THE ROLE OF THE FEMORAL STEM IN THE STABILITY OF A METAL ON METAL HIP RESURFACING IMPLANT. AN RSA STUDY

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INTRODUCTION

The advantage with the minimal resectioning concept is that natural anatomy is more closely replicated than with traditional total hip replacement devices.

Today, the Birmingham Hip Resurfacing (BHR) metal on metal resurfacing implant is the golden standard. It has a narrow, strait femoral stem which requires good bone stock. In many cases, bone stock of the femoral head does not allow resurfacing arthroplasty such as in BHR. A short-stemmed device has been developed with a more robust, curved femoral stem. The load pattern of this type of device is expected to be different than that described in BHR [1] and the different lever arms resulting from the curved design of the stem may result in greater retroversion problems. Will this contribute to a different migration pattern and early loosening as a result?

METHODS

For most joint implants, migration is known to correlate to loosening. Radiostereometric analysis (RSA) was used to measure migration, as this method has been proven to be superior to conventional radiography. This is an ongoing study, which at present includes 9 patients (8 male, 1 female; mean age 51.2, range: 33-62) with data up to 12-months post-operatively. All patients are physically active. Three 0.8 mm tantalum markers were attached on the tip and sides of the short stem implant and 5 – 8 markers were placed in the greater and lesser trochanters at the time of the hip arthroplasty. RSA evaluation was performed post operatively and at 2, 6 and 12 months follow-up. The first patients are expected for the 24-month follow-up this year.

The implant head centre was estimated from the acetabular cup circumference at the post-operative examination and calculated from femoral component markers in subsequent examinations. Standard RSA calculations were used to determine proximal/distal and anterior/posterior translation and implant rotation relative to the femur. The results were compared with the 2 years follow up of the BHR [1].

RESULTS AND DISCUSSION

Migration values for the BHR were very small up to 2 years follow up. The pattern of migration over time indicated limited subsidence. The mean of the BHR migration is presented as a strait line in the figures of the individual results of each migration parameter of the short stem device.

Short stem proximal translation: Values were small. However 2 slightly higher individual distal translation values were seen at 6 and 12 months follow up.

Short stem anterior translation: 2 values were greater in the anterior and 1 value in the posterior direction. No consistent pattern was seen, fig. 1.

Short stem Y rotation: Small values were measured. However individual outliers were seen, fig.2.
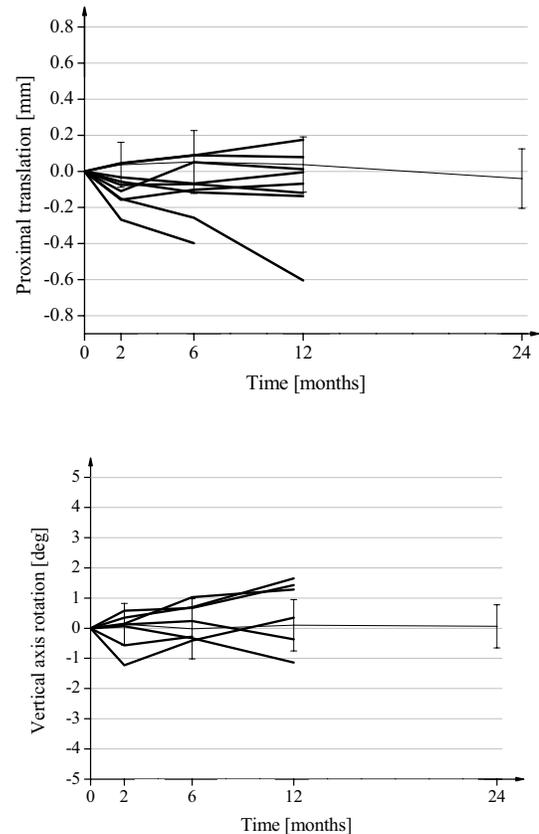

Figure 1. Proximal translation and vertical rotation of individual patients with the short stem hip resurfacing implant. The mean (± SD) of the BHR results is provided as a comparison.

CONCLUSIONS

We found a tendency towards a greater distribution in vertical migration in comparison to the BHR design. A large variation and no clear pattern in anterior migration and individual outliers in rotation could be described. At the 12-month stage no migrations exceeding those expected for conventional hip replacements were found. A follow-up of 20 patients for 2 years will provide final results.

REFERENCES

1. Itayem R, et al. In Press: *J Bone Joint Surg (Br) 87-B*. 2005.