Anterior Cruciate Ligament Rupture and Concomitant Injuries

ORIGINAL

Abstract

Introduction: The association between previous injury and the risk of re-injury has been widely studied, however still there are limited studies about the prevalence and distribution of the injuries associated to rupture of Anterior Cruciate Ligament (ACL) mainly focused on people who plays sports for leisure or to improve their quality of life.

Objective: To identify the prevalence of concomitant injuries with rupture of ACL and its association with sex, age and practice of sports for leisure.

Methods: Cross-sectional study of clinical base. It was analyzed the data of clinical records and demographic information of 807 individuals who underwent ACL reconstruction surgery in a clinic specializing in orthopedics knees in Santo André, São Paulo, Brazil.

Results: The prevalence of concomitant injuries with the ACL injury was 57.9%. The meniscus injuries were the main concomitant injuries found. It is observed a trend of concomitant injuries with ACL rupture in males (59.2%) and in individuals who do not practice recreational sports (58.9%). Individuals who had concomitant lesions had higher median age (37%, 95% CI 36-39) compared to individuals diagnosed with isolated ACL rupture.

Conclusions: The prevalence of concomitant injuries with the ACL rupture found in this study points to the need of further research about injuries of adjacent structures to ACL.

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Keywords

Anterior Cruciate Ligament; Ligaments; Knee Injury.

Introduction

The anterior cruciate ligament (ACL) is a major contributor to the stabilization of the knee [1] and so it's constantly injured [2], with an incidence of 0.8 cases per 1,000 inhabitants in individuals 10-64 years [3]. The rupture of this ligament commonly cause degeneration of other intrinsic knee structures as a consequence of post injury instability [4] and so articulate cartilage injuries are often encountered at the time of ACL reconstruction [5].

The association between previous injury and the risk of re-injury has been widely studied [6]. Many studies have been published examining risk factors for ACL injuries or determining an association with sports practice or sex [7, 8] or association of risk factors in the outcome of ACL reconstruction [9, 10] but still there are few studies about the prevalence and distribution of the injuries associated to rupture of ACL [4, 11] especially focused on people who plays sports for leisure.

Therefore, the objective of this study is to identify the prevalence of concomitant injuries with rupture of ACL and its association with sex, age and practice of sports for leisure.

Materials and methods

Cross-sectional study of clinical base with 807 individuals who underwent Anterior Cruciate Ligament reconstruction surgery in a clinic specializing in orthopedics knees in Santo André, São Paulo, Brazil, between January 2006 and December 2011. The study was approved by the Research Ethics Committee of the Health Department of Santo André, São Paulo, Brazil under N°. 022/2011.

The Data was obtained from 900 clinical records, but patients who had relapsing injury (n=38) or who choosed not to take the exam (n=55) were excluded. Thus, we analyzed 807 charts with sociodemographic and clinical information, which extracted variables were sex, operated knee,

sports practice in the period of the injury, presence and types of injuries diagnosed by physical examination and confirmed by Magnetic Resonance Imaging (MRI).

The quantitative variables were described by median and confidence interval; the categorical variables by absolute and relative frequency. To evaluate the relationship between the presence of associated injuries and sex, sports and leisure, we used chi-square test. To compare the age of individuals with or without associated injuries was used the Kruskal-Wallis test due to non-normality of the data (Shapiro-Wilk test, $p < 0.05$). The confidence level adopted was 5%. The data was analized using the statistical software Stata 11.0.

Results

There were studied 807 individuals (691 men and 116 women) with first Anterior Cruciate Ligament (ACL) injury diagnosed by Magnetic Resonance Imaging (MRI) who had a median age of 35 [95% CI 27-44]. Of those, 57.9% (n=467) had in addition other associated ACL injuries.

Individuals with concomitant injuries to ACL injury were mostly male (87.6%, n=409), who did not practice sports for leisure (73.2%, n=342). The main damages associated with ACL rupture were observed with greater frequency in the medial meniscus (54.6%) in the lateral meniscus (40.0%) and osteochondral lesions (14.1%) (**Figure 1**).

It is observed a tendency to higher prevalence of concomitant injuries to the ACL rupture in males (59.2%, n=409), most in those who not play sports for leisure (58.9%, n=342) (**Table 1**).

The age of the individuals who had concomitant injuries with ACL rupture was higher than those who had isolated ACL with a median of 37 [95% CI 36-39] and 32 (95% CI 31-34) respectively, a statistically significant difference ($p < 0.001$) (**Figure 2**).

Figure 1: Characterization of groups and distribution of injuries associated with rupture of anterior cruciate ligament in 807 individuals elected to ligament reconstruction surgery, Santo André, Brazil, 2006-2011.

Figure 2: Median (CI95%) of age of individuals diagnosed with isolated anterior cruciate ligament rupture (ACL) and individuals diagnosed with concomitant injuries to ACL rupture, Santo André, Brazil, 2006-2011.

* Anterior Cruciate Ligament

Table 1. Concomitant injuries to the anterior cruciate ligament rupture by sex and sports for leisure in 807 individuals elected to ligament reconstruction surgery, Santo André, Brazil, 2006-2011.

Characteristics	ACL injury with concomitant injury n (%)		p*
	Yes	No	
Sex			
Male	409 (59.2)	282 (40.8)	0.064
Female	58 (50.0)	58 (50.0)	
Play sports for leisure			
Yes	125 (55.3)	101 (44.7)	0.359
No	342 (58.9)	239 (41.1)	
ACL – Anterior Cruciate Ligament; * Probabilistic Value of the Chi-square Test.			

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Discussion

Initially, our first hypothesis was that the prevalence of concomitant injuries with Anterior Cruciate Ligament (ACL) rupture in addition to the association with female [8, 9] was associated with play sports for leisure and aging.

By identifying the prevalence of concomitant injuries to the ACL injury and its relation to sex, play sports as leisure and age of the individuals, the main findings were: i) the prevalence of concomitant lesions was 57.9%; ii) the meniscus injury was the main found concomitant injury; iii) there was no association of the prevalence of concomitant injuries to ACL injury by gender or play sports for leisure; iv) individuals with concomitant injury are older compared to those who were diagnosed with isolated ACL.

The ACL injury is associated with other injuries of the lower limbs [6] and its association with the practice of professional sports [2, 12, 14, 15] and female [16]. In addition, a variety of factors may contribute to cartilage damage, including the effects of altered tibiofemoral biomechanics as well as new traumatic injury resulting from recurrent episodes of instability [5].

The prevalence found in this study related to those individuals who plays sports for leisure was approximately found by Walden et al. [4] in professional athletes. This is due the higher risk of injury to other

knee structures after a ACL injury [17] mainly in the meniscus [11], which alerts to prevent injuries even in those who does not play sports professionally.

The injury meniscus was the main concomitant lesion found in this study and has a prevalence of 41% to 82% [3], this may arise as a result of instability of the knee after the injury and may recur if the instability remains [18].

The prevalence of associated injuries did not differ between the sexes, however there was found a higher proportion of associated injuries in males, which can be explained by the association between increased thickness articular cartilage and ACL injury in males [2] although the causes of injuries in men and women are multifactorial [13].

The higher prevalence of injuries in females is attributed to biomechanical and structural factors [4, 8, 15] that result in worse outcomes of injuries before ACL reconstruction surgery when compared to men [3].

The no association between prevalence of injuries associated with ACL rupture related to those individuals who plays sport for leisure found in this study should be viewed with caution because the population does not consist of professional athletes. In professional athletes who practice high level sports with overload knee the risk of injury may increase and consequently the prevalence of associated injuries [7, 19].

In this study, the age of the individuals associated with lesions was higher than those with only ACL injury. Meniscal lesions, cartilage and osteoarthritis has degenerative pathophysiology, so that over the years the body has to adapt to the abnormal mechanical stress by transfer loads, and during that traumas those injuries may appear more easily and are related to aging [20, 21, 22].

Therefore, research should be developed in order to deepen about health care, considering the importance of understanding from the reabilitação know the prevalence of patients. Research should be implemented to give visibility to situations like these, however, while in Brazil the scientific production has been increasing significantly increase with the proper training of health professionals who work with research in project management. [23, 24]

It is known that there are several limitations in this study. The largest proportion of non- leisure for sport practitioners found in this study may indicate an inverse association between related injuries and not playing sports, because you can not establish causality due to the absence of temporality and monitoring of cross-sectional studies. In addition, the association between concomitant injuries and injured knee can not be performed due to lack of information of the dominant limb.

Conclusions

The prevalence of concomitant injuries to the anterior cruciate ligament injury found in this study points to the need for further investigation of injury to adjacent structures to the anterior cruciate ligament in patients with injury in this ligament in order to implement more appropriate therapeutic practices before and after the surgery. In addition, there is a need for researching on causality between sports for leisure and concomitant injuries to the ACL.

Funding

None.

Conflict of interest

None.

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