



Incidence of Medial Meniscal Tears in Various Age Groups

Farklı Yaş Gruplarında Medial Menisküs Yırtıklarının İnsidansı

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ABSTRACT

Objective: Meniscal tears are very common and are a major risk factor for knee osteoarthritis development. The aim of this study was to ascertain the incidence of medial meniscal tears in magnetic resonance imaging (MRI) studies and to determine whether increasing age affects the likelihood of a patient having a meniscal tear.

Methods: All patients who underwent knee MRI at our institution between January 3, 2017, and December 30, 2017, were included in the study. Radiological reports of magnetic resonance images were assessed for evidence of any kind of medial meniscus tear. A logistic regression model was used to assess the effect of age and sex on the probability of a patient having a medial meniscal tear.

Results: A total of 1855 patients with a medial meniscal tear and 1935 patients without a medial meniscal tear were included in this study. The logistic regression model showed that the probability of having a medial meniscal tear increased with age in both men and women. In this sample, 52% (923/1767) of men had a medial meniscal tear versus 46% (932/2024) of women; men were more likely to have a medial meniscal tear than women (odds ratio, 1.28; 95% CI, 1.13-1.46; $p < 0.001$).

Conclusion: The incidence of medial meniscal tears increases with age. Therefore, radiologists and orthopedic surgeons interpreting MRI studies should remember that the existence of a medial meniscal tear in an elderly patient may be an incidental finding and may not explain the patient's symptoms.

Keywords: Meniscus, medial meniscus tear, knee magnetic resonance imaging (MRI)

ÖZ

Amaç: Menisküs yırtıkları, sıklıkla görülmekte olup diz eklemine osteoartrit gelişiminde önemli bir risk faktörüdür. Bu çalışmanın amacı manyetik rezonans görüntüleme (MRG) ile saptanan medial menisküs yırtıklarının insidansını göstermek ve artan yaşın menisküs yırtığı riski üzerindeki etkisini araştırmaktır.

Yöntemler: Kliniğimizde 3 Ocak 2017 ile 30 Aralık 2017 tarihleri arasında diz MRG yapılan tüm hastalar tarandı. MR raporları, yırtık tipi farketmezden medial menisküs yırtığı açısından değerlendirildi. Yaş ve cinsiyetin, medial menisküs yırtığı riski üzerindeki etkisi lojistik regresyon modeli kullanılarak gösterildi.

Bulgular: Kayıtları incelenen hastalardan, 1855'inde medial menisküs yırtığı olduğu, 1935'inde ise medial menisküs yırtığı olmadığı saptandı. Lojistik regresyon modeline göre, medial menisküs yırtığı riskinin her iki cinsiyette yaş ile arttığı tespit edildi. Çalışmada, erkeklerin %52 (923/1767)'sinde, kadınların ise %46 (932/2024)'sında medial menisküs yırtığı olduğu gözlemlendi. Erkeklerde menisküs yırtığı riskinin kadınlara göre daha fazla olduğu saptandı (odds ratio, 1,28; 95% CI, 1,13-1,46; $p < 0,001$).

Sonuç: Medial menisküs yırtıklarının insidansı yaş ile artmaktadır. Bu nedenle, diz MRG'yi değerlendiren radyologlar ve ortopedik cerrahlar, yaşlı hastada medial menisküs yırtığı ile karşılaştıklarında, bunun insidental bir bulgu olabileceğini ve hastanın semptomlarını açıklamayabileceğini hatırlamalıdır.

Anahtar kelimeler: Menisküs, medial menisküs yırtığı, diz manyetik rezonans görüntüleme (MRG)

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INTRODUCTION

The menisci are intra-articular structures that have complex biomechanic functions, such as shock absorption and load distribution (1, 2). Meniscal pathologies, especially symptomatic and asymptomatic meniscal tears, are the most prevalent intra-articular knee injury in the United States and are also the most common indication for knee surgery (3-5). Meniscal tear in par-

ticular is one of the important risk factors for the development and progression of knee osteoarthritis, regardless of tear type (6-8). Conversely, osteoarthritis can lead to meniscal tear in some patients (1). Research has shown that meniscal tears occur more frequently in the medial meniscus than in the lateral meniscus (9).

Magnetic resonance imaging (MRI) is often used to diagnose meniscal tears. Clinicians also use MRI findings to determine

whether a patient should undergo arthroscopic meniscectomy. Several previous studies have used MRI findings to assess the potential relationships between patient age and sex, and the incidence of meniscal tears (10-14). However, there is little information available regarding the incidence of medial meniscal tears specifically and the effect of patient age and sex on the incidence of these tears. In this study, we assessed knee MRI reports to ascertain the overall incidence of medial meniscal tears and to determine whether increasing age affects the likelihood of a patient having a meniscal tear.

METHODS

For this retrospective study, we used REDCap (a secure web application for building and managing online surveys and databases) to conduct a search of the Musculoskeletal Radiology Research Laboratory database for relevant patient records. This study was exempt from Institutional Review Board (IRB) approval because of using the existing records on REDCap. All patients who underwent knee MRI for any indication at our institution, between January 3, 2017, and December 30, 2017, were considered for inclusion in this study. All radiological reports of MR scans were assessed for evidence of any kind of medial meniscal tear regardless of whether the patient had any other knee pathologies.

Statistical Analysis

A logistic regression model was used to assess the effect of age and sex on the probability of a patient having a medial meniscal tear. Age, sex, and the interaction between age and sex were all included as predictors in the model. The interaction between age and sex was then dropped from the model, as this factor was not significant at the 0.10 level. The results presented are therefore based on a model with two main effects: age and sex. Only cases with complete records were included; one patient with unknown sex was excluded from the analysis.

RESULTS

A total of 3790 patients (1767 men; 2023 women) were included in the study. From the study patients, 1855 had a medial meniscal tear, and 1935 did not have a medial meniscal tear. The overall age of the patients was divided into 10- and 20-year interval subgroups (Figure 1). The most patients were in the 40-60 year age subgroup.

As age increased, the odds of having a medial meniscal tear increased (Figure 1). According to the model, the odds of having a medial meniscal tear nearly doubled with each 10-year increase in age (odds ratio, 1.94; 95% confidence interval (CI), 1.85-2.03; $p < 0.001$). Additionally, men were more likely to have a medial meniscal tear than women (odds ratio, 1.28; 95% CI, 1.13-1.46; $p < 0.001$) (Figure 2). In this sample, 52% (923/1767) of men had a medial meniscal tear (Figure 3) versus 46% (932/2024) of women (Figure 4).

DISCUSSION

With this model, we found that the probability of a medial meniscal tear occurring increases with increasing age regardless of patient sex, although men were more likely to have a medial meniscal tear than women.

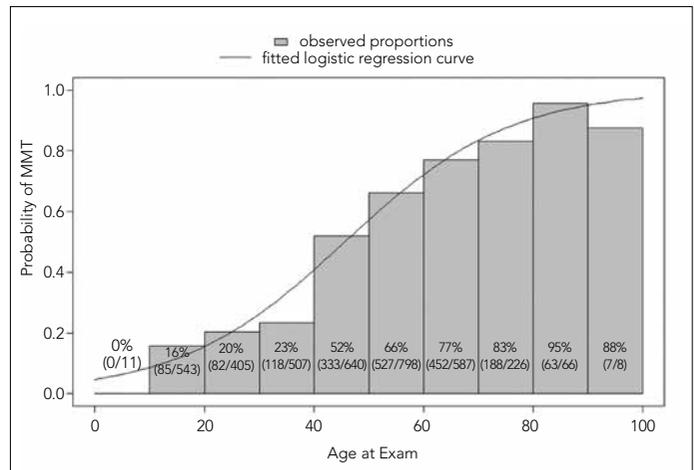


Figure 1. The probability of having a medial meniscal tear increases with age. Observed proportions from this sample are shown as gray bars. The fitted logistic regression curve is also shown.

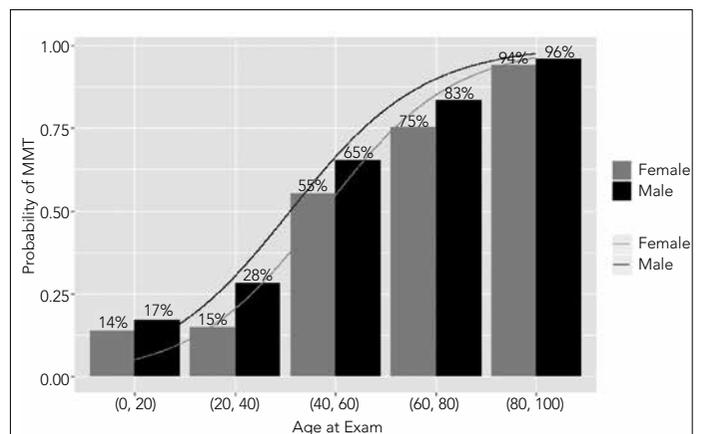


Figure 2. The probability of having a medial meniscal tear in men and women. Observed proportions from this sample are shown as orange (women) and green (men) bars. The fitted logistic regression curve is also shown using the same colors.

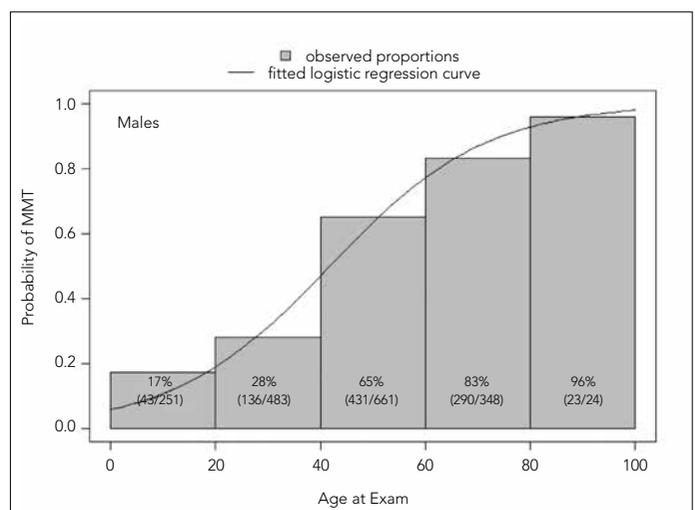


Figure 3. The probability of having a medial meniscal tear increases with age in men. Observed proportions from this sample are shown as gray bars. The fitted logistic regression curve is also shown.

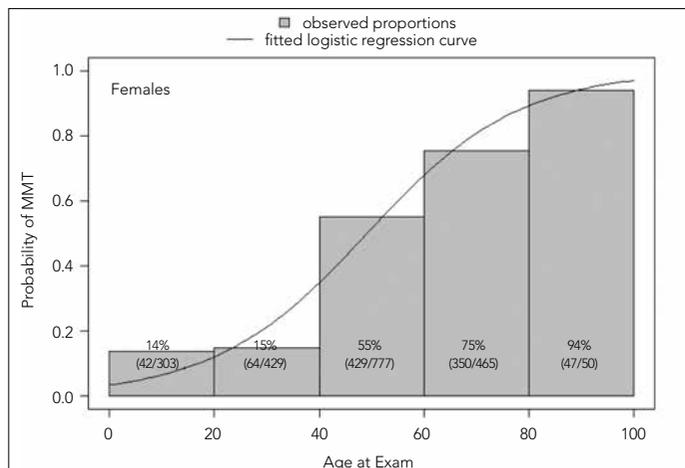


Figure 4. The probability of having a medial meniscal tear increases with age in women. Observed proportions from this sample are shown as gray bars. The fitted logistic regression curve is also shown.

In a previous study of randomly selected adults assessed without regard for symptoms, Englund et al. (10) similarly presented that the prevalence of meniscal tears increases with increasing age and is higher in men. Mansori et al. (12) also reported a higher risk for meniscal tears among older men (12). Meniscal tears in elderly patients likely result from long-term degeneration (10, 11); the higher incidence of tears among men may be related to an increased risk of injuries from playing male-dominated contact sports or working in fields that require strenuous physical activity. Interestingly, Hwang et al. (13) found that women are more likely to have medial meniscus root tears. In this study, we did not differentiate among types of medial meniscal tears.

Most meniscal tears are asymptomatic (1). Therefore, it is important to determine whether knee symptoms are caused by a meniscal tear or another pathology, especially in elderly patients. Meniscal tears are extremely rare in young children; in this study, no medial meniscal tears were seen among patients in the first decade of life. On the other hand, lateral meniscus tears are more frequent than medial meniscal tears in younger patients and are likely to be associated with trauma (14).

Magnetic resonance imaging is a useful imaging modality for the evaluation of meniscal tears, demonstrating a sensitivity of 93% and a specificity of 88% to diagnose medial meniscal tears (15). With the model described in this study, we were able to use knee MRI results to show the relationship between the medial meniscal tear and age/sex. Nearly every patient in the study older than 80 years demonstrated evidence of a medial meniscal tear on knee MRI. Because medial meniscal tears are so common among these patients, evidence of a tear on knee MRI may be an incidental finding and may not explain the patient's symptoms. Radiologists and orthopedic surgeons should therefore remember that elderly patients who present with knee pain should not undergo expensive MRI studies based solely on a suspicion of meniscal tear, as most of these patients will have a medial meniscal tear regardless of the presence or absence of symptoms. These patients should be examined carefully for the presence of the other pathologies related to the knee pain.

Our model was limited by including only patients who underwent knee MRI regardless of the presence of any meniscal tear symptoms; this may have affected our calculations regarding the real incidence of medial meniscal tears. Additionally, this was a retrospective review of scans that were performed on various 1.5 and 3 Tesla MRI systems and reviewed by various radiologists. These variations may also have affected our calculations.

CONCLUSION

We demonstrated that the incidence of medial meniscal tears increases with age. Nearly all patients older than 80 years demonstrated evidence of a medial meniscal tear on knee MRI; therefore, MRI findings of a medial meniscal tear in elderly patients may be incidental and may not explain the patient's symptoms.

Ethics Committee Approval: This study was exempt from the Institutional Review Board approval because of using the existing records on REDCap.

Informed Consent: Informed consent was not taken from patients due to the retrospective nature of the study.

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