INCIDENCE AND ASSOCIATED INJURIES OF KNEE DISLOCATIONS

LUXAÇÕES DO JOELHO INCIDÊNCIA E LESÕES ASSOCIADAS

INCIDENCIA DE DISLOCACIONES DE RODILLA Y LESIONES ASOCIADAS

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ABSTRACT

Objective: To carry out an epidemiological survey of patients with knee dislocations treated in hospital. Methods: This study analyzed 28 patients with this injury in a traumatology reference hospital. The results showed that the average age of the patients was 34.64 years, with a predominance of males and that the main mechanism of injury was due to motorcycle accidents. Associated injuries were common, including fractures and damage to ligaments and blood vessels. Results: The Schenck classification was used to categorize injuries and this work showed that KD III was more frequent, 28.6%, of which: 62.5% with associated lateral collateral ligament injury and 37.5% with medial collateral ligament injury. associated. There were 12.5% arterial injuries and 12.5% nerve injuries. Conclusion: Knee dislocation, a serious injury that occurs when the tibia and femur bones are displaced, which can cause permanent structural injuries. Correctly assessing the type of injury and treating it appropriately is crucial to avoid serious complications, and an individualized approach to the patient in conjunction with multidisciplinary assessment, including orthopedists, vascular surgeons and physiotherapists, is essential to ensure the best functional outcome for this serious injury.

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Keywords: Knee dislocations. Orthopedics. Trauma. Knee injuries.

RESUMO

Objetivo: Realizar um levantamento epidemiológico dos pacientes acometidos por luxações de joelho atendidos em hospital. Métodos: Este estudo analisou 28 pacientes com essa lesão em um hospital de referência em traumatologia. Resultados: Os resultados mostraram que a idade média dos pacientes foi de 34,64 anos, com predominância do sexo masculino e o principal mecanismo de lesão sendo por acidentes motociclísticos. Lesões associadas foram comuns, incluindo fraturas e danos aos ligamentos e vasos sanguíneos. A classificação de Schenck foi utilizada para categorizar as lesões e esse trabalho mostrou ser mais frequente a KD III 28,6%, deste sendo: 62,5% com lesão do ligamento colateral lateral associada e 37,5% com lesão do ligamento colateral medial associada. Evidenciou-se 12,5% de lesões arteriais e 12,5% de lesão nervosa. Conclusão: A luxação do joelho, é uma lesão grave que ocorre quando há deslocamento dos ossos da tíbia e do fêmur, podendo gerar lesões estruturais permanentes. Avaliar corretamente o tipo de lesão e tratar adequadamente é crucial para evitar complicações graves, sendo fundamental a abordagem individualizada ao paciente em conjunto com a avaliação multidisciplinar, incluindo ortopedistas, cirurgiões vasculares e fisioterapeutas para garantir o melhor resultado funcional a essa grave lesão.

Palavras chaves: Luxações do joelho. Ortopedia. Trauma. Traumatismos do joelho.

RESUMEN

Objetivo: Realizar una encuesta epidemiológica de pacientes con luxación de rodilla tratados en un hospital. Métodos: Este estudio analizó a 28 pacientes con esta lesión en un hospital de referencia para traumatología. Resultados: Los resultados mostraron que la edad media de los pacientes fue de 34,64 años, con predominio del sexo masculino y el principal mecanismo de lesión fueron los accidentes de motocicleta. Las lesiones asociadas fueron comunes, incluyendo fracturas y daño a ligamentos y vasos sanguíneos. Se utilizó la clasificación de Schenck para categorizar las lesiones y este estudio mostró que la luxación de rodilla III fue la más frecuente (28,6%), de las cuales el 62,5% presentó lesión asociada del ligamento colateral lateral y el 37,5%, lesión asociada del ligamento colateral medial. Se observaron lesiones arteriales en el 12,5% y lesiones nerviosas en el 12,5%. Conclusión: La luxación de rodilla es una lesión grave que ocurre cuando la tibia y el fémur se desplazan, y puede causar daño estructural permanente. La correcta evaluación del tipo de lesión y el tratamiento adecuado son cruciales para evitar complicaciones graves. Es fundamental un enfoque individualizado del paciente, junto con una evaluación multidisciplinaria que incluya ortopedistas, cirujanos vasculares y fisioterapeutas, para garantizar el mejor resultado funcional para esta grave lesión.

Palabras clave: Luxaciones de rodilla. Ortopedia. Traumatismo. Lesiones de rodilla.

INTRODUCTION

Knee dislocation, also known as tibiofemoral disjunction, is a severe orthopedic injury that occurs when there is loss of joint congruence between the tibia and femur, resulting in a complete or partial dislocation of these bones (Figure 1). This condition is extremely painful and can result in permanent damage to the structures of the knee, including ligaments, menisci, articular cartilage, and blood vessels.[1]

Anatomically, the knee is a complex joint that involves the distal end of the femur, the proximal end of the tibia, and the patella. The bones of the knee are held together by a series of ligaments, which are structures that connect two bones together. The ligaments of the knee include the anterior cruciate ligament (ACL), the posterior cruciate ligament (PCL), the medial collateral ligament (MCL), and the lateral collateral ligament (LCL). The knee joint also contains two types of cartilage: the articular cartilage and the meniscus. Articular cartilage is a smooth layer that lines the end of the bones, and when damaged, it can result in arthritis of the knee.[2] The meniscus, on the other hand, is a "shock absorber" that lies between the distal end of the femur and the plateau of the tibia. In addition to bones, ligaments, and cartilage, the knee is also affected by two major muscle groups: the quadriceps muscles, which provide strength and power with knee extension, and the hamstring muscles, which are responsible for knee flexion.[3]

Figure 1: AP and Lateral Radiographs of a Right Knee Dislocation

Source: the Authors (2022)

In terms of epidemiology, knee dislocations are rare, occurring in about 0.02% of the general population per year. Males are more often affected than females, and young adults are most frequently affected.[4] The most common mechanism of injury is forced knee

hyperextension, which can occur in both high-energy (e.g., automobile accidents) and low-energy (e.g., sports injuries) traumas. About half of the cases are the result of major trauma and about half as a result of minor trauma.[5]

Thus, the present study aims to analyze the incidence of knee dislocations as well as to study the causes of trauma, associated injuries, established conducts and outcome of the patients studied.

METHODOLOGY

The present study is a descriptive quantitative research that will be carried out by retrospective analysis in patients admitted with knee dislocations from 03/01/2019 to 03/01/2022.

The study was submitted to the Research Ethics Committee of the University of Contestado (UNC) and Plataforma Brasil and approved by Plataforma Brasil (CAAE: 78590123.0.0000.0117).

The most complete classification for knee dislocation is the Schenck classification. She categorizes knee dislocation based on the pattern of ligament injuries. The four main ligament stabilizers are the anterior cruciate ligament (ACL), the posterior cruciate ligament (PCL), the medial collateral ligament (MCL), and the lateral collateral ligament complex (LCL). The Schenck classification includes five patterns of serious injuries seen in knee dislocations (KD), each designated by a Roman numeral, from I to V:[4]

- KD I: involvement of the ACL or PCL.
- KD II: injury of both the ACL and PCL, with both collaterals intact (rare).
- KD III: injury to both ACL and PCL, and MCL or LCL - not both - ruptured.
- KDIIIM (if LCM is broken)
- KDIIIL (if LCL is broken)
- KD IV: all 4 ligaments torn.
- KD V: multiligament injury with periarticular fracture, i.e., fracture-dislocation of the knee.

Additional letter designators indicate the presence of neurovascular injury:

- C: popliteal artery injury.
- N: peripheral nerve injury. Any deficit: neuropraxia, neurotmesis, or axonotmesis. Peroneal nerve (most common) or tibial nerve.

It is important if tendon injuries, biceps femoris avulsions, tibial tubercle, and/or quadriceps tendon tears are present, in these cases, an additional descriptor is documented.

Injuries associated with knee dislocation are often severe and can involve multiple structures of the knee. Here are some of the most common injuries:[2]

- Ligament injuries; Knee dislocations are invariably associated with ligament injuries. The most common pattern is bicruciate rupture (i.e., both the anterior and posterior cruciate ligament) with medial collateral ligament rupture or posterolateral corner injury.

-Fractures; Fractures of the distal femur or proximal tibia are also common (about 15% of cases).

- Vascular lesions; Overall attendance of 3.3%. Men were found to have an increased risk of vascular injury compared to women.

- Nerve injuries; Injury to the peroneal nerve that runs along the outer edge of the calf is a potential complication.

- Deep vein thrombosis (DVT); potential complication.

Retrospective descriptive quantitative research that will be carried out through the analysis of medical records of patients admitted with knee dislocations.

4 items were analyzed in medical records, including: which side was affected by the injury, the mechanism of trauma, the classification of dislocation, and whether associated injuries.

Patients with knee dislocations previously defined by the researchers were included, and all data will be available in medical records. Only patients within the period from 03/01/2019 to 03/01/2022 will be analyzed.

All patients who do not fit into the knee dislocations and medical records outside the delimited dates (03/01/2019 - 03/01/2022) were excluded from the study

4 items were analyzed in the medical records: side affected by the injury, trauma mechanism, classification of dislocation and associated injuries.

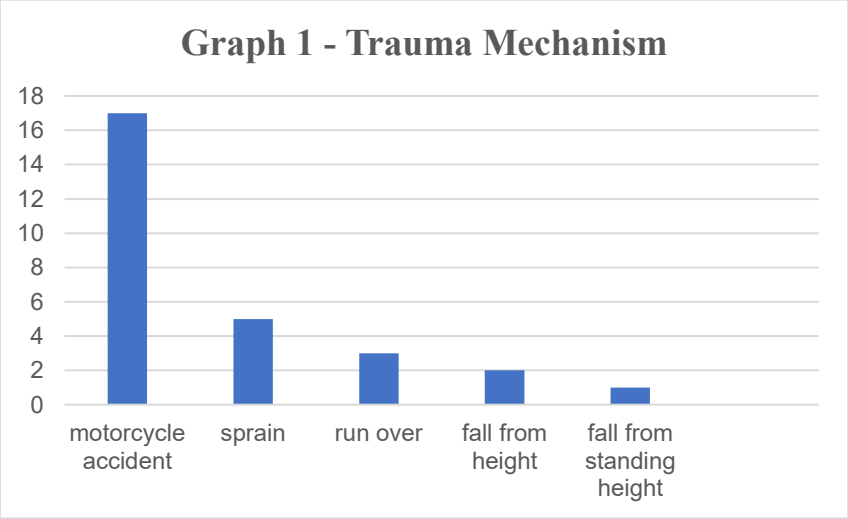
The data obtained were typed and incorporated into the electronic spreadsheet of the Microsoft Excel program, being carried out after analysis and preparation of tables for comparison.

FINDINGS

The mean age of the patients was 34.64 years (18 to 64 years), with a median of 32 years. Males were affected in 85.7% (24 patients) and females in 14.3% (4 patients).

The most prevalent mechanism was motorcycle accidents with 17 patients (60.7%), followed by sprains in sports practice - soccer and volleyball - 5 (17.8%), being run over 3 (10.7%), falls from heights with 2 patients (7.2%) and falls from own heights with 1 patient (3.6%).

Graph 1

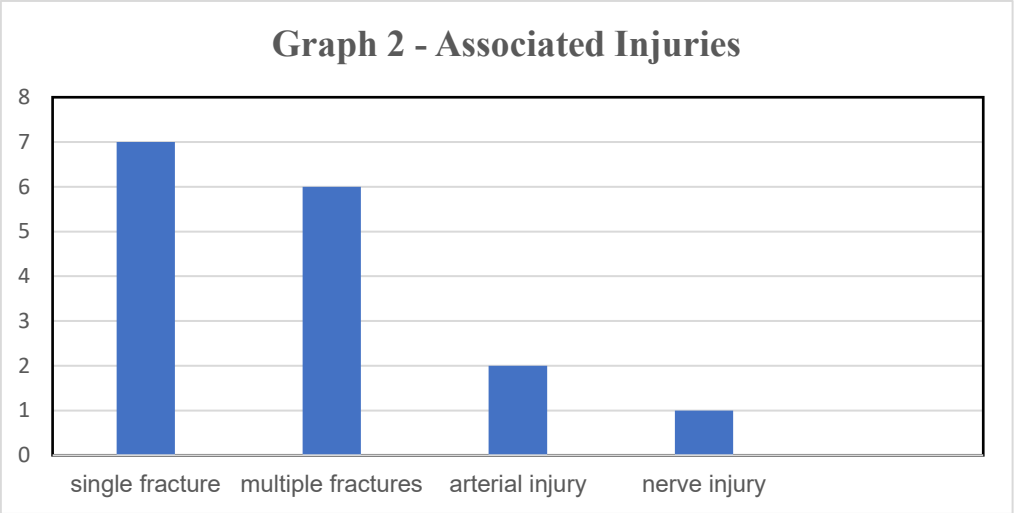


Source: The authors.

The right side was the most affected with 19 patients (67.8%) and the left side was the most affected with 8 (28.6%). Only 1 patient (3.6%) was bilateral.

Of the 28 patients studied, 13 patients (46.4%) had concomitant fractures, 7 (53.8%) of which occurred in isolation, and 6 (46.2%) patients had multiple associated fractures, 2 patients had arterial injury (7.1%) and only 1 of them had nerve injury (2.8%).

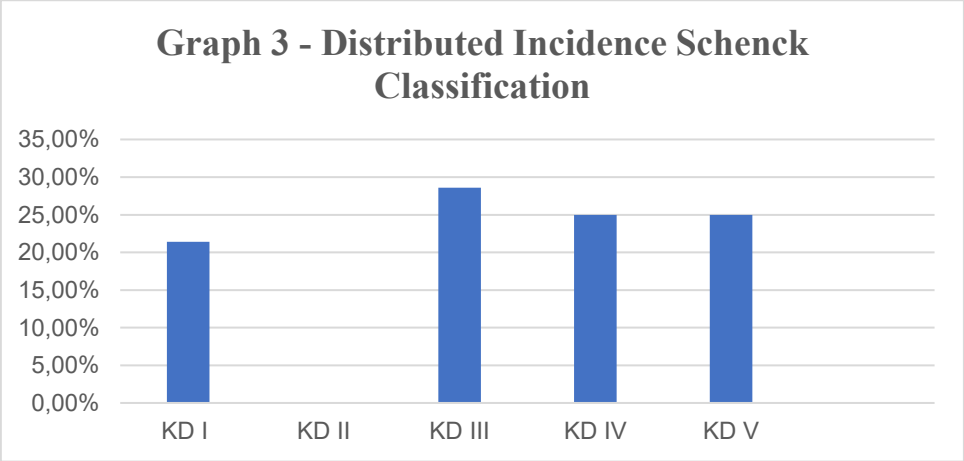
Graph 2



Source: The authors.

Our data showed that of the 28 knee dislocations, using the Schenck classification, we observed: KD I 21.4%; KD II 0%; KD III 28.6%, of which: 62.5% with associated lateral collateral ligament injury and 37.5% with associated medial collateral ligament injury. Also in KD III, 12.5% of arterial lesions and 12.5% of nerve lesions were observed; KD IV 25%, 85.7% without neurovascular lesions and 14.3% with arterial lesions; KD V 21.4% and 3.6% with undefined classification.

Graph 3



DISCUSSION

Knee dislocations are serious injuries that have an important impact on the patient's life, both in their functionality for activities of daily living and in the financial sphere. Thus, evaluating, classifying, and knowing dislocations in terms of their mechanism, impacts, and prognosis is of fundamental importance to the specialist. They are often associated with other musculoskeletal injuries and other systems, as shown in our results.

When compared with classic studies of knee dislocation, there is an increase in incidence and better outcomes today[6,7] But it still shows itself as a rare injury and the conduct taken on a case-by-case basis.

Through the medical records, we noticed that male patients prevailed, with a total of 85.7%, a fact triggered by their greater exposure to risk situations such as traffic and more dangerous jobs. Corroborating this, for the age group that showed an average of 34.64 years (18 to 64 years) and a median of 32 years, in agreement with the study by Rocha and Marcelino (2022)[8] where they highlighted that most victims are men and in the age group of 18 to 40 years.

Regarding the mechanism of trauma, 60.7% showed that the traumas were related to motorcycle accidents, followed by sprains in sports practices (17.8%), being run over (10.7%). Falls from own height and falls from height together corresponded to 10.8% of the total number of patients, alerting us and going against the literature that shows that the main causes of trauma are accidents with high kinetic energy, with motorcycles being the main etiological agents, in agreement with the literature.[9]

The classification of dislocations is an important therapeutic and prognostic instrument for the patient, and as an instrument, we used the classification proposed by Schenck.[4] It was observed that the dislocation that stood out was the one with rupture of the ACL + PCL + collateral ligaments (28.6%), with the associated lateral collateral ligament in 62.5% and the medial collateral ligament in 37.5% of the cases. Also in this classification (Schenck - KD III), 12.5% of arterial lesions and 12.5% of nerve lesions were evidenced, which is below what is shown in the literature: where about 25% of knee dislocations have associated vascular lesions.[10] On the other hand, we did not obtain any samples for the bicruciate lesion with intact peripheral ligaments (Schenck – KD II), which is consistent with the literature, which defines it as extremely rare.[4]

The possibility of arterial injury is explained by local anatomy. Two fixation points are formed: through the fibrous tunnel of the adductor hiatus and through the fibrous arch of the soleus muscle, generating an area of stress due to displacement and/or hyperextension of the popliteal artery.[11] The incidence in this study was 7.1% (two cases). Regarding the injury to the common fibular nerve, more frequent in posterolateral dislocations, due to stretching of the nerve structures.[14] In this study, only one case was observed (2.8%). This differs from the literature, which presents a variation of 14% to 40%, showing a worse functional outcome for the patient when present, requiring a thorough physical examination to avoid diagnostic failure.[13.14]

All cases were evaluated in the initial care without the aid of Magnetic Resonance Imaging, due to the unavailability of this exam in the institution. This is a limiting variance in the descriptions of the lesions. However, it is a complementary examination, not a substitute for an adequate physical examination – under anesthesia, being pointed out with greater specific and sensitive accuracy in the description of ligament injuries.[15] Thus, the physical examination under anesthesia, the initial radiographs and joint exploration in surgery, made it possible to describe the ligament injuries and associated injuries, which were confirmed in the second moment, after emergency stabilization, with the complement of magnetic resonance imaging, always emphasizing the need for individualized treatment given the great variability of injuries that knee dislocations can infer

CONCLUSION

Dislocations require specific skills for recognition, emergency treatment, and attention to different structural damages and their complications.

Given the diversity of injury patterns and the frequent association with other injuries, a careful and individualized approach to each patient is crucial. A high index of suspicion is necessary to identify dislocations and reduce their complications, especially due to neurovascular damage and possible negative outcomes.

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