A COMPARISON OF THREE VARIETIES OF NONCEMENTED POROUS-COATED HIP REPLACEMENT

RAY J. HADDAD, STEPHEN D. COOK, MARK R. BRINKER

From Tulane University School of Medicine, New Orleans

We reviewed 134 primary noncemented porous-coated total hip replacements in 125 patients: 64 were DePuy AML prostheses, 20 were Howmedica PCA and 50 were Implant Technology LSF. The prostheses had been in situ for an average of 36 months, 40 months and 24 months respectively.

The average pre-operative Harris hip scores were 38.2 for AML, 33.2 for PCA, and 41.0 for the LSF prostheses. The average postoperative scores were 80.7 for AML, 83.8 for the PCA, and 91.5 for LSF. Thigh or groin pain associated with the prosthesis was present in 30% of AML, 30% PCA and 8% of the LSF cases. The clinical and radiographic review showed better early results with the LSF prostheses than the others; this seemed to be related to the implant design, which provided improved initial stability and more physiological transfer of load.

Aseptic loosening is the most common mode of failure of cemented total joint replacements. Various factors including patient selection, implant design and cementing technique have been implicated in the failures (Stauffer 1982; Dorr, Takei and Conaty 1983; Johnston and Crowninshield 1983). The increased use of hip replacement in younger, more active patients has led to the development of porous-coated devices intended for fixation by bone ingrowth. Extensive bone ingrowth has been demonstrated in numerous animal studies (Galante et al 1971; Cameron, Pilliar and Macnab 1973, 1976; Ducheyne, De Meester and Aernoudt 1977; Bobyn et al 1980; Clemow et al 1981; Harris et al 1983; Hedley et al 1983; Cook, Walsh and Haddad 1985) but only limited bone ingrowth with abundant fibrous tissue has been reported in human retrieval studies (Bobyn and Engh 1984; Brooker and Collier 1984; Cameron 1986; Cook et al 1986; Ranawat et al 1986; Engh, Bobyn and Glassman 1987; Collier et al 1988; Cook, Thomas and Haddad 1988; Cook et al 1988a).

Early clinical results with noncemented joint replacements have been promising (Engh 1983; Hungerford and Kenna 1983; Dorr 1986; Landon, Galante and Maley 1986; Hedley et al 1987; Laskin 1988), but some recent studies have suggested that cemented implants perform significantly better (Harris and McGann 1986; Alani et al 1988; Petty, Fajgenbaum and Bush 1988; Rorabeck, Bourne and Nott 1988; Russotti, Coventry and Stauffer 1988). Of particular concern is the troubling incidence of persistent pain reported in many studies of uncemented implants (Engh et al 1987; Callaghan, Dysart and Savory 1988; Petty et al 1988; Rorabeck et al 1988). This is generally attributed to poor initial fit and instability as well as mechanical factors such as stress shielding and altered stress transfer. A number of porous-coated total hip systems have become available.

Our study reports the results of a clinical and radiographic comparison of three noncemented porous-coated total hip designs in 134 primary arthroplasties. The first prosthesis was the DePuy AML (Anatomic Medullary Locking; DePuy Inc, Warsaw, Ind, USA) which consists of a straight femoral stem with a collar and a hemispherical acetabular cup with three spikes, all porous-coated (Fig. 1). The second prosthesis was the Howmedica PCA (Porous Coated Anatomic; Howmedica Inc, Rutherford NJ, USA); this has an anatomically shaped collarless femoral stem and a hemispherical acetabular cup with two fixation pegs (Fig. 2). The third was the Implant Technology LSF (Long-Term Stable Fixation; Implant Technology Inc, Secaucus, NJ, USA) which consists of an anatomically shaped femoral stem

R. J. Haddad, Jr, MD, Lee C. Schlesinger Professor and Chairman
S. D. Cook, PhD, Professor
M. R. Brinker, MD, Orthopaedic Research Fellow
Department of Orthopaedics, Tulane University School of Medicine, 1430 Tulane Avenue, New Orleans, Louisiana 70112, USA.

Correspondence should be sent to Professor S. D. Cook.

0301-620X/90/1021 $2.00
J Bone Joint Surg [Br] 1990; 72-B: 2–8.