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Original Article

Evaluation of intraoperative radioscopy on the coronal alignment of the tibial component in primary knee arthroplasty☆

*Hugo Cobra, Marcio Bruno Hadid, Daniel Torres Jácome, Eduardo Branco de Sousa, Alan de Paula Mozella, Rodrigo Pires e Albuquerque**

Knee Surgery Center, Instituto Nacional de Traumatologia e Ortopedia (INTO), Rio de Janeiro, RJ, Brazil

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ABSTRACT

Objectives: The present study had the objective of evaluating the effect of the use of intraoperative radioscopy in cases of primary knee arthroplasty, on the final alignment of the tibial component.
Methods: Patients who underwent total knee arthroplasty (TKA) between April 13, 2013, and April 20, 2013, were included in the study. These patients were evaluated retrospectively and two groups were identified: one in which intraoperative radioscopy was used to assess the positioning of the tibial component during the surgery and the other in which this resource was not used.
Results: The mean angle of alignment of the tibial component in relation to the tibial diaphysis was greater in the group without use of intraoperative radioscopy (90.82) than in the group with radioscopy (90.63), which was a statistically significant result ($p < 0.05$).
Conclusion: Use of intraoperative radioscopy during TKA produced a better mean angle of alignment between the tibial component and the tibial diaphysis, in comparison with nonuse.

Avaliação da radioscopia intraoperatória no alinhamento coronal do componente tibial em artroplastias primárias de joelho

Palavras-chave:
Artroplastia
Radiologia
Joelho

RESUMO

Objetivos: Avaliar o efeito do uso da radioscopia intraoperatória em artroplastias primárias de joelho sobre o alinhamento final do componente tibial.
Métodos: Foram incluídos no estudo os pacientes submetidos à artroplastia total do joelho (ATJ) entre 13/04/2013 e 20/04/2013. Os pacientes foram avaliados retrospectivamente e dois

☆ Work performed at the Instituto Nacional de Traumatologia e Ortopedia (INTO), Rio de Janeiro, RJ, Brazil.

* *Corresponding author.*
E-mail: rodalbuquerque@ibest.com.br (R.P. e Albuquerque).

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grupos foram identificados, um com uso de radioscopia intraoperatória para avaliação do posicionamento do componente tibial durante a cirurgia e o segundo sem uso desse recurso. *Resultados:* A média do ângulo de alinhamento do componente tibial em relação à diáfise da tíbia foi superior no grupo sem uso de radioscopia intraoperatória (90,82) em comparação com o grupo com radioscopia (90,63), com resultado estatisticamente significativo ($p < 0,05$). *Conclusão:* O uso de radioscopia no intraoperatório de ATJ produz melhor média de ângulo de alinhamento entre o componente tibial em relação à diáfise da tíbia quando comparado ao não uso.

Introduction

The total number of knee arthroplasty procedures performed every year has increased exponentially and the mean age of the patients undergoing this intervention has decreased, such that the topic of longevity or survival of implants has gained greater attention.[1,2]

The success of this procedure is related to achieving proper alignment and correct management of ligament balance, along with precise positioning of its components.[3–5]

Many authors have investigated the outcomes from total knee arthroplasty (TKA) and they have reported that varus or valgus misalignments greater than 3° result in greater chances of aseptic loosening and failure of the implant.[5,6] Berend et al.[7] investigated the mechanisms through which the tibial component failed and concluded that misalignment of this component greater than 3° would increase the failure rate.

During surgical procedures, the methods that physicians have available to them for verifying satisfactory positioning of the components include classical alignment guidance systems, evaluation methods using navigated surgery, conventional radiographs and intraoperative radioscopy.[2,3,8]

After the operation, the alignment of prosthetic components can be evaluated by means of simple radiographs, as recommended by the Knee Society.[1,9] On panoramic radiographs in AP view, the tibial component should be at 90° in relation to the long axis of the tibia[1] (Fig. 1).

The present study had the objective of evaluating the effect of using intraoperative radioscopy on the final alignment of the tibial component, in cases of primary knee arthroplasty.

Materials and methods

We retrospectively evaluated 115 patients who underwent total knee arthroplasty between April 13 and 20, 2013: 53 in a group without use of intraoperative radioscopy and 62 in a group with use of radioscopy. All the patients had indications for undergoing total knee arthroplasty, with a diagnosis of primary osteoarthrosis. The exclusion criteria were previous surgery, body mass index > 35, extra-articular deformity, varus and valgus deformity > 10°, flexion > 10°, bone defects greater than 5 mm and rheumatic diseases. All of the patients constituted a homogenous group without serious deformities and with moderate knee osteoarthrosis.

Fig. 1 – Postoperative radiographic alignment.

The primary arthroplasty was performed in accordance with the classical techniques that have been described, with the only difference that intraoperative radioscopy might or might not be used, according to the preference of the surgeon of the group. In the group in which it was decided to use radioscopy with a Philips® image intensifier, a single AP view of the knee was produced on the operated knee just after the tibial cuts had been made and the test component had been emplaced. This made it possible for the surgeon to interfere in the final result from positioning the tibial component, such that the viewed position could be accepted or could be altered through making a bone cut.

After analysis on the sample, patients with incomplete medical documentation or absence of complete pre and postoperative routine radiological examinations would be excluded. However, none of the patients in our sample were excluded.

The immediate postoperative radiographic routine of our knee surgery group involves production of AP radiographs of the knee and lateral and AP panoramic radiographs including