MENISCAL AND LIGAMENTOUS INJURIES FOLLOWING ACUTE KNEE TRAUMA AND ITS ASSOCIATION WITH AGE, GENDER AND BODY MASS INDEX

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ABSTRACT

OBJECTIVE: The objective of current study was to determine the frequency of meniscal and ligamentous injuries following acute knee trauma and find its association with age, gender and body mass index.

METHODS: This cross sectional study was conducted in a tertiary care hospital of Peshawar, Pakistan from January to June 2018. A total of 150 participants presented to orthopedic department with history of acute knee trauma due to motor vehicle accident were included in the study through consecutive sampling. Assessment of meniscal and ligamentous injuries was performed through physical examination tests and imaging studies. Questionnaire having questions regarding demographic information and knee injury was used to collect the data. SPSS version 20 was used for data analysis.

RESULTS: The mean age of participants was 29.5±6.7 years. Almost half (n=72, 48%) of the participants had meniscal and/or ligamentous injuries. Out of these 72, 38 (52.8%) had meniscal injuries, 27(37.5%) had ligamentous injuries and 7 (9.7%) had both ligamentous and meniscal injuries. Majority of patients who had meniscal and/or ligamentous injuries were of female gender (n= 43, 59.7%) and had age less than 30 years (n=39, 54.1%). Twelve (16.7%) underweight, 36 (50.0%) normal, 14 (19.4%) overweight and 10 (13.9%) obese patients had meniscal and/or ligamentous injuries. There was significant association of meniscal and/or ligamentous injuries with female gender (p-value 0.021) and age less than 30 years (p-value 0.039) while there was insignificant association with body mass index (p-value 0.091).

CONCLUSION: The frequency of meniscal and ligamentous injuries is high among patients with acute knee trauma. Female are more prone to these injuries after knee trauma as compared to their counterpart male population. Moreover, young population is more at risk for these injuries.

KEY WORDS: Age, Injury, Knee, Ligament, Menisci, Obesity.

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INTRODUCTION

Knee injuries are common in general population due to its anatomical orientation and biomechanical configuration(1). Though minor knee trauma may not cause much sufferings however major knee trauma such as knee injuries due to motor vehicle accident are associated with incredible human sufferings and financial costs(2, 3). These motor vehicle accident related knee injuries can cause meniscal and ligamentous injuries that may contribute to severe episodes of knee pain. The incidence of meniscal and ligamentous injuries after an acute knee trauma ranges from 4.8% to 20.3%.(4-7). According to the study of Vahasarja et al. 19% of school age children suffered chronic knee pain due to complex knee injuries (8, 9).

As compared to degenerative joint disease of knee such as osteoarthritis that is common in old age, knee injuries are more common in young age, which are the productive years of life. Because treatment of meniscal and ligamentous tears can take from months to years, that's the reason these injuries have profound physical, social, financial and psychological implications (1,8). Management of the knee injuries requires proper clinical assessment to identify the treatment that whether it should be managed conservative or surgical. The conservative treatment includes modifying physical activities, physiotherapy that is strengthening of weak muscles, proprioceptive training, stimulation exercises and knee bracing etc. The surgical treatment is required in severe injuries and includes reconstruction of injured ligaments and meniscectomy for meniscal injuries (10-15).

Despite the fact that thousands of patients sustained knee injuries in everyday life, yet the exact burden of meniscal and ligamentous injuries following knee trauma is not reported. Though there are studies which reported these injuries in athletes, however literature regarding meniscal and ligamentous injuries in general population is scarce. To the author's knowledge, there was no study conducted in Pakistan that had reported the frequency of meniscal and ligamentous injuries following knee trauma, therefore there was a dire need to conduct this study to determine the frequency of meniscal and ligamentous injuries in Pakistan following acute knee trauma and find its association with age, gender and body mass index.

METHODS

This cross-sectional study was conducted in a tertiary care hospital of Peshawar, Pakistan from January to June 2018. A total of 150 participants presented to orthopedic department with history of

acute knee trauma due to motor vehicle accident were included in the study through consecutive sampling. Patients with the history of tumors, and other co-morbidities such as degenerative joint diseases or any systemic disease were excluded. Patients with lower limb fractures or minor injuries such as superficial skin abrasions were also excluded.

The meniscal and/or ligamentous injuries were diagnosed by performing different tests such as Mc. Murray test for meniscal injury, anterior drawer test for ACL, posterior drawer test for PCL, valgus and varus stress test for medial and lateral collateral ligaments while the diagnosis was confirmed with Magnetic Resonance Imaging (MRI) and arthroscopy for differentiating grades of meniscal and ligamentous injuries.

Questionnaire having questions regarding demographic information, severity of injury, and other information relevant to knee injury such as physical examination tests, imaging study results etc. was used to collect the data. Body mass index was calculated according to general rules as BMI = weight in kilogram / (Height in meter)^2. SPSS version 20 was used for data analysis. Chi-square test was used to find the association between categorical variables. P-value <0.05 was considered significant.

RESULTS

The mean age of the participants was 29.5±6.7 years. Of total participants, 72 (48%) had meniscal and/or ligamentous injuries. Out of these 72, 38 (52.8%) had meniscal injuries, 27(37.5%) had ligamentous injuries and 7 (9.7%) had both ligamentous and meniscal injuries. Of 38 patients, who had only meniscal injuries, 23 (60.5%) had medial, 9 (23.7%) had lateral while 6 (15.8%) had both medial and lateral menisci involvement. Of 27 patients who had only ligamentous injuries, 25 (92.6%) had anterior cruciate ligament, 1 (3.7%) had posterior cruciate ligament and 1 (3.7%) had medial collateral ligament injury. (Table 1) Anterior cruciate ligament and medial menisci were injured in the remaining 7 (9.7%) patients who had both ligamentous and meniscal injuries.

Majority of patients who had meniscal and/or ligamentous injuries were of female gender (n= 43, 59.7%) and had age less than 30 years (n=39, 54.1%). Twelve (16.7%) underweight, 36 (50.0%) normal, 14 (19.4%) overweight and 10 (13.9%) obese patients had meniscal and/or ligamentous injuries. There was significant association of meniscal and/or ligamentous injuries with female gender (p-value 0.021) and age less than 30 years (p-value 0.039) while there was insignificant association with body mass index (p-value 0.091).

Table 1: Frequency of meniscal and ligamentous injuries

Meniscal Injuries	Meniscal Injury N=38	Percent (%)	Types Of Ligamentous Injuries	Ligamentous Injury N=27	Percent (%)
Medial	23	60.5	ACL	25	92.6
Lateral	9	23.7	PCL	1	3.7
Both	6	15.8	MCL	1	3.7

DISCUSSION

Knee pain after an acute trauma is one of the most common reason patients visit orthopedic departments. Though obvious fractures are diagnosed easily and mostly managed in emergency basis, however, occult meniscal and ligamentous injuries are sometime missed in emergency departments. A number of studies have reported about management of meniscal and ligamentous injuries, nevertheless, there is limited literature available regarding frequency of these injuries after an acute knee trauma (16, 17). Moreover, adequate literature is available about prevalence of meniscal and ligamentous injuries in athletes, however, literature regarding these injuries in general population is scarce. Therefore, current study was designed in order to determine the exact burden of meniscal and ligamentous injuries in general population following knee trauma and to find its association with age, gender and body mass index.

Results of current study showed that that almost half (48%) of the patients who sustained acute knee trauma had meniscal and ligamentous injuries. Indeed these statistics are alarming and clinicians must take extreme care in managing acute knee trauma patients. Moreover, it is suggested that each patient who sustained major acute knee trauma must be examined carefully to exclude these injuries. Thorough physical examination can help in diagnosing apparent meniscal and ligamentous injuries; however, imaging studies such as MRI are usually used to confirm these injuries in clinical settings. Shea et al. reviewed a series of twenty MRI examinations and found meniscal injuries in about 40% of patients where-as the study of Johnson et al. examined twenty MRI reports and found the prevalence of meniscal injury as 30% (18, 19).

The anterior cruciate ligament and medial meniscus are the most commonly disrupted structures in physically active persons. Results of current study showed that meniscal and ligamentous injuries following knee trauma was more in young individuals. Because these young individuals are more active, that is the reason that they are more prone to sustain meniscal and ligamentous injuries. A similar study was done by Englund M et al., which reported high prevalence of meniscal injury and showed significant association with age (5). Another study conducted by Matthias J. Feucht reported that one third of adolescents who are physical active in their young age sustained these injuries (18-20). Biomechanical, anatomical and hormonal factors can contribute to these injuries among adolescents (21, 22). R. B. Frobell et al. showed in his study that acute rotational trauma to knee cause unhappy triad in many cases. Their study reported high prevalence of meniscal (38%) and

ligamentous injury(56%) in patients with acute knee trauma (23).

Voluminous studies have shown the anatomical and physiological determinants of knee injuries in both the genders, and majority of them reported that females are at higher risk of meniscal and ligamentous injury as compared to men, the main cause of which is increased Q-angle. Similar results are reported in the current study and reported that female gender is significantly associated with meniscal and ligamentous injuries after acute knee trauma (18-20). Despite the fact that current study was first of its kind which reported frequency of meniscal and ligamentous injuries in general population following acute knee trauma and find its association with age, gender and body mass index, however current has some limitations. First, current study was conducted in clinical settings due to which it was difficult to control confounding variables. Secondly sample size of current study was small due to which generalizability of the results of current study is questionable.

CONCLUSION

To sum up it can be concluded from the current study that the frequency of meniscal and ligamentous injuries is high among patients with acute knee trauma. Female are more prone to these injuries after knee trauma as compared to their counterpart male population. Moreover, young population is more at risk for these injuries. Large multicenter trials and prospective studies are required to truly determine the exact burden of meniscal and/or ligamentous injuries following knee trauma.

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