

Cementless Total Hip Arthroplasty in Primary Myelofibrosis – a Case Report

Necementovaná alopastika kyčelního kloubu u primární myelofibrózy – kazuistika

S. BRODT¹*, E. EIGENDORFF², G. MATZIOLIS¹

¹ Klinik für Orthopädie, Friedrich-Schiller Universität Jena, Campus Eisenberg, Eisenberg, Germany

² Klinik für Innere Medizin II, Abt. Hämatologie und Internistische Onkologie, Universitätsklinikum Jena, Germany

SUMMARY

There is a great deal of data available, in part contradictory, on the best fixation technique to use for total hip arthroplasty (THA) in hip osteoarthritis. Both the cementless and the cemented versions offer excellent long-term outcomes – if the respective technique is applied correctly. However, as far as we know, no recommendation has been made regarding cemented vs. cementless THA in primary myelofibrosis.

The case described here concerns a very active 76-year-old patient with primary myelofibrosis. This is a rare hematological disease. It develops from clonal hematopoiesis with impaired blood formation and progressive bone marrow fibrosis. An MRI scan of the patients pelvis showed a marked spotted change over all of the imaged bone.

Ultimately, in preoperative planning we decided in favor of a proven cementless implant (Allofit Alloclassic cup and the CLS Spotorno stem from Zimmer). Complication-free osseous integration of the cementless implants was observed.

Histologic analysis of the bone showed a focally sclerotically altered bone structure. Neither osteoporosis nor osteopenia were found.

In our opinion, taking into account all other indication criteria, there is no reason not to perform a cementless THA implantation in the presence of primary myelofibrosis.

Key words: hip, primary myelofibrosis, cementless, THA, total hip replacement.

INTRODUCTION

To our knowledge, the literature contains no mention of the anchorage technique used for primary total hip arthroplasty (THA) in primary myelofibrosis. The present case report is thus the first of its kind. Prior to preparation of the manuscript, the informed consent of the patient was obtained for publication.

Primary myelofibrosis (PMF) is a rare hematological disease. It develops from clonal hematopoiesis with impaired blood formation and progressive bone marrow fibrosis. The clinical picture is diverse. Characteristic are initial thrombo- and leukocytosis, anemia and splenomegaly. The prognosis is determined by the patient's age, clinical symptoms, hematologic and genetic parameters. The only curative therapy is allogeneic stem cell transplantation. However, it is only offered to suitable patients with an unfavorable prognosis of their PMF.

For symptomatic therapy, there are various different drug options available, as well as local treatment of the splenomegaly. In the case of a predominant pure anemia – as in the present patient – virtually the only therapeutic options available are the regular transfusion of packed red blood cells and chelate therapy to prevent iron overload.

Imaging often reveals diffuse changes in the entire skeleton as a result of the clonal hematopoiesis linked to bone marrow fibrosis (9).

CASE DESCRIPTION

In the following report, we present the case of a 76-year-old patient, 177 cm in height and weighing 92 kg, who presented at our orthopedic clinic due to pain in the right hip. He described inguinal symptoms upon weight-bearing and at rest, with pain radiating into the thigh and down to the knee over a period of approximately six months. The symptoms had worsened markedly over the previous 8 weeks. Mobility in the right hip was markedly impaired, at extension/flexion (Ex/Flex) 0/0/90°, ext/int rotation (ER/IR) 20/0/0° and abduction/adduction (Abd/Add) 20/0/10°. The Harris Hip Score modified according to Haddad was 37, the WOMAC score was 103. The contralateral hip showed neither pain nor restriction of mobility. A conventional X-ray was taken as a pelvic survey with a low ap setting and laterally of the right hip. This revealed grade III osteoarthritis of the hip according to Kellgren and Lawrence, with the joint gap obliterated centrocaudally (Fig. 1). Conservative therapy had been exhausted. This presented the indication for alloarthroplastic replacement of the right hip joint, which was also expressly desired by the patient.

As regards notable previous operations, the patient had received a cemented total knee replacement in an external hospital in 2010, due to primary osteoarthritis of the knee. The medical history also included an appendectomy in childhood, removal of a calcaneal spur



Fig. 1. AP-view of the pelvis preoperative.



Fig. 2. MRI-scan of the pelvis preoperative (T1 coronar).



Fig. 3. AP-view of the pelvis postoperative.

on the left in 2012, and cataract surgery on both sides in 05/2015. Beside hyperuricemia, the patient was suffering from primary myelofibrosis.

An MRI scan showed a marked spotted change over all of the imaged bone (Fig. 2). The acetabulum and the femur were affected to an equal extent. For us, this initially led to uncertainty about the quality of the bone. This is, however, immensely important for the choice of fixation technique for anchoring the endoprosthesis in the bone.

Total hip replacements can be implanted with cement, without cement, in a hybrid (stem cemented, cup cementless) or reversed hybrid technique (stem cementless, cup cemented). The available data is unclear on this matter. Scandinavian register data show a trend toward advantages of the cemented technique, whereas the Australian prosthesis register suggests advantages of the cementless version (1, 3). Only in elderly patients, who tend to have osteoporotic or osteopenic bones, does the current data favor the cemented version. It has to be said that in principle more cemented prostheses are implanted than cementless ones in Scandinavia. 66% of primary total hip arthroplasties were fully cemented in Sweden between 2012 and 2013 (8). In Australia, in contrast, approx. 70% were primarily implanted without cement (1). In turn, this creates the impression that surgeons achieve better results using the technique with which they are most familiar.

The USA as well as Canada and Germany are countries that have been using the cementless technique in the majority of cases for many years. For example, around two thirds of cases were implanted without cement in Germany in 2007, whereby the authors predicted an increasing tendency (5). Such a tendency can be confirmed in our hospital. In 2014, of 737 primary THAs that were implanted due to primary osteoarthritis (posttraumatic or dysplastic situations were excluded, along with re-implantations) 94.5% of all patients were treated without cement.

The present case thus also raised the question of which fixation technique to use for the prosthesis in the planned operation. Bone density measurement conducted preoperatively using DEXA showed a T-score of 1.3 and a Z-score of 2.5 in the area of the right femoral neck. Despite the numerically high age of 76 years, the patient concerned is a biologically much younger, former competitive athlete (track and field) with high functional demands on the joint. There were no contraindications to the operation. Ultimately, in preoperative planning we decided in favor of a proven cementless implant (Allofit Alloclassic cup and the CLS Spotorno stem from Zimmer) (6, 7).

The operation was performed under intubation anesthesia, applying single shot antibiotics with cephazolin 2.0 g. After standard preparation of the surgical site, the operation was performed via a modified transgluteal approach act Bauer (2). After capsule resection and osteotomy of the femoral neck, the head-neck fragment was removed and inspected. Visually and haptically, neither this fragment nor the acetabulum nor the proximal

femur region gave the impression of a lacking bone quality. Therefore, the planned cementless implantation was not deviated from. The incision-suture time was 71 min. One deep intraarticular drain was inserted, which was removed on the second postoperative day. The perioperative blood loss within the first 24 hours was 720 ml, calculated according to the formula of Nadler (4). As a result of the low preoperative baseline Hb of 4.8 mmol/l within the context of the primary disease, the patient was transfused 2 units of packed red blood cells each on the 3rd and 10th postoperative days, which were well tolerated. The wound healed primarily. As a whole, the intra- and postoperative course was free of complications. The patient was discharged on the 11th postoperative day. The X-ray showed a normal position of the cementless THA, with a correctly adjusted leg length and offset. At discharge, the inflammatory parameters showed a trend toward normal values (leukocytes 6.8 Gpt/l, CRP 23.1 mg/l).

The histologic analysis of the bone showed the morphologic correlate of hip osteoarthritis as well as evidence of a myeloproliferative disease, which is morphologically consistent with the already known primary myelofibrosis. In addition, a focally sclerotically altered bone structure was found.

Three, 6 and 15 months after the operation, the patient attended our outpatient department for routine follow-up. The wound had healed completely, was free of irritation and dry. The follow-up X-ray showed findings identical the X-ray taken 6 days postoperatively (Fig. 3). Subsidence or a periprosthetic fracture were not present. Rather, the prosthesis was now seen to be securely integrated in the bone. Functionally, the patient was fully mobilized and very satisfied, without symptoms. The range of motion (ROM) showed a good postoperative outcome, with Ex/Flex = 0/0/90°, ER/IR 25/0/15°, and Abd/Add 25/0/15°. The HHS increased by 58 points to now 95 points and the WOMAC dropped from 103 points to now 0 points postoperatively.

CONCLUSION

In our opinion, taking into account all other indication criteria, there is no reason not to perform a cementless THA implantation in the presence of primary myelofibrosis.

References

1. Australian Orthopaedic Association National Joint Replacement Registry. Annual Report. Adelaide:AOA; 2015.
2. Bauer R, Kerschbaumer F, Poisel S, Oberthaler W. The transgluteal approach to the hip joint. *Arch Orthop Trauma Surg.* 1979;95:47–49.
3. Mäkelä KT, Matilainen M, Pulkkinen P, Fenstad AM, Havelin L, Engesaeter L, Furnes O, Pedersen AB, Overgaard S, Kärrholm J, Malchau H, Garellick G, Ranstam J, Eskelinen A. Failure rate of cemented and uncemented total hip replacements: register study of combined Nordic database of four nations. *BMJ.* 2014;348:f7592.
4. Nadler SB, Hidalgo JH, Bloch T. Prediction of blood volume in normal human adults. *Surgery.* 1962;51:224–232.
5. Sendtner E, Boluki D, Grifka J. [Current state of doing minimal invasive total hip replacement in Germany, the use of new implants and navigation – results of a nation-wide survey]. *Z Orthop Unfall.* 2007;145:297–302.
6. Streit MR, Innmann MM, Merle C, Bruckner T, Aldinger PR, Gotterbarm T. Long-term (20- to 25-year) results of an uncemented tapered titanium femoral component and factors affecting survivorship. *Clin Orthop Relat Res.* 2013;471:3262–3269.
7. Streit MR, Weiss S, Andreas F, Bruckner T, Walker T, Kretzer JP, Ewerbeck V, Merle C. 10-year results of the uncemented Allofit press-fit cup in young patients. *Acta Orthop.* 2014;85:368–374.
8. Swedish Hip Arthroplasty Register (SHAR). Annual Report 2013. www.shpr.se.
9. Tefferi A. Primary myelofibrosis: 2014 update on diagnosis, risk-stratification, and management. *Am J Hematol.* 2014;89:915–925.

Corresponding author:

Dr. Steffen Brodt
Klinik für Orthopädie, Friedrich-Schiller
Universität Jena Campus Eisenberg
Klosterlausnitzer Str. 81
07607 Eisenberg, Germany
E-mail: s.brodt@krankenhaus-eisenberg.de