



Original Research Article

The Fate of Menisci in ACL Deficient Knee Joints: An Arthroscopic Evaluation

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ABSTRACT

The purpose of the present study was to determine the relation between the incidence of meniscal injuries in ACL deficient knees and the time of surgery as well as to analyse the location of meniscal tears, whether medial or lateral, in acute versus chronic ACL deficient knees. We retrospectively reviewed 100 patients who underwent arthroscopic ACL reconstruction in our institute between January 2012 and September 2013. The incidence of meniscal tears was assessed and related to the time from injury to surgery. We divided the patients into an early group (surgery within 6 months of injury) and a late group (surgery more than 6 months after injury). There was a significantly higher incidence of meniscal tears in patients undergoing ACL reconstruction in the late group as compared to those in the early group (54.2% vs 26.8%). There was also a significant difference in the site of meniscal tear in both the groups. This was due to a large increase in medial meniscal tears in the late group. We concluded that the incidence of meniscal tears in ACL deficient knees increases with time and that lateral meniscal tear occurs more frequently in acute ACL injury while the incidence of medial meniscal tear increases with time.

Key words: ACL deficiency; Meniscal tear; ACL reconstruction; Knee.

INTRODUCTION

Anterior knee instability is a disabling clinical problem, especially in the athletic individual. Of all the knee ligaments, anterior cruciate ligament (ACL) is the most frequently injured. Meniscal lesions are strongly associated with ACL injuries but the exact relationship between the two has not been established. [1-3] Lateral meniscal injury occurs more commonly in acute ACL tears while the incidence of medial meniscal injury increases with time. [4-6]

Studies have shown that delayed reconstruction of ACL was associated with a

higher incidence of medial meniscal tears. [3,5] Other studies examined the different patterns of meniscal tears in acute and chronic ACL ruptures and showed an increased incidence of medial meniscal injuries in ACL deficient knees. [6,7]

It has been suggested that chronic ACL insufficiency leads to increased damage to the menisci and reconstruction of the ACL reduces the incidence of meniscal tears. [8,9] Hence, while reconstructing the ACL, apart from stabilizing the knee joint the aim is also to reduce secondary damage to the intra-articular structures.

The aim of the present study was to determine the relation between the incidence of meniscal injuries in ACL deficient knees and the time of surgery. A secondary aim was to analyse the location of meniscal tears, whether medial or lateral, in acute versus chronic ACL deficient knees.

MATERIALS AND METHODS

Inclusion criteria were patients who underwent arthroscopic ACL reconstruction in our institute, with both the menisci being visualised during the procedure. The age group from 15 -65 years was included in the study. Patients with associated fractures were excluded from the study. Over a period of 21 months (January 2012 - September 2013), 100 patients fulfilled the criteria and were included in the study.

Sex, side, and age of the patient at the time of surgery were noted. The interval between injury and the time of surgery was recorded and the patients were divided into two groups: those undergoing ACL reconstruction within 6 months after injury were included in the early group and those undergoing surgery after 6 months of injury were included in the late group.

The presence and type of meniscal tears, if any, was noted. All clinical records were reviewed to evaluate the incidence of meniscal tears at the time of surgery. The location of meniscal tears was studied. The incidence was then compared to the time since injury. The relationship between the meniscal tears and the time since injury was analyzed to determine if a delay in surgery resulted in an increased incidence in meniscal tears.

RESULTS

Of the 100 patients, 92 were males and 8 were females (Table 1) with 54 patients injuring the right knee and 46 injuring the left knee. Most of the patients belonged to the 21-30 years age group

(Table 2). There were 41 patients in the early group and 59 in the late group. The commonest mode of injury was road traffic accidents (46%), closely followed by sports injury (44%).

The overall incidence of meniscal tears in ACL deficient knees was 43 out of 100 patients (43%). Eleven out of the 41 patients in the early group (26.8 %) had meniscal injuries as compared to 32 out of 59 patients (54.2%) in the late group. In the early group, there were 2 cases of medial meniscus injury (4.9 %) (Fig.1) as compared to 9 cases of lateral meniscus injury (21.9 %) (Fig.2). In the late group, there were 22 cases of medial meniscus injury (37.3 %) as compared to 10 cases of lateral meniscus injury (16.9%) (Table 3).

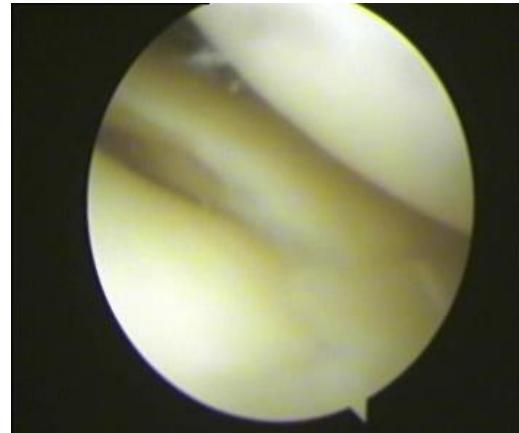


Fig.1: Medial meniscal tear

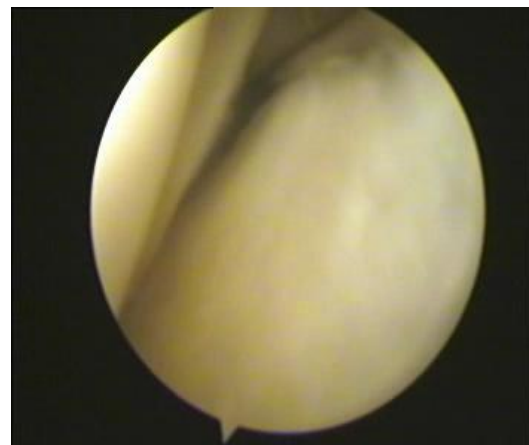


Fig.2: Lateral meniscal tear

Table 1: Sex Distribution

Sex	Patients	Percentage
Male	92	92 %
Female	8	8 %
Total	100	100 %

Table 2: Age Distribution

Age	Patients	Percentage
15-20	22	22 %
21-30	44	44%
31-40	21	21 %
41-50	10	10 %
51-60	2	2 %
61-65	1	1 %
Total	100	100 %

Table 3: Incidence and site of meniscal tears in the early and late group.

	Early group	Late group	Total
Patients	41	59	100
Meniscal injury	11 (26.8%)	32 (54.2%)	43 (43%)
Medial meniscus	2 (4.9%)	22 (37.3%)	24 (24%)
Lateral meniscus	9 (21.9%)	10 (16.9%)	19 (19%)

DISCUSSION

We retrospectively reviewed 100 patients who underwent ACL reconstruction in the period between January 2012 and September 2013. The incidence of meniscal tears was assessed and related to the time from injury to ligament reconstruction. The relationship between the meniscal tears and the time since injury was analyzed to determine if a delay in surgery resulted in an increased incidence of meniscal tears. We noted a high incidence of meniscal tears in patients with ACL deficient knee joints. We also noted that the patients with chronic ACL deficiency had a higher incidence of meniscal tear. In this study we recorded the incidence of meniscal tears in ACL deficient knee joints and related our findings to the time elapsed since injury.

Noyes et al had suggested that meniscal tears are common following ACL disruption and that the patients showed functional deterioration with time. [1] Church and Keating reviewed 183 patients who underwent ACL reconstruction between 1996 and 2002 at the Edinburgh Royal Infirmary. [3] Their findings showed a highly significant increase in meniscal tears in patients undergoing ACL reconstruction

more than 12 months after injury as compared to those in the early group (72% vs 42%). Demirag et al found that the incidence of meniscal lesions in ACL deficient knees was higher when the time elapsed between injury and surgery increased. [10] In the present study we found a significant increase in meniscal tears in the late group as compared to the early group (54.2% vs 26.8%).

Studies have shown that the medial meniscus is more commonly injured as compared to the lateral meniscus. In Church and Keating's study 29% of the patients with ACL deficient knees had medial meniscal tears while only 19% had lateral meniscal tears. [3] 66% of the patients studied by McDaniel and Dameron had medial meniscal tears as compared to 20% who had lateral meniscal tears. [2] Our study also shows a higher incidence of medial meniscal tears as compared to lateral meniscal tears (24% vs 19%).

Studies have also shown a difference between acute and chronic ACL deficient knees with regard to the site of meniscal tear. Anstey et al found a significant increase in the incidence of medial meniscal tears in patients who underwent ACL reconstruction more than 6 months after the injury. [11] In Church and Keating's study the incidence of medial meniscal tears was 20.4% in the early group as compared to 40% in the late group. [3] The incidence of lateral meniscal tears was similar in both groups; 17.5% in the early group vs 20% in the late group. Similarly, in our study the incidence of lateral meniscal tears did not show a significant difference in both groups. The incidence was 21.9% in the early group and 16.9% in the late group. However, the incidence of medial meniscal tears showed a significant increase as the time since injury progressed (4.9% in the early group vs 37.3% in the late group).

In acute injuries, lateral meniscal tears were more common (21.9% vs 4.9%) whereas in chronic ACL injuries, the medial meniscus was more commonly involved (37.3% vs 16.9%). This finding indicates that lateral meniscal tear occurs more commonly at the time of ACL injury or soon after, whereas medial meniscal injuries are mostly acquired after the knee has been ACL deficient for more than 6 months. This may be due to the altered biomechanics of an ACL deficient knee resulting in increased risk of sub-clinical injury.

Anatomical and biomechanical factors can explain the distribution of meniscal tears in ACL insufficiency. [12-14] Owing to its secure attachment to the tibia and medial collateral ligament, the medial meniscus is less mobile. Anterior tibial translation causes the posterior horn of medial meniscus to wedge against the medial femoral condyle in ACL deficient knees, resulting in medial meniscal tears when higher forces are applied. The lateral meniscus being more mobile is able to translate freely and hence it is not subject to recurrent shear loads. These factors explain the increased incidence of medial meniscal tear in chronic ACL insufficiency.

CONCLUSION

The incidence of meniscal tears in ACL deficient knees increases with time. There is a significant increase in the incidence of meniscal lesions if ACL reconstruction is delayed for more than 6 months. The lateral meniscus is more frequently injured in acute ACL injury, while the incidence of medial meniscal tears increases with time. In order to minimize the risk of meniscal injury and for better surgical outcome, we recommend ACL reconstruction be performed as early as possible, ideally within 6 months of injury.

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