ANTERIOR CRUCIATE LIGAMENT RUPTURE: AN ANALYSIS OF THE EPIDEMIOLOGICAL PROFILE AND MECHANISMS OF INJURY

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ABSTRACT

Ligaments play a crucial role in the passive stabilization of joints. Instability leads to decreased quality of life, reduced activity levels, and the management of patients with ACL injury may involve either surgical or non-surgical treatment. The aim of this study was to analyze the epidemiological profile of patients with anterior cruciate ligament (ACL) rupture, identifying the main injury mechanisms and associated risk factors. This was a descriptive, cross-sectional, and quantitative study conducted at a referral orthopedic hospital in north-central Goiás, designed to identify patterns and correlations between different risk factors and the occurrence of ACL injuries. Data were collected through a sociodemographic questionnaire prepared by the authors. A total of 27 individuals with ACL rupture were evaluated: 22.2% were female and 77.8% were male, with a mean age of 34 years. Injuries were caused mainly by sports activities (48.1%), followed by falls (18.5%), animal-related accidents (14.8%), motorcycle accidents (7.4%), and work-related accidents, representing only 3.7% of cases. Therefore, it can be concluded that males are more prone to ACL rupture, particularly in active and productive age groups, and that injury mechanisms are determining factors in its occurrence, with sports-related activities being the most prevalent. Preventive measures should be adopted to reduce the high rate of such injuries, aiming to promote greater well-being and contribute to public health.

Keywords: Anterior Cruciate Ligament Rupture; Sports Injuries; Epidemiological Profile.

INTRODUCTION

Ligaments play a crucial role in the passive stabilization of joints (Leong et al., 2019). Soft tissues are highly susceptible to injuries and diseases, which compromise performance in daily activities (Esmonde-White, 2019). Among knee-related injuries,

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anterior cruciate ligament ruptures (ACLR) are the most common, with approximately 120,000 ligament reconstructions performed each year in the United States (Mok et al., 2022). When ruptured, the ACL results in joint instability and a sensation of "giving way" when bearing weight (Gayatri et al., 2021).

It is noteworthy that physical activity and/or sports such as running, soccer, handball, and basketball are major contributors to injury, with the knee being one of the most affected structures due to its load-bearing role (Szabo et al., 2022). Consequently, lower-limb injuries are frequently reported in athletes, particularly involving the anterior cruciate ligament (ACL) and talofibular ligament (Martín-Guzón et al., 2021).

A systematic review published in 2014, assessing sex-based differences in ACLR, found no significant differences between male and female patients among the 13 included articles (Ryan et al., 2014). Previous epidemiological reviews on ACL injury incidence did not consider injury mechanisms (Chia et al., 2022).

Thus, the objective of this study was to analyze the epidemiological profile of patients with ACL injury, identifying the main mechanisms of injury and risk factors among individuals in the postoperative period at a referral hospital in north-central Goiás.

METHODOLOGY

This was a cross-sectional, quantitative study conducted at a referral orthopedic hospital in north-central Goiás in 2024, investigating the epidemiological profile of patients with anterior cruciate ligament (ACL) rupture in the postoperative period. Participants were selected through non-probabilistic sampling and provided informed consent (ICF).

Inclusion criteria comprised adults aged 18 to 60 years, of both sexes, admitted for ACL injury treatment. Data collection was carried out through a sociodemographic questionnaire administered digitally via Google Forms, ensuring confidentiality and security of the information. The study was conducted at an orthopedic referral unit located in the north-central region of Goiás, following approval by the Research Ethics Committee (approval number 6970562).

Statistical analysis was performed using descriptive methods (absolute and relative frequencies) and the Chi-square test, involving 27 participants. Tests for normality were conducted, and comparisons of variables related to physical aspects in the postoperative period were made, aiming to provide a detailed overview of the profile and characteristics of ACL injury in surgical patients.

RESULTS

The study included 27 individuals with ACL rupture, of whom 22.2% were female and 77.8% were male, with a mean age of 34 years. These results indicate a marked predominance of cases among men, within a young adult age group. In the sample, it was observed that 76.92% of male participants sustained the injury while playing soccer during leisure activities

Table 1: Distribution of injury mechanisms among participants with ACL rupture

	Frequência	%
Automobilístico	2	7,4
Animal	4	14,8
Motociclístico	2	7,4
Esportivo	13	48,1
Queda	5	18,5
Outros	1	3,7
TOTAL	27	100,0

Source: Prepared by the authors (2024).

Table 1 presents the distribution of injury causes among the participants in the sample. It is observed that most injuries occurred as a result of sports activities, representing 48.1% of cases (n=13). Falls accounted for 18.5% of injuries (n=5), followed by accidents involving horses, which represented 14.8% (n=4). Automobile and motorcycle accidents showed the same frequency, each with 7.4% (n=2). Finally, injuries occurring during work activities accounted for 3.7% (n=1) of the cases.

These data indicate that, within the analyzed sample, the practice of sports activities was the main cause of injuries, followed by falls and accidents involving animals (horses). Work-related injuries, although present, occurred less frequently. The cumulative percentage shows that, after considering sports and fall-related

injuries, 96.6% of the causes were non-occupational, indicating that most events occurred during physical activities or accidents.

CONCLUSION

The analysis evidenced ACL rupture mainly as a result of the intense use of the lower limbs in specific activities such as sports or recreational practices, representing the highest percentage of cases. Therefore, preventive measures should be adopted to reduce this high incidence of injuries, aiming to promote greater well-being and contributing to public health.

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