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ORIGINAL ARTICLE

Risk factors for total hip arthroplasty dislocation and its functional outcomes☆

J. Sanz-Reig*, **A. Lizaur-Utrilla**, **F. Miralles-Muñoz**

Servicio de Cirugía Ortopédica, Hospital Universitario de Elda, Alicante, Spain

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KEYWORDS
Total hip arthroplasty;
Dislocation;
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Abstract
Objectives: To evaluate risk factors for dislocation after primary total hip arthroplasty (THA), and its functional outcomes.
Material and methods: A retrospective study was conducted on 22 cases with dislocation and 431 controls without dislocation, but all were performed with lateral access. The data were collected prospectively with a minimum follow-up of 5 years. Patient-related factors, from primary surgery, and position of components on simple radiographs were analyzed. Harris and Merle D'Aubigné hip scores, and short Womac questionnaire were used.
Results: Demographic, patient-related or surgical technique factors were not risk predictors of dislocation. With regard to position of components, an acetabular abduction >50° ($p = 0.003$) and anteversion lower or higher than 10°–20° ($p = 0.044$) were risk factors. Controls and dislocation treated conservatively had similar outcomes, and in both were better than in those treated with surgical revision ($p = 0.03$).
Discussion: Factors relating to the patient and soft tissues status may influence the stability of the arthroplasty, but malposition of the acetabular component seems to be the most important and common risk factor for dislocation.

PALABRAS CLAVE
Artroplastia total de cadera;
Luxación;
Factores de riesgo

Factores de riesgo de luxación de artroplastia total de cadera primaria y su resultado funcional

Resumen
Objetivos: Evaluar los factores de riesgo de luxación tras artroplastia total de cadera (ATC) primaria y su resultado funcional.

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* Corresponding author.
E-mail address: javisanz@coma.es (J. Sanz-Reig).

Material y métodos: Estudio retrospectivo de 22 luxaciones comparadas a 431 ATC no luxadas, todas por vía lateral, cuyos datos habían sido recogidos prospectivamente con seguimiento mínimo de 5 años. Se evaluaron factores relacionados con el paciente, de la cirugía primaria y posición de componentes sobre radiografías simples. Se utilizaron las escalas de Harris y Merle D'Aubigné y el cuestionario Womac corto.
Resultados: No fueron predictores de luxación los factores demográficos, estado del paciente o técnica quirúrgica. Respecto a la posición de componentes fueron factores de riesgo una abducción acetabular > 50° (p = 0,003) y anteversión fuera del rango de 10°-20° (p = 0,044). Funcionalmente, los resultados fueron similares entre los controles y las luxaciones tratadas conservadoramente, y en ambos fueron superiores a las tratadas mediante revisión quirúrgica (p = 0,03).
Discusión: Aun cuando los factores relacionados con el paciente y estado de las partes blandas pueden influir en la estabilidad de la ATC, la malposición del componente acetabular parece ser el más importante y frecuente factor de riesgo para la luxación.

Introduction

Dislocation is a relatively frequent complication after total hip arthroplasty, with 2–5% of patients suffering a significant impact on morbidity and costs deriving from treatment.[1] Around 45% of cases take place in the first 2 weeks following the intervention.[2] Numerous risk factors have been reported,[3,4] including demographic, related to the health status and general condition of patients, the approach route, implant design, size of the prosthetic head and position of the components. The latter is considered as a crucial factor, and although several measurements have been published as ideal position of the components, as well as safety ranges to avoid dislocation,[5] these are difficult to achieve even by experienced surgeons.[1] Moreover, the posterior route approach is considered to increase the risk of dislocation compared to the lateral route,[6] although the risk associated with the posterior route can be reduced through adequate repair of the soft tissues.[7,8] The intrinsic factors of each patient are difficult to assess in many cases.

One objective of this study was to identify potential risk factors for dislocation following uncemented primary total hip prosthesis implanted through the lateral route. The second objective was to compare the functional outcome following dislocation versus non-dislocated hips.

Materials and methods

The study was approved by the Clinical Research Ethics Committee of our center. We identified 986 consecutive, uncemented, primary, total hip arthroplasties (THA) in 804 patients, performed between 2001 and 2007 by the 2 leading authors of the study and with a minimum follow-up period of 5 years. Of these, 22 THA had suffered dislocation and were the subjects of the study.

In terms of comparison, we selected consecutive THA implanted in the last 3 years of the studied range (2005–2007) applying the exclusion criteria of age under 20 years, diagnosis of sequelae of developmental dysplasia, need for surgical revision and not completing a minimum follow-up of 5 years. We excluded 21 patients, thus being left with a valid cohort of 431 THA without dislocation. No cases were excluded due to a lack of clinical or radiographic data in the database. The clinical and perioperative characteristics of both cohorts are presented in Table 1, which shows that there were no significant differences regarding demographic data or the prosthetic components employed.

Primary surgical intervention

All the surgical interventions were carried out in a laminar flow room and applying spinal anesthesia. The Hardinge lateral approach was used in all cases.[9] The anterior capsule was sectioned and not repaired. During the closure we performed suture and reinsertion of the tendon of the *gluteus medius* muscle to the greater trochanter and closure of the *fascia lata*. We implanted 2 systems of uncemented THA according to their availability at the center. One was the Meridian stem system with Vitalock or Trident cup (Stryker, Mahwah, USA) in 232 cases (51.2%), and the other was the Duofit stem and cup system (Samo, Bologna, Italy) in 221 cases (48.8%). Both systems had similar geometries. The stems were straight and collarless, composed of a titanium alloy with a circumferential, porous, plasma-spray cover in the proximal third and pressure fit implantation following drilling of the femoral canal. All the cups were semispherical, made of a titanium alloy with porous, plasma-spray, cover and pressure fit implantation following drilling, and had orifices for additional stability with screws. In 93.3% of cases we used 2 divergent screws. The inserts were made of high molecular weight polyethylene sterilized with gamma radiation in air with an elevation of 12° in 377 cases (83.2%), and ceramic in 76 cases (16.8%). The diameter of the femoral head employed was of 28 mm in 435 cases (96.0%) and of 32 mm in 18 cases (4.0%). Metallic heads were used with polyethylene inserts and ceramic heads were used with ceramic inserts. All the patients received perioperative