



Original Article

Revision of unicompartmental knee arthroplasty: implants used and causes of failure[☆]



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ARTICLE INFO

Article history:

Received 3 April 2013

Accepted 9 April 2013

Available online 31 March 2014

Keywords:

Arthroplasty, replacement, knee

Revision

Bone graft

ABSTRACT

Objective: to determine the causes of unicondylar knee arthroplasty failures, as well as identify the implants used and the need of bone grafting in patients undergoing revision UKA in Center of Knee Surgery at the Instituto Nacional de Traumatologia e Ortopedia (INTO) in the period between January 1990 and January 2013.

Methods: a retrospective analysis of the medical documentation and imaging, determining the cause of failure of UKA and the time of its occurrence, as well as prosthetic components implanted during the review and the need for bone grafting.

Results: in this study, 27 UKA failures in 26 patients were included. Collapse of one or more components was the main cause of failure, occurring in 33% of patients. Aseptic failure was identified in 30% of cases, progression of osteoarthritis in 15%, infection and pain 7% each, and osteolysis and polyethylene failure in 4% each. Early failure occurred in 41% of all revisions of UKA and late failure in 59%. 23 patients have undergone revision of UK.

Conclusion: in 35% of revisions the use of bone grafting was needed in tibial area; in 3 cases we needed allograft from Tissue Bank. We did not use metal increase in any of the revision. In one patient we used implant constraint for instability.

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Revisão de artroplastia unicompartmental de joelho: implantes usados e causas de falha

RESUMO

Objetivo: determinar as causas de falha da artroplastia Unicondilar, assim como identificar os implantes utilizados e a possível necessidade de enxertia óssea nos pacientes submetidos à cirurgia de revisão de AUJ no Centro de Cirurgia do Joelho do Instituto Nacional de Traumatologia e Ortopedia - INTO, no período entre janeiro de 1990 a janeiro de 2013 foram analisados.

Métodos: análise retrospectiva da documentação médica e exames de imagem, determinando-se a causa da falha da AUJ e o momento de sua ocorrência, assim como os componentes protéticos implantados durante a revisão e a necessidade de enxertia óssea.

Palavras-chave:

Artroplastia do joelho

Revisão

Enxerto ósseo

[☆] Please cite this article as: Mozella AdP, Backer RC, Borges Gonçalves F, Osterno Vasconcelos J, de Araújo Barros Cobra HA. Revisão de artroplastia unicompartmental de joelho: implantes usados e causas de falha. Rev Bras Ortop. 2014;49:154-159.

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2255-4971/\$ - see front matter © 2014 Sociedade Brasileira de Ortopedia e Traumatologia. Published by Elsevier Editora Ltda. All rights reserved. <http://dx.doi.org/10.1016/j.rboe.2014.03.018>

Resultados: foram incluídos nesta série 27 falhas de revisão de AUJ (26 pacientes). Colapso (afundamento) de um ou mais componentes representou a principal causa de falha, ocorrendo em 33% dos pacientes, soltura asséptica foi identificado em 30% dos casos, por progressão da osteoartrose em 15%, infecção e dor em 7% cada, desgaste do polietileno e osteólise em 4% cada. Falha precoce ocorreu em 41% de todas as indicações de revisões e falha tardia em 59%. A cirurgia de revisão da artroplastia unicompartmental foi realizada em 23 pacientes.

Conclusões: em 35% das cirurgias de revisão foi necessária enxertia óssea no lado tibial, sendo três casos necessário enxerto homólogo de Banco de Tecidos Músculo Esquelético. Não utilizamos aumento metálico em nenhum caso. Em um caso foi implantado prótese semiconstrita por instabilidade.

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Introduction

Unicompartmental knee arthroplasty (UKA) was introduced into clinical practice for treating unicompartmental osteoarthritis by McKeever,¹ who performed the first implant in 1952. At the end of the 1960s, Marmor² disseminated the technique and it was subsequently advocated by Cartier et al.³

Over the course of these years, the popularity of this technique and the enthusiasm for applying it oscillated greatly. Several short and medium-term studies published in the 1980s, which compared the clinical and radiographic results from this technique, came to unfavorable conclusions because they found that the results were not reproducible and there was a high failure rate, in relation to total knee arthroplasty (TKA).^{2,4-6}

Over the last decade, the advent of the concepts of minimally invasive surgery together with evolution of the rigor of patient selection and development and refinement of surgical techniques and implant design have led to favorable evolution of the clinical results and, consequently, renewed interest in UKA.^{7,8}

Recently published studies, with medium and long-term follow-up, which evaluated unicompartmental arthroplasty using modern implants in properly selected patients, have confirmed these good and excellent results and have demonstrated durability comparable to that of TKA.⁹⁻¹²

Although UKA is a therapeutic method of proven effectiveness and safety, it may lead to either early or late failure with unsatisfactory results in a few cases.^{13,14} In the initial series reported by Marmor,² with first-generation implants, reoperation was necessary in 35% of the cases. Studies analyzing modern implants have identified rates of conversion to TKA ranging from 6% to 8%.¹⁵⁻¹⁷

Preservation of the bone stock in cases of failure of UKA theoretically makes conversion to conventional total arthroplasty possible. Thus, there would not be a need for metallic expanders, intramedullary nails, bone grafts or increased constriction of the implants.^{18,19}

However, several authors have questioned the possibility of converting TKA without the need for metallic expanders, intramedullary nails or bone grafts.²⁰⁻²⁴

The aims of the present study were to determine the causes of failure of UKA in patients who underwent revision

at a single hospital institution and to identify the implants used and the possible need for bone grafting.

Materials and methods

The medical files of patients who underwent UKA revision surgery at the Knee Surgery Center of the National Institute of Traumatology and Orthopedics (Instituto Nacional de Traumatologia e Ortopedia, INTO) between January 1990 and January 2013 were analyzed.

This study was firstly submitted to and approved by this institution's Research Ethics Committee.

A retrospective analysis was conducted on the medical files and the cause of UKA failure and time of its occurrence were determined, along with the prosthetic components implanted during the UKA revision and any need for bone grafting.

Demographic data were gathered and the patients' histories, preoperative physical examinations, laboratory tests and imaging examinations were evaluated, along with the surgical descriptions and findings from the operation. In addition, information obtained from cultures on fluids and tissues was analyzed.

UKA revision was defined as any surgical procedure performed subsequent to unicompartmental arthroplasty in which prosthetic components were removed, added or exchanged.

UKA failures were categorized in conformity with current concepts in the literature, as due to mechanical, septic or disease progression factors, in compartments that had not come back to the surface.

Mechanical failure of UKA was defined as situations in which alterations to one or more compartments occurred, culminating in imposing limitations on the functioning of the prosthetic device and, consequently, limitations on the clinical results.

Failures due to mechanical alterations were subdivided into loosening of one or more components of the prosthetic device, worn-out polyethylene, migration or collapse of one or more components, instability and periprosthetic fractures.

Diagnoses of infection were proven based on the criteria established by the Centers for Disease Control and Prevention (CDC), in the USA.²⁵

Progression of osteoarthritis in compartments that had not been replaced by a prosthetic implant, which caused

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