

Experience of Ceramic-On-Polyethylene Bearing Surface with Use of Large-Diameter Femoral Heads in Total Hip Arthroplasty O-021

郭亮增¹ 黃贊文^{1,3} 彭國狄^{1,2} 李炫昇^{1,2} 許文蔚^{1,2}
嘉義長庚醫院 骨科系¹ 長庚大學² 長庚科技大學³

Introduction: Alumina ceramic was introduced as a bearing surface in the 1971 as an alternative to the metal on-polyethylene couplings. Since then, alumina ceramic has been used in THA successfully for more than 35 years. The advantages of using alumina ceramic as a bearing surface in THA are related to its hardness, wettability, fluid film lubrication, inertness, high level of oxidation of alumina ceramic which provide resistance to scratches, and high biocompatibility. These characteristics seem to make less polyethylene wear when alumina ceramic head articulates with polyethylene than metal head. In vitro hip simulator studies of alumina ceramic-on-polyethylene articulations, the wear rate of polyethylene with the alumina ceramic head was lower than that of polyethylene with metal head. Also, at equivalent particle volumes the clinically relevant alumina particles showed less toxic than cobaltchromium particles in vitro.

Materials and Methods: Between January 2011 and June 2012, patients underwent total knee arthroplasty at Chang Gung Memorial Hospital, Chiayi were enrolled in this study. The medical records and radiological data for all patients were reviewed retrospectively. The study was approved by the Institutional Review Board of the Chang Gung Memorial Hospital. Patient receive ceramic-on-polyethylene cementless hip replacements with a 36-mm-diameter articulation were analysed.

Results: The function outcome was improved significantly. No patient had asymptomatic acetabular osteolysis and no hip had been revised. No postoperative dislocation, periprosthetic fracture, superficial or deep infection were noted in this study.

Discussion and Conclusion: The alumina ceramic-on-polyethylene including recently developed highly crosslinked polyethylene articulation would be remained as a good option for THA especially young and active patients. In future, it is necessary to perform prospective randomized comparative studies to compare various bearing surfaces in patients matched in age, sex, diagnosis, body mass index, kinds of polyethylene and ceramic head according to manufactures, head diameter, follow-up period, and measuring method for wear.

Zirconia Ceramic-on-Ceramic Bearing Surfaces in Total Hip Arthroplasty – Preliminary Report O-022

黃柏樺 楊傑思 黃鑑樂 許弘昌
中國醫藥大學附設醫院 骨科部

Introduction: Although the published studies on the outcomes of total hip arthroplasty (THA) performed with currently available ceramic components show high survivorship, concern over ceramic fracture and squeaking persist. For these reasons, a new alumina matrix composite material (Zirconia) with improved material properties was developed to address these concerns. We report the early outcomes of total hip arthroplasty with the fourth generation ceramic-on-ceramic (COC) bearings.

Materials and Methods: From December 2011 to December 2012, 50 primary total hip replacements with fourth-generation COC bearings (BIOLOX Delta) in 50 patients were enrolled (male: female 10:40). The average age of the patients at the time of the arthroplasty was fifty-three years. All procedures were performed with use of MIS antero-lateral approach and the same implant at a single center. The mean length of incision was 6.4 cm. The minimum follow-up interval was 10 months (mean, 14.2 months; range, 10 to 22 months). We assessed patients clinically and radiographically. The mean operative time was 37 minutes. The mean blood loss was 140 ml.

Results: The mean preoperative Harris hip score was 56 points. At the time of final follow-up, the mean Harris hip score was 97 points. No patient had thigh pain or groin pain postoperatively. All of the femoral stems and the acetabular components were well-fixed. No hip exhibited squeaking, ceramic fracture, loosening, or osteolysis at the time of the final follow-up. The rate of survival of both components, with revision because of aseptic loosening or osteolysis as the end point, was 100%.

Discussion: In the short term, the fourth generation COC bearings provided satisfactory clinical results and a high rate of survivorship. Optimally positioned bearing surfaces and improved material properties including lower wear rate and higher strength were associated with minimal osteolysis. Ceramic fracture and squeaking on the alumina-on-alumina ceramic bearings were not observed. Moreover, it provided more stability and range of motion due to larger head diameter. We concluded that the fourth generation COC bearings should be recommended in THA, especially for young or active patients.