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Original article

Correlation between Ahlbäck radiographic classification and anterior cruciate ligament status in primary knee arthrosis☆

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ABSTRACT

Objective: To correlate the Ahlbäck radiographic classification with the anterior cruciate ligament (ACL) status in knee arthritis patients.
Methods: The study evaluated 89 knees of patients who underwent total knee arthroplasty due to primary osteoarthritis: 16 male and 69 females, with mean age 69.79 years (53–87 years). Osteoarthritis was classified radiographically by the Ahlbäck radiographic classification into five grades. The ACL was classified in the surgery as present or absent. The correlation of ACL status and Ahlbäck classification was assessed, as well as those of ACL status and the parameters age, gender, and tibiofemoral angulation (varus–valgus).
Results: In cases of varus knees, there was a correlation between grades I to III and ACL presence in 41/47 (86.7%) cases and between grades IV and V and ACL absence in 15/17 (88.2%) cases ($p < 0.0001$). In valgus knees, no statistically significant correlation was observed between the ACL status and the Ahlbäck classification. In the present study, absence of the ACL was more common in men (9/17; 52%) than in women (19/72; 26%).
Conclusion: In cases of medial osteoarthritis, the Ahlbäck radiographic classification is a useful parameter to predict ACL status (presence or absence). In gonarthritis in genu valgum, ACL status was not predicted by Ahlbäck's classification.

☆ Study conducted at the Hospital Federal de Ipanema, Rio de Janeiro, RJ, Brazil, and at the Department of Orthopedics and Traumatology, Faculty of Medicine, University of São Paulo, São Paulo, SP, Brazil.

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Correlação entre a classificação radiográfica de Ahlbäck e o estado de conservação do ligamento cruzado anterior em gonartrose primária

Palavras-chave:
Ligamento cruzado anterior
Artrose do joelho
Artroplastia do joelho

RESUMO

Objetivo: Correlacionar a classificação radiográfica de Alhbäck com o estado de conservação do ligamento cruzado anterior (LCA).
Métodos: Avaliados 85 pacientes (89 joelhos) submetidos à artroplastia total de joelho por osteoartrose primária. Foram 16 homens e 69 mulheres com média de 69,79 anos (53 a 87). A osteoartrose foi subdividida em cinco graus de acordo com a classificação radiográfica de Alhbäck. O LCA foi avaliado na cirurgia como presente ou ausente. Foi feita a correlação entre o estado do LCA e a classificação de Alhbäck. Foi também analisada a correlação entre o estado do LCA e os parâmetros idade, sexo, angulação tibiofemoral (varo-valgo).
Resultados: Nos casos de joelho varo, foi observada uma correlação entre os graus I até III e a presença do LCA em 41/47 (86,7%) casos, bem como entre a ausência do LCA e os graus IV e V em 15/17 (88,2%) casos ($p < 0,0001$). Por outro lado, nos casos de joelho valgo não houve relação estatisticamente significante entre a presença ou ausência do LCA e a classificação de Alhbäck. Nesta série, foi observado que a ausência do LCA foi mais comum entre os homens 9/17 (52%) do que em mulheres 19/72 (26%).
Conclusões: Nos casos de gonartrose do compartimento medial, a classificação de Alhbäck é parâmetro confiável para prever a condição do LCA (presente ou ausente). Nos casos de gonartrose em genu valgo não se observou correlação entre a classificação de Alhbäck e a condição do LCA.

Introduction

The Ahlbäck radiographic classification for knee osteoarthritis was originally described by the author[1] in 1968 and modified in 1992 by Keyes et al.,[2] who subdivided it into five grades (I–V). This classification is the most commonly used by orthopedic surgeons, not only to assess the degree of radiographic involvement, but also to monitor disease progression and assist in surgical planning.

Despite the widespread use of this classification, some studies criticize the inadequate levels of interobserver agreement with different degrees of experience. However, this classification is more reproducible when used by experienced observers.[3,4]

One of the factors to be taken into account before a surgical procedure in the treatment of knee arthrosis is the preservation status of the anterior cruciate ligament (ACL). Keyes et al.,[2] in their work, recommended osteotomy or unicompartmental prosthesis for cases with intact ACL. When the ACL is compromised, total knee arthroplasty would be indicated.

In this classic study,[2] although the authors analyzed 200 cases of medial arthrosis of the knee, in only 25% of the cases (50 knees) was the presence or absence of the ACL evaluated and described. No other studies evaluating the same correlation were retrieved in the literature. This raises the question of what the relationship between ACL preservation status and Ahlbäck classification would effectively be.

The possibility of determining the ACL preservation status preoperatively through a radiographic examination of the knee based on Alhbäck classification would be relevant in choosing the most appropriate surgical technique[2] for cases of knee arthrosis. This information becomes more significant when considering the increasing trend to use implants that aim to preserve the still intact structures in cases of knee arthrosis. Examples of this trend include the use of unicompartmental prosthesis[5] and prostheses that allow preservation of both cruciate ligaments, currently under evaluation.[6,7]

The present study aimed to correlate the Ahlbäck radiographic arthrosis classification with the ACL preservation status (absent/present).

The secondary goal was to correlate the ACL preservation status with the parameters age, gender, and tibiofemoral angle (varus/valgus).

Material and methods

This study was approved by the Research Ethics Committee of this hospital and follows the Helsinki Convention norms.

Eighty five (89 knees) consecutive patients who underwent total knee arthroplasty with substitution of the posterior cruciate ligament between November 2010 and November 2014 were studied. Of the 85 patients, 16 were male and 69 female; their age ranged from 53 to 87 years (mean 69.79).

Only cases of primary arthrosis in individuals over 50 years were included. Patients who had undergone previous knee osteosynthesis surgery, osteotomies, and arthrotomies were not included, as well as cases of osteonecrosis, rheumatologic disease, or post-traumatic sequelae.

Standard digital weight bearing radiographs of the knee were made including the shafts of the distal femur and

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