroscopy, anterior cruciate ligament, medial meniscus, posterior cruciate ligament

INTRODUCTION: Injuries to the knee joint are one of the commonest injuries pertaining to the joints in the body, especially amongst sports professionals and athletes. The incidence of permanent and progressive residual disability following knee injury is higher than any other trauma sustained in sports. The diagnosis is perplexing and it has always been difficult to establish correct diagnosis in a large number of patients with complaints about the knee ¹.

Diagnosis of knee joint disorders can be made by clinical examination, arthrography, magnetic resonance imaging (MRI) and arthroscopy. Clinical examination is a quick and fast method that helps in diagnosing the lesions of knee joint correctly. This holds true for single lesions but combined lesions are more difficult to be diagnosed only by clinical examination e.g.

a ruptured ligament of knee joint is readily diagnosed but an associated lesion of menisci or cartilage may be overlooked^{2,3}.

In the modern era, arthroscopic surgery is being used with increasing frequency for knee disorders. Arthroscopy provides full exploration of knee joint, thus extensive surgical procedures are avoided. It is possible to make selective and rather limited incisions because of knowledge of intrarticular lesions gained by arthroscopy.

The purpose of the present study was to evaluate the reliability of clinical assessment in knee disorders by comparing the initial preoperative (clinical) diagnosis with the postoperative diagnosis as determined by arthroscopy.

MATERIAL AND METHOD: The present study was conducted in the department of orthopedic surgery, Himalayan Institute of Medical Sciences, Swami Rama Nagar, Dehradun (Uttarakhand) over a period of 18 months. Patients reporting to the orthopedic outpatient department with complaints suggestive of internal derangement of knee were the potential participants.

A total of 50 patients (50 knees) fulfilling the inclusion criteria were entered in the study. There were 36 males and 14 females with the average age of 31.6 years (range 18 to 55 years).

INCLUSION CRITERIA:

The Patients with history of:

1. Recurrent pain and swelling in knee joint
2. Locking/giving way
3. Catching/snapping/clicking
4. Instability
5. Post traumatic knee pain not responding to conservative treatment

EXCLUSION CRITERIA:

1. Infective arthritis of the knee.
2. Clinical conditions which preclude anaesthesia
3. Ankylosis of knee joint where it leads to difficulty in performing arthroscopy

Written informed consent was obtained from the patient before including him/her in the study.

Patients were examined by senior operating surgeons first without anesthesia and then under anesthesia in both supine and prone position to look for the following:

- a. Lachman test
- b. Anterior/posterior drawer test
- c. Mc Murray Test
- d. Apley's Grinding Test done in supine position without anaesthesia
- e. Apley's Distraction Test
- f. Valgus stress instability
- g. Varus stress instability
- h. Squat test done in supine position without anaesthesia

However pivot test, dial test and apprehension sign were not included in this study due to examiners preference.

Routine investigations Haemoglobin, TLC, DLC, ESR, Blood glucose and Blood urea nitrogen were done as a part of pre-anaesthetic check up.

X-ray examination of the part was done and MRI was also done wherever possible.

OPERATIVE PROTOCOL : Informed consent was taken from all patients. Patient was given general or spinal anaesthesia in supine position. Under all aseptic precautions, the part was cleaned, painted and draped. Before arthroscopy, evaluation under anaesthesia was done. Arthroscopy was done with the help of 5 mm 30° arthroscope.

POSTOPERATIVE PROTOCOL: In post arthroscopy follow up, patients were advised to take rest for days to weeks depending upon the procedure done and quadriceps exercises were advised. Prophylactic antibiotic were given for 5 days.

Based on the clinical examination and arthroscopic diagnosis, evaluation of the accuracy of the clinical examination was done. The collected data was subjected to standard statistical analysis.

DEFINITIONS: Full agreement means that the arthroscopic diagnosis confirms the preoperative diagnosis. Partial agreement means that the arthroscopic diagnosis confirms the preoperative diagnosis in addition to other pathology in the knee which was not diagnosed clinically.

RESULTS: Out of the 50 patients, the primary (preoperative) clinical diagnosis was fully correct in 16 (32%), partially correct in 16 (32%) and incorrect in 18 (36%) cases. The most common preoperative diagnosis was the tear of medial meniscus (32), tear of anterior Cruciate ligament (22) and tear of lateral meniscus (12) (table I).

The collected data was subjected to standard statistical analysis i.e. accuracy, sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) as shown in table II. The diagnosis of torn medial meniscus was correct in 18 knees out of 32 clinically diagnosed cases. The diagnosis of ACL tear was made in 24 patients by clinical means and was found to be true in 22 cases; the only misdiagnosed case was found to have lateral meniscal tear. The diagnosis of lateral meniscal tear was correct in 8 out of 12 clinically diagnosed patients. All misdiagnoses (false positives) are summarized in table I. Osteoarthritic changes were seen in 12 knees during arthroscopy which could not be suspected clinically.

DISCUSSION: Arthroscopy is a well-established and reliable modality for diagnosing internal derangements of the knee. Bomberg et al⁴ and Noyes et al⁵ showed in their respective studies that arthroscopy allows more accurate diagnosis of acute injuries to joint structures. To know the accuracy of clinical diagnosis, this study was conducted in 50 patients (50 knees) who were subjected to arthroscopy.

In our study, during clinical examination, lateral joint line tenderness was observed in 10 patients out of whom 8 had lateral meniscal tear on arthroscopy; as compared to 26 patients who had medial joint line tenderness and only 18 medial meniscal tear were confirmed on arthroscopy. It suggests that clinically lateral joint line tenderness is more accurate of a tear as compared to medial joint line tenderness. Similar findings were observed by Eren in his study⁶. Similarly, Anterior Drawer Test was found positive in 24 patients indicating ACL tear and arthroscopically it was confirmed in 22 patients. It suggests that clinical examination is effective in diagnosing single joint lesions. However, the complex lesions may not be diagnosed as efficiently by clinical examination as single lesions.

The diagnosis by clinical examination was compared with diagnosis at arthroscopy and diagnostic accuracy at clinical examination was found out by various statistical means. The accuracy, sensitivity, specificity, positive predictive value, negative predictive value of the overall preoperative clinical assessment made in this study and of those specifically pertaining to medial meniscus, lateral meniscus were compared with publish reports. The results are summarized in table III.

A correlation between the arthroscopic diagnosis and pre operative diagnosis was made in all 50 patients. There was full agreement in 16 (32%) patients, partial agreement in 16 (32%) patients and no agreement in 18 (36%) patients. In a study done by Brooks and Morgan⁹, there was full agreement in 62% of patients, partial agreement in 24% and no agreement in 34%. In the findings made by Dehaven¹⁰, clinical diagnosis was correct in 72% of cases, correct but incomplete in 10% of cases and incorrect in 8% cases.

The overall accuracy of clinical examination in our study was found to be 81% , which is slightly less than that observed by Terry et al ⁷ and Ireland et al ⁸ .The overall sensitivity, specificity, PPV and NPV in the present study was 82%, 62%, 71% and 74% respectively. These were slightly less than the findings of Terry et al ⁷.Our data suggest that clinical assessment though is a simple and useful method to identify the majority of knee pathology but its accuracy is not as high as that of arthroscopy.

CONCLUSION: Though the present study suggests that the diagnostic value of arthroscopy is higher than clinical examination but it also makes it apparent that the two techniques complement each other. The inferior surface and periphery of the menisci are structures which are inaccessible to arthroscope especially in a tight knee joint; but a pre-operative clinical diagnosis of these lesions helps to look for them in a more efficient way during arthroscopy. So it can be concluded that the two techniques complement each other and are more accurate when taken together than individually.

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Table I: Lesion distribution

Lesion	Clinical diagnosis	Arthroscopy
ACL tear	24	22
Medial meniscal tear	32	18-M.M., 4-L.M., 4-O.A., 2-S.H., 2-ACL, 2-N.
Lateral meniscal tear	12	4-L.M., 1-O.A., 1-M.M.
PCL tear	0	2
Osteoarthritis	0	12
Medial collateral ligament	4	0

M.M – medial meniscus; L.M – lateral meniscus; O.A – osteoarthritis;
S.H- synovial hypertrophy; ACL-anterior cruciate ligament; N-normal

Table II: Diagnostic reliability of clinical assessment:

Diagnosis	True Positive	True Negative	False Positive	False Negative	Accuracy (%)	Sensitivity (%)	Specificity (%)	PV+ (%)	PV- (%)
Torn MM	18	16	14	2	68	90	53	56	89
Torn LM	8	34	4	4	84	67	42	67	42
Torn ACL	22	24	2	2	92	91	92	91	92

PPV- positive predictive value, NPV- negative predictive value- MM- medial meniscus, LM- lateral meniscus, ACL- anterior cruciate ligament

Table III: Comparative table

Method	Accuracy (%)	Sensitivity (%)	Specificity (%)	PV+ (%)	PV-(%)	Reference
Overall	81	82	62	71	74	Current study
Overall	93	89	94	81	97	Terry et al ⁷
Overall	64	Data not available	Data not available	Data not available	Data not available	Ireland et al ⁸
Medial meniscus	68	90	53	56	89	Current study
Medial meniscus	89	99	72	85	98	Terry et al ⁷
Lateral meniscus	84	67	42	67	42	Current study
Lateral meniscus	92	88	92	58	98	Terry et al ⁷
ACL tear	92	91	92	91	92	Current study
ACL tear	99	83	99	83	99	Terry et al ⁷

PV+, positive predictive value; PV-, negative predictive value; ACL, anterior cruciate ligament