

# M.O.R.E. Journal s u p p l e m e n t

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MEDACTA ORTHOPAEDIC RESEARCH AND EDUCATION

# AMIStem-H Radiological Assessment

5 Years Outcomes

PASCAL VIÉ



THE LOGICAL EVOLUTION OF HIP STEM DESIGN



# First stem specifically designed for AMIS



# AMIStem-H Radiological Assessment

# 5 Year Outcomes

PASCAL VIÉ - Clinique du Cèdre, Bois Guillaume, France

# ABSTRACT

The aim of this study is to retrospectively evaluate the clinical and radiological performance of a cementless hydroxyapatite (HA) coated stem (AMIStem-H) at mid-term follow-up. A consecutive series of patients bearing an AMIStem-H stem was clinically and radiographically assessed at one and five years after surgery. No stem revisions occurred at the 5-year follow-up: the survival rate in this series was 100% considering any reason for revision. 97% of the patients reported no or mild hip pain at their last follow-up. Radiographically, all implants are stable, well fixed and osteointegrated without critical (>2mm) radiolucencies.

# **INTRODUCTION**

Over the last twenty years, there has been an increase in the use of cementless fixation in an effort to improve total hip replacement (THR) long term survival. Cementless total hip arthroplasty is believed to reduce the prevalence of periprosthetic osteolysis and component loosening, preserve bone stock and thus lead to easier revisions, and be less technically demanding<sup>[1]</sup>. Several studies of cementless total hip arthroplasty have demonstrated good mid-term and long-term outcomes, comparable with, and in some cases superior to, those of fixation with cement<sup>[2]</sup>.

The AMIStem was developed to satisfy the growing demand for minimally invasive options in THR. The short, curved stem design facilitates implantation when using the anterior approach and allows bone stock preservation, especially in the trochanteric region. The AMIStem prosthesis is a straight rectangular stem designed to have a metaphyseal fit: its triple tapered shape provides high primary stability.

The aim of the current clinical study is to evaluate the clinical and radiological performance of AMIStem-H five years after implantation.

# MATERIALS AND METHODS

# Inclusion criteria in retrospective study

A consecutive series of 81 patients (83 hips) bearing an AMIStem-H cementless stem (Medacta International SA, Castel San Pietro) clinically and radiographically checked up at 1-year follow-up was recruited at 5 years after surgery. All operations were performed by the principal investigator (P.V.) in the same hospital (Clinique du Cèdre, Bois Guillaume - France). Patients' demographic data is shown in Table 1.



# Patient selection criteria at primary operation

The investigator's site provides elective surgery to the general population of the city of Rouen, in Northern France. Cementless AMIStem-H represented 65% of hip stems used by Dr. Viè in the years of recruitment; 10% of cases received a cemented stem, 9% a longer Quadra-H stem and 16% MiniMAX (both by Medacta International SA, Castel San Pietro). No detailed patient selection criteria were followed at the time of surgery: cemented stems were an option rarely taken and the only alternative femoral stems at that time were an anatomic cementless stem (MiniMAX), chosen for femurs with a significant anteroposterior proximal dimension and pronounced Dorr Type A shape and, particularly during the initial phase, the longer Quadra-H cementless stem.

All THR patients were given a Versafitcup cementless acetabular component (Medacta International SA, Castel San Pietro). Tribological couple was ceramic on ceramic in 75% of cases, ceramic on cross-linked polyethylene in 25%.

Nr. of patients/Nr. of hips	81/83
Age (years)	69 (45-85)
Gender (female/male)	42/39
Side (right/left)	49/34
BMI (kg/m2)	26.9 (20.2-39.1)

Table 1. Patient Demographics

All surgeries were performed using the AMIS technique (Anterior Minimally Invasive Surgery, Medacta International SA) with the aid of the AMIS Mobile Leg Positioner. 75% of patients had a Dorr type A femur, while the remaining 25% had a Dorr type B. Stem size distribution is shown in Figure 2: 81% of the stems implanted were standard and 19% lateralised.



All patients fulfilling the inclusion criteria were invited to participate in this study during the 5-year followup visit planned according to standard practice. Preoperative and intra-operative details and 1-year X-rays were collected retrospectively. Radiographic evaluation was performed by an independent radiologist. Hip pain and level of activity were also recorded.

At the 5-year follow-up, 2 patients died and 2 were lost to follow-up. From a radiological point of view, particular attention has been paid to the osteointegration of the stem, incidence of greater trochanter fractures and the presence of radiolucencies. The area around the stem has been divided into 7 different zones on the anteroposterior view as described by Gruen et al.<sup>[3, 4]</sup> (figure 3). As reported by many authors, only radiolucencies larger than 2 mm have been considered critical as predictive of probable loosening<sup>[4, 5]</sup>. Heterotopic bone formation has been evaluated according to Brooker classification<sup>[6]</sup>. Most authors agree that the grade of heterotopic ossification and excessive bone formation negatively affects hip function after total hip arthroplasty. Brooker

class I, II or III do not alter significantly the results obtained with a total hip replacement.



# RESULTS

At the 5-year follow-up visit, 97% of patients reported no or slight hip pain, the remaining 3% reported mild pain: 95% of the patients did not use pain relief. Two traumatic femoral fractures (1 month and 4 years after surgery) were observed: neither of them required stem replacement. Ossification around the stem neck was observed in one patient during their 5-year follow-up.

# **Radiological results**

Radiological analysis was performed by an independent radiologist. One-year x-rays were available for 72 of the 79 patients who attended the final follow-up.

No signs of stem fracture, subsidence, endosteal cavitations or resorption of the medial neck were observed in either of the 1 and 5-year x-rays.

Brooker I ectopic ossification was observed in 4 patients at 1-year and in 5 at 5-year assessment; two patients showed healed not displaced fractures and 2 slight ossifications of the greater trochanter.

No critical radiolucencies (greater than 2 mm) were observed. At 1 year assessment, radiolucencies <1mm were shown by 2 patients in Gruen zone 1: none of them were progressive. At the last follow-up, 8 hips showed the presence of radiolucencies <1mm in zone 1 and 1 in zone 6.

# Survival rate

No revision surgery for any reason was reported in this series. The survival rate of the stem 5 years after surgery is 100% considering aseptic loosening and stem revisions as endpoint.

No impending revisions, loose stems or painfully impairing hips were recorded.

# DISCUSSION

The population observed in this study includes all the patients bearing a cementless AMIStem: the inclusion criteria were wide in order to reduce the selection bias. No selection restrictions were made in terms of age, BMI or activity levels.

The AMIS approach had been performed by the surgeon for several years, hence this series does not include any learning curve related to the surgical approach.

Patients were discharged from hospital 3-4 days after surgery and unrestricted load bearing and activity were allowed.

XL or XXL heads have never been used. No stem subsidence, either at surgery or subsequent was observed. Medium neck heads were used in 60% of cases, indicating good correspondence between broach and final stem. Furthermore, no luxation was observed.

# CONCLUSION

This study indicates that the AMIStem cementless femoral stem can be safely and effectively used for general surgical treatment of hip diseases by total joint replacement in a wide variety of patients with good reliability.



Figure 4. Five years X-ray images

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Over the last 10 years, the AMIS Education Program has enabled a successful diffusion of the AMIS approach to total hip arthroplasty the world over.



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