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ORIGINAL ARTICLE

Risk factors for infection in total knee arthroplasty, including previously unreported intraoperative fracture and deep venous thrombosis[☆]



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KEYWORDS

Knee;
Prosthesis;
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Abstract

Purpose: To carry out a statistical analysis on the significant risk factors for deep late infection (prosthetic joint infection, PJI) in patients with a knee arthroplasty (TKA).

Methods: A retrospective observational case-control study was conducted on a case series of 32 consecutive knee infections, using an analysis of all the risk factors reported in the literature. A control series of 100 randomly selected patients operated in the same Department of a University General Hospital during the same period of time, with no sign of deep infection in their knee arthroplasty during follow-up. Statistical comparisons were made using Pearson for qualitative and ANOVA for quantitative variables.

Results: The significant ($p > 0.05$) factors found in the series were: preoperative previous knee surgery, glucocorticoids, immunosuppressants, inflammatory arthritis.

Intraoperative prolonged surgical time, inadequate antibiotic prophylaxis, intraoperative fractures. Postoperative secretion of the wound longer than 10 days, deep palpable hematoma, need for a new surgery, and deep venous thrombosis in lower limbs. Distant infections cutaneous, generalized sepsis, urinary tract, pneumonia, abdominal.

Conclusions: This is the first report of intraoperative fractures and deep venous thrombosis as significantly more frequent factors in infected TKAs. Other previously described risk factors for TKA PJI are also confirmed.

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PALABRAS CLAVE

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Factores de riesgo para la infección en prótesis de rodilla, incluyendo la fractura intraoperatoria y la trombosis venosa profunda, no descritos previamente**Resumen**

Objetivo: Describir los factores de riesgo estadísticamente significativos para la infección periprotésica tardía (PJI, «prosthetic joint infection») en rodilla.

Material y método: Estudio observacional y retrospectivo mediante comparación de series de casos y controles. Se han analizado todos los factores de riesgo descritos en la literatura. Casos: 32 prótesis de rodilla infectadas diagnosticadas consecutivamente. Controles: 100 pacientes seleccionados aleatoriamente, intervenidos quirúrgicamente en el mismo servicio de un hospital general universitario durante el mismo período de tiempo, sin signo alguno de infección a lo largo de todo el seguimiento. Comparaciones estadísticas: Pearson para variables cualitativas y ANOVA para cuantitativas.

Resultados: Los siguientes hechos son significativamente más frecuentes ($p < 0,05$) en la serie de casos infectados: Preoperatorios Cirugía previa en la rodilla, terapia corticoidea, tratamiento con inmunosupresores, y artritis inflamatoria.

Intraoperatorios Tiempo quirúrgico excesivo, profilaxis antibiótica inadecuada, fractura periprotésica intraoperatoria. Postoperatorios Secreción persistente tras 10 días, hematoma palpable profundo, necesidad de nueva cirugía, trombosis venosa profunda en extremidades inferiores. Infecciones a distancia Cutánea, sepsis generalizada, urinaria, neumonía, abdominal.

Discusión y conclusiones: Esta es la primera descripción de una fractura intraoperatoria y de una trombosis venosa profunda como hechos significativamente más frecuentes en las prótesis de rodilla con infección tardía. Asimismo se confirma la significación de otros factores de riesgo previamente descritos.

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Introduction

Infections in total knee arthroplasties (TKA) are usually classified into early (up to 3 months after the intervention), late and hematogenous.¹ Early infections are the most common acute complications despite current prophylactic measures.² The incidence of late infection reported in the literature ranges from 0.9–1%^{3,4} to 2.19%.⁵ Occasionally, patients and clinical situations with a high risk of infection are not correctly identified, thus increasing the probability of suffering these severe complications.

Multiple risk factors for infection of knee prostheses have been reported (Table 1),^{3–30} but most publications present one of the following problems: firstly, numerous studies focus exclusively on a specific problem,^{5–16} ignoring all the risk factors of each individual patient from a holistic perspective, secondly, the primary objective of some published series is not to analyze infection *per se*, instead the information on cases of infection is offered collaterally,^{7,8,10} and thirdly, the level of evidence of some articles is low because they deal with case series, non systematic reviews and expert opinions.^{10,13,16,17}

Objective

The aim of this study was to analyze, through a comparative study of cases and controls, all the risk factors described in the literature as statistically significant for infection of knee prostheses.

Materials and methods**Study design**

This was a comparative, retrospective and observational study of cases and controls. We compared the incidence of possible risk factors for infection among non-infected controls and patients with late infection in their knee prostheses.

Case series

The case series included 32 patients who had been diagnosed consecutively with late infection in their knee prostheses.

Inclusion criteria:

- (1) Patients who underwent surgical intervention at the orthopedic surgery service of a teaching general hospital between January 1999 and December 2009.
- (2) Suspicion of late infection: chronic severe pain, persistent signs of local inflammation (erythema and/or swelling), wound suppuration and/or fistula. Periostitis (periosteal reaction), endosteal erosions and focal osteolysis were considered as radiographic signs for suspicion of infection. Likewise, it was considered that infection was likely in cases of loosening or early migration of the implant, rapidly progressive radiotransparent lines and osteolysis with a rapid progression in the absence of obvious mechanical causes

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