

Reliability of Clinical Tests in Detecting Meniscal Tears

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Abstract: *This study was done to check the diagnostic accuracy of various clinical test in detecting meniscal tears. This retrospective study was in government bone and joint surgery hospital, Government medical college srinagar. This study consisted of a total 100 case, over a period of two years. All patients had undergone clinical examination, MRI knee and subsequent diagnostic knee arthroscopy.*

1. Introduction

Menisci are commonly injured in knee trauma especially in road traffic accidents and amongst young males in the sports field.¹ Medial Meniscus is more commonly injured than lateral meniscus.² Individuals who experience a meniscus tear usually complain of pain and swelling as their primary symptoms. Although symptoms and signs are helpful in diagnosis however, sometime they may be confusing and delay in diagnosis may result in a worse prognosis, therefore, confirmation of meniscal injuries requires further evaluation by arthroscopy or MRI.^{3,4,5}

2. Aim and objective

To analyse the reliability of the clinical diagnosis in meniscal tears.

3. Material and Methods

This retrospective study was in government bone and joint surgery hospital, Government medical college srinagar. This study consisted of a total 100 case, over a period of two years. All patients had undergone clinical examination, MRI knee and subsequent diagnostic knee arthroscopy. Physical examination include joint line tenderness, McMurray's test⁶, Apley's test, squat test and thessaly's test.

4. Statistical Analysis

Collected data was analyzed for sensitivity, specificity, positive predictive value, negative predictive value and accuracy.

A result was considered to be true-positive, when the MRI diagnosis is confirmed by positive intraoperative findings. A false-positive result was defined as a positive MRI diagnosis with missing pathological intraoperative findings.

A result was considered as true-negative, when the absence of pathological findings in the MRI could be verified by intraoperative findings.

A false-negative result was defined as a positive intraoperative finding following a negative MRI.

Reviewing our results, accuracy, specificity, sensitivity, positive predictive value (PPV) and negative predictive values (NPV) was set up using specific equations:

Accuracy = (true-positive + true-negative) / total examined knees x 100

The accuracy is the percentage of patients in whom the MRI is correct.

Sensitivity = true-positive / (true-positive + false-negative) x 100

The sensitivity is the ability of a test to detect an abnormality.

Specificity = true-negative / (true-negative + false-positive) x 100

The specificity is an assessment of the accuracy of a test result such that the more specific a test is, the fewer are false-positive results.

Positive Predictive Value (PPV) = true-positive / (true-positive + false-positive) x 100

The PPV correlates a positive test result on MRI with the finding at surgery.

Negative Predictive Value (NPV) = true-negative / (true-negative + false-negative) x 100

The NPV correlates a negative diagnostic result with the finding at surgery.

Results were analyzed using epiInfo 7. Sensitivity, specificity, PPV, NPV, and diagnostic accuracy was reported in percentage along with their 95% confidence interval. Continuous variables were summarized as mean and SD. Categorical variables were summarized as percentages.

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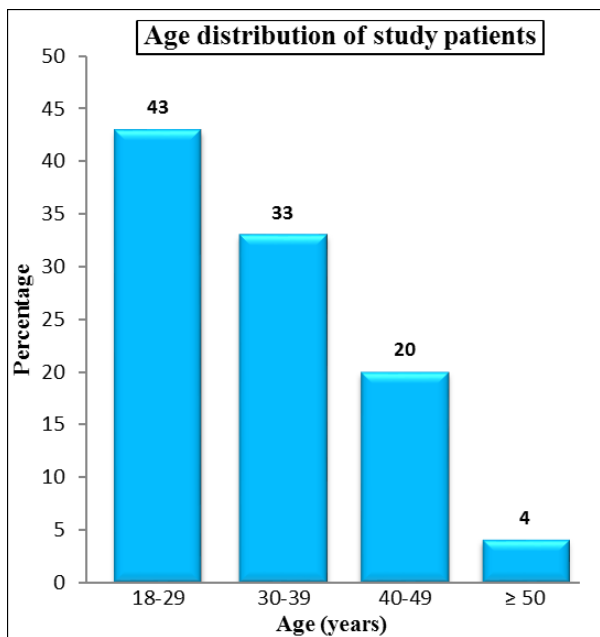
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5. Results

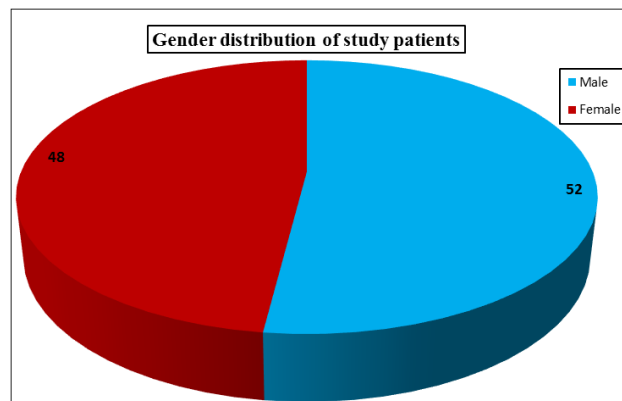
This study group consists of 100 patients. Out of hundred 52 were males and 48 were females. 65% had medial meniscus tear, 13% had lateral meniscal tear, 2% had both meniscal involvement and 20% had no meniscus involved.

Age (years)	Frequency	Percentage
18-29	43	43
30-39	33	33
40-49	20	20
≥ 50	4	4
Total	100	100

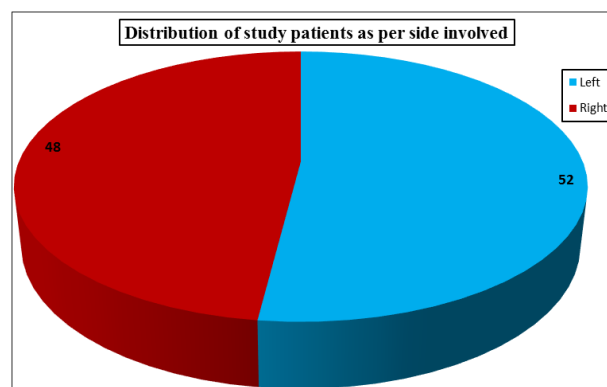
Mean±SD=33.0±8.17



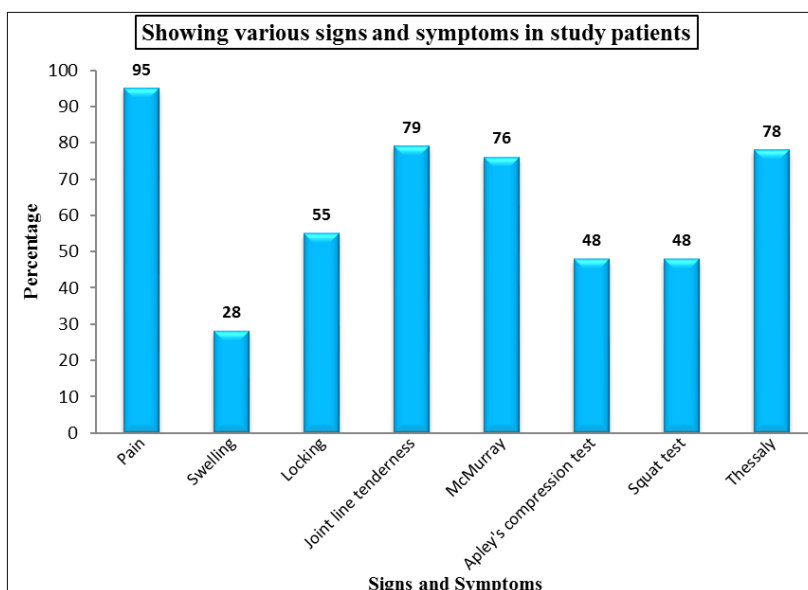
Gender	Frequency	Percentage
Male	52	52
Female	48	48
Total	100	100



Side Involved	Frequency	Percentage
Left	52	52
Right	48	48
Total	100	100



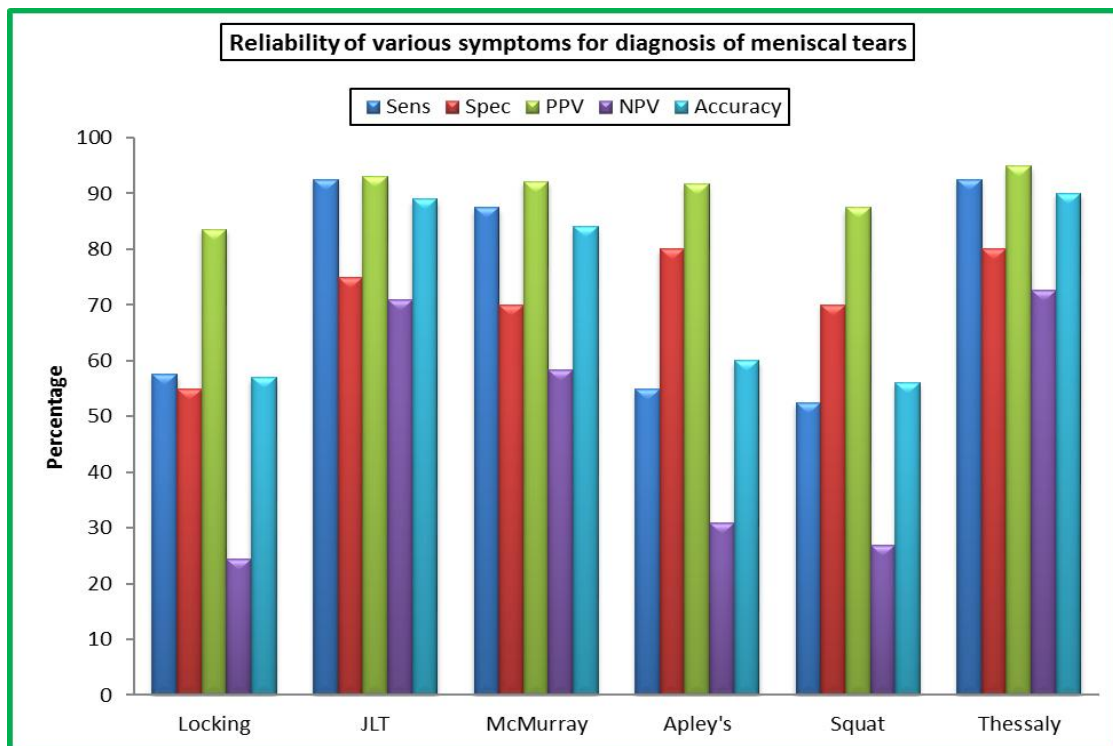
Signs and Symptoms	Frequency	Percentage
Pain	95	95
Swelling	28	28
Locking	55	55
Joint line tenderness	79	79
McMurray's test	76	76
Apley's compression test	48	48
Squat test	48	48



Variable	TP	TN	FP	FN
Locking	46	11	9	34
JLT	74	15	5	6
Mcmurray's	70	14	6	10
Apley's	44	16	4	36
Squat	42	14	6	38
Thessaly's	74	16	4	6

The reliability of various clinical test in detecting meniscal tears are

Variable	Sensitivity	Specificity	PPV	NPV	Accuracy
Locking	57.5	55	83.6	24.4	57
JLT	92.5	75	93	71	89
Mcmurray's	87.5	70	92.1	58.3	84
Apley's	55	80	91.7	30.8	60
Squat	52.5	70	87.5	26.9	56
Thessaly's	92.5	80	94.9	72.7	90



Pateints underwent MRI and subsequent diagnostic arthroscopy .The accuracy of MRI in detecting meniscal tears is 96%. For lateral meniscus accuracy is 95% and for medial meniscus accuracy is 93% .The accuracy of diagnostic test in dectecting meniscal tears is similar to that of MRI.

6. Discussion

Although major advances have taken place in the field of non-invasive diagnostic tools such as MRI, clinical diagnosis remains important and reliable. Expensive investigation could be avoided if clinical diagnosis is as reliable as MRI. This study was conducted to determine the reliability of clinical diagnosis of meniscal tears as compared to MRI scan results. There are various tests described to diagnose meniscal tears such as joint line tenderness, McMurray test and Apley compression test, thessalys test. The advent of arthroscopy of the knee has revolutionalised the diagnosis and treatment of meniscal tears. It is routinely carried out as a day case procedure. It facilitates rapid rehabilitation. The clinical diagnosis was confirmed or refuted during this procedure. The accuracy, sensitivity and specificity were calculated based on the arthroscopic findings.

Eren⁷ reported on accuracy of joint line tenderness in meniscal tears in 104 knees, which was 74% for medial meniscal tears and 96% for lateral meniscal tears. The study group had a mean age of 19.2 years (range: 18– 20 years) with definite history of injury.

In our study group with maximum number of cases were in age group 18 to 29. The accuracy of joint line tenderness is 89%.

Miller ⁸ found overall clinical diagnosis accuracy of meniscal tears of 80.7% and the corresponding accuracy for MRI was 73.7%. We had an accuracy of 90% for the clinical diagnosis test. Rose and Gold⁹ found the clinical examination to be correct more often than MRI diagnosis

They stated that most often MRI just confirms the clinical diagnosis and adds a little more information about the injury pattern. They suggested that negative clinical examination eliminates the need for MRI as a screening tool. They found no significant difference in accuracy between clinical examination and MRI in both medial and lateral meniscal tears or anterior cruciate ligament (ACL) tears. The accuracy of MRI in their study for medial meniscal tears was 75% and 76% for lateral meniscal tears which is lower than our accuracy rates.

7. Conclusion

Most studies do not show any significant differences in clinical and MRI diagnosis of meniscal tears. Our study has an accuracy similar to most of the MRI studies on meniscal tears. Hence we conclude that physical examination is a useful and important diagnostic technique and is as reliable as MRI to diagnose meniscal tears. We recommend the use of MRI for more doubtful, difficult and complex knee injuries.

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