MRI ASSESSMENT OF CLINICALLY SUSPECTED MENISCAL TEARS

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ABSTRACT

Background: Magnetic resonance imaging (MRI) is the tool commonly used in the diagnosis of meniscal tears. It has been suggested that, for clinically suspected meniscal tears, the adoption of routine MRI before therapeutic arthroscopy will reduce the number and cost of unnecessary invasive procedures.
The aim of this study was to document MRI yield in knee injuries clinically suspected as possible meniscal tears in Duhok city

Subject and Methods: This cross sectional study was conducted during the period from June to December 2014. A consecutive sampling procedure was used to enroll eighty cases of Knee injuries presenting with clinical features of meniscal tears. All patients underwent MRI examination by 1.5 Tesla machine.

Results: The mean age of the patients was 33.5 years. The number of males was 58 (72.5%) with mean age 29.55 years while females constituted 22 (27.5%) with mean age 44years.The results revealed that 64 patients (80%) were affected by tear in the medial meniscus compared to 16 patients (20%) in the lateral meniscus .
Isolated anterior horn tear was significantly more common in the lateral meniscus (12.5%) than in the medial meniscus (1.25%) while isolated posterior horn tear was more common in the medial meniscus (66.25%) than the lateral meniscus (7.5%)

Conclusions: Meniscal tears were more common in males (~ 3/4th of cases) who presented at a younger age. Medial meniscal tears were four times as common as those affecting the lateral meniscus.

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Keywords: MRI Assessment, Meniscal Tears

The knee meniscus was known to be as non-important vestigial structure that has no function.[1]

In 1887 Sutton described the meniscus as the functionless remains of a leg muscle.[2] In1948; Fairbank stated that meniscectomy is not wholly innocuous in his report on the radiographic changes of post meniscectomy which will lead to early degenerative knee changes.[3]

In 1883 Thomas Annandale was the first one to do meniscal repair.[4] Now the meniscus is known to play an important function in the complex biomechanics of the knee[5].Meniscal tears are the result of either trauma in young athletes or degenerative changes in elderly patients.

The radiological assessment of meniscal tear by MRI examination, significantly participated in avoiding unnecessary diagnostic arthroscopy.[6] .Since the introduction of magnetic resonance imaging in 1980, it has been used as diagnostic tool for musculoskeletal disorders so that arthroscopy now is mostly used for treatment purposes, and it is replaced by the noninvasive MRI for diagnosis.[7] It is safe for the patient and

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does not need exposure to ionizing radiation .[8]

Currently, MRI of the knee for detecting internal derangement has an accuracy rate of more than 90% by most studies.[9] This study has been designed to assess MRI yield in a sample of patients with knee injuries.

PATIENTS AND METHODS

This cross sectional study was done at the department of surgery and MRI unit/ Azadi teaching hospital/ Duhok/ Kurdistan Region during the period June to December 2014.

All patients with knee complaints referred from the department of surgery suspected of having of meniscal tear, were enrolled consecutively and examined by MRI.

the patient lied on supine position with knee slightly external rotation (5-100), small field of view (14-16cm) and slice thickness of 4-5 cm.

MRI protocol used for the examination was sagittal proton density weighted turbo spine echo sequence with fat suppression (TR=3000ms, TE-30ms) and coronal weighted with fat suppression (TR=3000ms, TE-60ms) axial Gradient and T1W coronal also used.

Intra meniscal signals have three grades on MRI which are first described by Stoller and Colleagues.[10] Grade 1 is rounded or amorphous signal intensity that does not disrupt the articular surface.

Grade 2 is liner signal that does not disrupt the articular surface. Grades 1and 2 represent myxoid and fluid intra substance degeneration.[11] Grade 3 in signal that extended to the articular surface and represents a meniscal tear.[12] Data management and statistical analysis were performed by using the statistical package for social sciences (SPSS) version10.

RESULTS

The study sample comprised eighty patients; 58(72.5%) males and 22(27.5%) females. The mean age of the studied groups was 33.52 years; 29.55 years for males and 44years for females. (Table1):

Table 1: Study Sample by Age and Gender

Gender	No. (%)	Mean Age ± SD	*P-value
Gender			
Male	**58(72.5)**	**29.55 ±7.554**	**<0.001***
Female	**22(27.5)**	**44.00 ±14.102**	**<0.001***

* Fisher's Exact Test

Sixty four patients (80%) had tear in the medial meniscus compared to 16 patients (20%) with tear in the lateral meniscus Isolated anterior horn tear was significantly more common in the lateral meniscus (12.5%) compared to those affecting the medial meniscus (1.25%) while isolated posterior horn tear was more common in the medial meniscus (66.25%) than in the lateral meniscus (7.5%).
(Table 2):

Table 2: Affected Menisci by Site of Injury

Site of tear	Affected Meniscus: Medial Meniscus No.	Medial Meniscus (%)	Lateral Meniscus No.	Lateral Meniscus (%)	Total No.	Total (%)
Anterior	**1**	**1.25**	**10**	**12.5**	**11**	**13.73**
Posterior	**53**	**66.25**	**6**	**7.5**	**59**	**73.75**
Combined	**10**	**12.5**	**0**	**0**	**10**	**12.5**
Total	**64**	**80**	**16**	**20**	**80**	**100**

Common stressors

Forty patients (50%) had horizontal tear,8 (10%) had vertical tear, 10 (12.5%) had bucket handle and 22(27.5%)had complex tear the horizontal, complex and bucket handle tears are more common at the medial meniscus (41%,24% and 12.5%

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respectively) while the vertical tear are more common at the lateral meniscus (Table 3):

Table 3: Affected Menisci by Type of Tear

Type of tear	Affected Meniscus: Medial Meniscus No. (%)		Lateral Meniscus No. (%)		Total No.	(%)
Horizontal	33	41	7	12.5	40	40
Vertical	2	2.5	6	7.5	8	10
Bucket handle	10	12.5	0	0	10	12.5
Complex	19	24	3	3.5	22	27.5
Total	64	80	16	20	80	100

DISCUSSION

In the current study, MRI was performed on 80 patients referred from the surgical department because of a unilateral knee injury with clinical suspicion of meniscal tear.

Male predominance (72.5%) was documented, in agreement with another study by Magee and Williams.[13] which also showed male preponderance (73%).

The mechanism of tear was either traumatic or degenerative. The traumatic type was the most commonly occurring (mean age of 29.39 years) and its rate decreased with increasing age. The non-traumatic cause of injury occurred with mean age of 40.79. These findings are comparable to the findings of a study done in Erbil.[14] Traumatic tears more commonly occurred in patients of lower body mass index (BMI) while the degenerative tears were more common in obese patients; this is in agreement with a study done in Australia.[15]

There is a significantly higher proportion of medial meniscus tear (80%) than that of the lateral meniscus (20%).

Isolated anterior horn tear was significantly more common in the lateral meniscus (12.5%) than the medial meniscus (1.25%) while, isolated posterior horn tear was more common in the medial meniscus (66.25%) than the lateral meniscus (7.5%).

The other finding was that horizontal tear was the most common tear (50%) and more commonly occurred at the medial meniscus (41%) mostly in the posterior horn. The vertical longitudinal tear occurred most commonly at the lateral meniscus (10%) while, Bucket handle tear was much more common in the medial meniscus (12.5%) than the lateral meniscus, these results are comparable to a study done by Wright et al., 1995.[16]

Complex tears which are combination of horizontal and vertical tears comprised (27.5%), these findings were with agreement with the results of Englund et al.[17]

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ثوختة

ئةطةرىَ ظىَ نامةيىَ بو هةلسةنطاندنا جوريَن شكاندنا كرِكرِكا ضوكى ئةويَت تيَنة دةستنيشانكرن ب تيشكا رةنينىَ

ثيَشةكى: تيشكا رةنينا موگناتيسى ئيك ژ چارةسةريئت سةرةكيية بو دةست نيشانكرنا نةخوشيت وةكى پچرينا غةضروفي بو گةها چوكي.

ريَكيَن ظةكولينىَ: ويَنةييَت رةنينىَ فاست سثن ئيكو ثروتون ديَنستى و T2 ويَتيد ئيَميَج هاتينة وةرطرتن ب سيستةمىَ 1.5 تسلا ب شيَوازىَ ساجيتال و كورورنال بو (80) نةخوشا ئةويَت شكاندن ل كرِكرِكا ضوكى هةبووين، و ئةو شكاندن تيَنة دابةشكرن بؤ ضوار جورا: ئاسويى، ستوينى، ئالوز و باكيَت هاندل.

ئةنجام: ب تيشكا رةنينىَ شكاندنيَت كرِكرِكا ضوكى تيَنة دابةشكرن بو ئاسويى، ستوينى، ئالوز و باكيَت هاندل، شكاندنيَت ئاسويى ذ هةمى جوريَت دى مشةترن (50%)، ثشتى وا شكاندنيَت ئالوز (27.5%) شكاندنيَت باكيَت هاندل (12.5%) و دوماهيكىَ شكاندنيَت ستوينى (10%)، شكاندنيَت كرِكرِكا ضوكى بيَت رةخىَ ذناظدا ثترن ذ رةخىَ دةرظة، و رةخىَ ثشتىَ ثترن ذ رةخىَ بةرظة.

دةرئةنجام: تيشكا رةنينىَ يا ضوكا باشترين ريَكا نةبيَنظيَزيَظ بو شلوظةكرنا هةمى جوريَت شكاندنيَت كرِكرِكا ضوكى و بو ديتنا هةر بريندارييةكا دى دناف يان دورماندوريَت ضوكى.

الخلاصة

تقييم التمزق الغضروفي بواسطه الرنين المغناطيسي

الخلفية والأهداف: التصوير بالرنين المغناطيسي (MRI) هو الوسيلة التي عادة ما تستخدم في تشخيص اصابات الغضروف الهلالي لمفصل الركبة. وقد أشارت الدراسات إلى أناعتماد التصوير الروتيني بالرنين المغناطيسي قبلا لتنظير العلاجي في حالات الاصابات المحتملة سريريا سوف يقلل من عدد وتكلفة الإجراءات المجتاحة لاعضاء الجسم. كان الغرض من هذه الدراسة هو توثيق نتائج التصوير بالرنين المغناطيسي في إصابات الركبة و التي يشتبه فيها سريريا تضرر الغضروف الهلالي لدى عينة من المرضى في مدينة دهوك.

طرق البحث: أجريت هذه الدراسة المقطعية خلال الفترة من حزيران الى كانون الاول 2014. تم استخدام اسلوب الاعتيان المتعاقب لضم ثمانين حالة من إصابات الركبة ممن لديهم ملامح سريرية لاصابة الغضروف الهلالي. اخضع جميع المرضى لفحص التصوير بالرنين المغناطيسي (1.5 Tesla) .

النتائج: اظهرت النتائج بانمتوسط عمرالمرضى 33.5 سنة. وكان عدد الذكور 58 (72.5 %) بمتوسط عمر 29.55 سنة، في حين شكلت الإناث 22 (27.5%) بمتوسط عمر44 سنة. كما كشفت أن 64 مريضا (80%) تضرر لديهم الغضروف الهلالي الأنسي مقارنة مع 16 مريضا (20%) تضرر لديهم الغضروف الهلالي الوحشي. كذلك اظهرت النتائج بان تمزق القرن الأمامي للغضروف كان أكثر شيوعا في الغضروف الوحشي (12.5%) من الغضروف الأنسي (1.25%) بينما كان تمزق القرن الخلفي أكثر شيوعا في الغضروف الأنسي (66.2%) من الغضروف الجانبي (7.5%).

الاستنتاجات: كانت اصابات الغضروف الهلالي أكثر شيوعا في الذكور (~ 4/3 من الحالات) وحدثت في اعمار اصغر مما هي لدى الاناث كما ان اصابات الغضروف الهلالي الانسي اكثر شيوعا باربعة اضعاف من نضيراتها في الغضروف الهلالي الجانبي.

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