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Original Research Article

Incidence of Other Knee Injuries Associated with ACL Tears in Road Traffic Accidents in India

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Abstract:

Background: The injuries related to knees are common and affect the overall physical activities of and individual. According to clinical studies, knee is having one of the largest joints in body as well as has the complex anatomy. It is considered as pivotal hinge joint that has medial and lateral rotation. The knee has surrounding of the ligaments which considered as soft tissue. The knee is an important part of the body that helps to manage the body weight and affected by the acute injuries or the development of osteoarthritis. In this event, ACL is providing the control in movement and managing the joint of knee. However, any injury and impact are influencing the control of ACL. The slip and Road Traffic Accident (RTA) also cause the injuries to knee and influence the health of the individual. Additionally, ACL injuries involve the heavy or stiffed legged landing that cause twisting and turning of the knee affect the muscles and rotation of the knee.

Aim: The study aims to determine the incidence of knee associated injuries with Anterior Cruciate Ligament (ACL) tears in road traffic accidents (RTA) in India.

Method: The study was approved by the ethics committee that was conducted at department of orthopaedics of MKCG MCH, Berhampur from January 2019 to September 2022. The number of patients that were involved in the study was 100 and prior consent was taken from every individual. All the patients were having the issues related to ACL and diagnosed through MRI. For the study, the collected data involve the epidemiologic, demographic and RTA injury information. RTA was divided into issues related to two and four-wheeler accidents. The analysis of data was done using the SPSS version 28.0.

Results: The higher numbers of accident were involving 53% four-wheeler and 44% two-wheeler followed by 3% others. Apart from this, 55% patients were affected in right side, 44% were affected in left side and 1% had both sides affected. The most patients were having Central Meniscal (CM) ACL tear 45% that followed by the Lateral Collateral Ligament (LCL) 28%, Medial Meniscal (MM) 23% and Posterior Cruciate Ligament (PCL) 24%.

Conclusion: According to the outcome of the study, ACL tears were shown to be more common in RTAs, and most of these injuries were accompanied by concurrent knee injuries. CM was shown to have a greater prevalence of ACL tears (45%), followed by LCL (28%) and PCL (24%).

Keywords: Anterior Cruciate Ligament, Road Traffic Accidents, Knee injuries.

Background

In life span, there were many incidents happening with the human that led to injuries and influence the physical health. The injuries related to knees are common and affect the overall physical activities of and individual [1]. According to clinical studies, knee is having one of the largest joints in body as well as has the complex anatomy. It is considered as pivotal hinge joint that has medial and lateral rotation [2]. The knee has surrounding of the ligaments which considered as soft tissue. These ligaments are helping to maintain the stability and control the movement of knee. In addition to this, there are different types of menisci and bursae, shield, and articular cartilage to control and mutation of knee. In this process Anterior Cruciate Ligament (ACL) is considered as medial and anterior that includes the tibial plateau and runes superiority [3]. ACL is involving two fibres such as anteromedial and posterolateral bundles that offer 85% of the total restraining for anterior translation [4]. The knee is an important part of the body that helps to manage the body weight and affected by the acute injuries or the development of osteoarthritis [5]. In this event, ACL is providing the control in movement and managing the joint of knee. However, any injury and impact are influencing the control of ACL [6].

According to the analysis, non-contact tear and rupture are major aspects of ACL injuries and affecting the knee movement [7]. In addition to this, when the knee bents too much also have a significant impact on the ligaments which leads to tear and facture [8]. Apart from this, the slip, and Road Traffic Accident (RTA) also cause the injuries to knee and influence the health of the individual [9]. Additionally, ACL injuries involve the heavy or stiffed legged landing that cause twisting and turning of the knee affect the muscles and rotation of the knee [10]. However, there are differences in the strengths, anatomy and reaction time of the gender that affect the contraction and coordination [11]. For diagnosis of the issue, the MRI technique is used that helping to analyse the severity of the injury and planning of the treatment [12].

Aim

The study aims to determine the incidence of knee associated injuries with Anterior Cruciate Ligament (ACL) tears in road traffic accidents (RTA) in India.

Method and Material

The study was approved by the ethics committee that was conducted at department of orthopaedic of MKCG MCH, Berhampur from January 2019 to September 2022. The number of patients that were involved in the study was 100 and prior consent was taken from every individual. All the patients were having the issues related to ACL and diagnosed through MRI. Apart from this, the patient age below 15 years and multiple ligament tear were excluded from the study.

Data Analysis

For the study, the collected data involve the epidemiologic, demographic and RTA injury information. RTA was divided into issues related to two and four-wheeler accidents. The analysis of data was done using the SPSS version 28.0 and for normality of data Shapiro-Wilk test was applied.

Results

Table 1: Age

Age group	Frequency	(%)
16-25 years	19	20%
26-35 years	29	29%
36-45 years	36	36%
46-55 years	6	6%
>56 years	10	10%
Total	100	100%

As per the outcome of table 1, most numbers of patients 36% were aged between 36-45 years followed by 29% 26-35 years, 20% 16-25 years and 10% above >56 years.

Table 2: Gender

Gender	Frequency	(%)
Male	75	75%
Female	25	25%
Total	100	100%

According to table 2, there were 75% male and 25% female patients involved in the study.

Table 3: Weight

Weight	Frequency	**(%)**
41-50 kg	28	28%
51-60 kg	31	31%
> 61 kg	41	41%
Total	100	100%

According to table 3, majority of patients 41% were above the weight of >61 kg followed by 31% between 51-60 kg and 28% were between 41-50 kg.

Table 4: Mode of accident

Mode of accident	**Frequency**	**(%)**
Two-wheeler	44	44%
Four-wheeler	53	53%
Other	3	3%
Total	100	100

According to table 4, the higher number of accidents were involving 53% four-wheeler and 44% two-wheeler followed by 3% others.

Table 5: Affected side

Affected side	**Frequency**	**(%)**
Left side	44	44%
Right side	55	55%
Both side	1	1%
Total	100	100%

As per the outcome of table 5, 55% patients were affected in right side, 44% were affected in left side and 1% had both sides affected.

Table 6: Incident of knee associated injuries.

Incident of knee associated injuries	**Frequency**	**Percentage**
Posterior Cruciate Ligament (PCL)	24	24
Medial Meniscal (MM)	23	23
Central Meniscal (CM)	45	45
Lateral Collateral Ligament (LCL)	28	28
Medial Collateral Ligament (MCL)	10	10
Popliteal Tendon (PT)	9	9
Lateral Patellar Retinaculum (LPR)	4	4

As per the table 6, the most patients were having Central Meniscal (CM) ACL tear 45% that followed by the Lateral Collateral Ligament (LCL) 28%, Medial Meniscal (MM) 23% and Posterior Cruciate Ligament (PCL) 24%.

Discussion

The knee has surrounding of the ligaments which considered as soft tissue. These ligaments are helping to maintain the stability and control the movement of knee. In addition to this, there are different types of menisci and bursae, shield, and articular cartilage to control and mutation of knee. In this process Anterior Cruciate Ligament (ACL) is considered as medial and anterior that includes the tibial plateau and runes superiority. ACL is involving two fibres such as anteromedial and posterolateral bundles that offer 85% of the total restraining for anterior translation. The slip and Road Traffic Accident (RTA) also cause the injuries to knee and influence the health of the individual [13]. Additionally, ACL injuries involve the heavy or stiffed legged landing that cause twisting and turning of the knee affect the muscles and rotation of the knee. However, there are differences in the strengths, anatomy and reaction time of the gender that affect the contraction and coordination.

As per the outcome of the current study, most numbers of patients 36% were aged between 36-45 years followed by 29% 26-35 years, 20% 16-25 years and 10% above >56 years. Majority of patients 41% were above the weight of >61 kg followed by 31% between 51-60 kg and 28% were between 41-50 kg. Additionally, the higher number of accidents were involving 53% four-wheeler and 44% two-wheeler followed by 3% others. Apart from this, 55% patients were affected in right side, 44% were affected in left side and 1% had both sides affected. The most patients were having Central

Meniscal (CM) ACL tear 45% that followed by the Lateral Collateral Ligament (LCL) 28%, Medial Meniscal (MM) 23% and Posterior Cruciate Ligament (PCL) 24%.

In addition, Joshi et al., (2022) [14] reported a prevalence of ligamentous knee injuries in pedestrian versus motor vehicle accidents of 53.90% with a 94% confidence range and an acceptable difference of 9%. Additionally, the Mayo et al., (2019) [15] study indicated that RTA was the most common cause of ACL injuries (39.9%), and that it was more common in patients over the age of thirty and more years as well as among office workers.

Conclusion

According to the outcome of the study, ACL tears were shown to be more common in RTAs, and most of these injuries were accompanied by concurrent knee injuries. CM was shown to have a greater prevalence of ACL tears (45%), followed by LCL (28%) and PCL (24%).

References

1. Kaarre J, Zsidai B, Winkler PW, Narup E, Horvath A, Svantesson E, Senorski EH, Musahl V, Samuelsson K. Different patient and activity-related characteristics result in different injury profiles for patients with anterior cruciate ligament and posterior cruciate ligament injuries. Knee Surgery, Sports Traumatology, Arthroscopy. 2023 Jan;31(1):308-15.
2. McPherson AL, Shirley MB, Schilaty ND, Larson DR, Hewett TE. Effect of a concussion on anterior cruciate ligament injury risk in a general population. Sports medicine. 2020 Jun; 50(6):1203-10.
3. Zhang S, Lv Z. Diagnosis and exercise rehabilitation of knee joint anterior cruciate ligament injury based on 3D-CT reconstruction. Complexity. 2020 Sep 28;2020:1-3.
4. Mahmood A, Mlv SK, Garika SS, Mittal R, Digge VK, Gamanagatti S. Ramp Lesions in Chronic Anterior Cruciate Ligament Injuries. Cureus. 2022 Aug 26;14(8).
5. Razi M, Soufali AP, Ziabari EZ, Dadgostar H, Askari A, Arasteh P. Treatment of concomitant ACL and MCL injuries: spontaneous healing of complete ACL and MCL tears. The Journal of Knee Surgery. 2020 Apr 8;34(12):1329-36.
6. Sulaiman Y, Li J, Chen G, Abudouaini H, Li Q, Tang X. The relationship between a Segond fracture and meniscus injury in patients with anterior cruciate ligament tears. The Knee. 20 21 Dec 1;33:193-9.
7. Zhao M, Zhou Y, Chang J, Hu J, Liu H, Wang S, Si D, Yuan Y, Li H. The accuracy of MRI in the diagnosis of anterior cruciate ligament injury. Annals of translational medicine. 2020 Dec;8(24).
8. Sundararajan SR, Ramakanth R, Rajasekaran S. Concomitant Patellar Tendon Tear (PTT) with Cruciate and/Collateral ligament injury (Multi-Ligamentous Knee Injury–MLKI) and new pathoanatomical-Ganga PTT classification aids to strategize treatment options. Injury. 2023 Feb 1;54(2):712-21.
9. Ovigue J, Bouguennec N, Graveleau N. Arthroscopic anterior cruciate ligament reconstruction is a reliable option to treat knee instability in patients over 50 years old. Knee Surgery, Sports Traumatology, Arthroscopy. 2020 Nov;28:3686-93.
10. Mlv SK, Mahmood A, Vatsya P, Garika SS, Mittal R, Nagar M. Demographic characteristics of patients who underwent anterior cruciate ligament reconstruction at a tertiary care hospital in India. World Journal of Clinical Cases. 2023 May 26;11(15):3464-70.
11. Ahmed S, Ashraf M, Sahanand S, Rajan DV. Can ACL Tears be Restricted to Sports Injuries Alone? A Retrospective Analysis. Indian Journal of Orthopaedics. 2021 Jul;55:402-8.
12. Venkataraman S, Ethiraj P, Shanthappa AH, Vellingiri K. Association of Meniscus Injuries in Patients With Anterior Cruciate Ligament Injuries. Cureus. 2022 Jun 12;14(6).
13. Markus DH, Mojica ES, Bi A, Kahan JB, Moran J, Mannino BJ, Alaia EF, Jazrawi LM, Medvecky MJ, Alaia MJ. Relationship between peroneal nerve and anterior cruciate ligament involvement in multiligamentous knee injury: a multicenter study. Journal of the American Academy of Orthopaedic Surgeons. 2022 Nov 15;30(22):e1461-6.
14. Joshi A, Singh N, Basukala B, Bista R, Maharjan B, Pradhan I. Epidemiological profile of anterior cruciate ligament injuries in a tertiary referral trauma center of Nepal. BMC musculoskeletal disorders. 2022 Jun 21;23(1):595.
15. Mayo MH, Mitchell JJ, Axibal DP, Chahla J, Palmer C, Vidal AF, Rhodes JT. Anterior cruciate ligament injury at the time of anterior tibial spine fracture in young patients: an observational cohort study. Journal of Pediatric Orthopaedics. 2019 Oct 1;39(9):e668-73.