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Hip instability following Arthroplasty, is it related to ASA grading?

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Abstract

Background: Complex primary total hip replacement presents a challenging condition for both new arthroplasty surgeons and experienced ones. Similar to a revision scenario, there may be difficulties such as shortening, soft tissue contractures, and fragile bones. Furthermore, these patients are at a higher risk of postoperative hip dislocation.

Method: We present a case of a 57-year-old patient with a Pipkin fracture of the left femoral head and avascular necrosis (AVN) of the femoral head. This patient had a history of chronic alcoholism and smoking and had experienced a fall four years prior, resulting in gross shortening and complete loss of hip movements, except for flexion from 20-degree fixed flexion deformity (FFD) to 70. To achieve good outcomes, we used the latest evidence and opted for a Capitol C Monoblock dual mobility cemented cup (Evolutis.inc) and Exeter V40 cemented stem (Stryker.inc) for left hip reconstruction, successfully achieving perfect limb equalization.

Conclusion: Total hip replacement in patients with alcoholism and ASA grade > 3+ is always a challenging surgical problem. Orthopaedic surgeons may not be aware that ASA grade > 3+ patients are at a higher risk of dislocation following hip replacement. By following the latest evidence-based principles and choosing a dual mobility cup for this patient, who had more than two risk factors for postoperative dislocation, we achieved a very good patient outcome.

Keywords: Hip arthritis, AVN hip, ASA grading, total hip replacement, dual mobility cup, hip instability, alcoholism.

Introduction

Complex primary total hip replacement is a challenging condition in hip Arthroplasty. Just like in a revision scenario, surgeons may have to deal with issues such as shortening, soft tissue contractures, bone fragility, and acetabular and femoral bone loss, in addition to challenging medical conditions. Such patients are also more prone to post-operative hip dislocation. In this article, we present a challenging case where we used the latest evidence to achieve good outcomes for our patient.

Treatment options for end stage osteoarthritis following AVN of the hip include osteotomy, excision Arthroplasty, arthrodesis or total hip Arthroplasty. In the last three decades, the management of THA instability has focused on changes in component design, primarily achieved by increasing the head size to 32/36mm, which has now become a standard in Arthroplasty, but also with a rise in popularity in dual mobility bearings. Constrained acetabular liners are used as a last resort.

Dual mobility devices have gained popularity, with several manufacturers now offering these devices as part of their portfolio. This French concept, first developed by Professor Gilles Bousquet and engineer André Rambert at the end of the 1970s, called the Evolutis Cup, now has an established pedigree in terms of the prevention and treatment of hip instability. The basic fundamentals of this dual mobility cup involve an increased jump distance for the head compared to traditional large bearings. With this particular design, the polyethylene articulates with the highly polished metal surface of the cup, reducing the chance for wear and metal ion release, unlike in modular dual mobility cups.

Case report

A 57-year-old male patient presented to our OPD with complaints of severe pain, with a VAS score of 9/10 in intensity. He has been having difficulty walking for the last 4 years. The patient has a history of a fall 4 years back but did not seek treatment for it. The patient was a known alcoholic, consuming 180ml of rum every week for the past 20 years, and a known smoker, smoking 30 cigarettes per day for more than 20 years, which led to smoking-induced chronic bronchitis. The patient suffered from COVID-19 infection 2 years ago during the 2nd wave in India, for which he was hospitalized. He was a known case of hypertension on medication and was also diagnosed with diabetes mellitus prior to surgery, which was controlled before surgery.

On local examination, it was revealed that there was tenderness in the anterior and posterior joint line. The movements of the hip were grossly restricted, with internal rotation and external rotation of 0°, abduction and adduction of 0°, with a fixed flexion deformity of 20° on Thomas test with further flexion from 20-70°. There was a presence of 1.5cm shortening noted, and no neurovascular deficits were seen. The patient was investigated with haematological and radiological examinations. The X-ray of the pelvis showed an old malunited Pipkin type of femoral head fracture with end-stage arthritic changes with deformity of the head and subluxation of the head. ESR and CRP were normal, and other pre-op investigations were within normal limits.

The patient was initially managed with analgesics to relieve the pain. The patient was also started with physiotherapy to increase the strength in the affected muscles around the hip. We obtained a template X-ray with a marker of 2cm diameter. We used an acetate template to determine the cup size, femoral offset, and stem size.

The patient was operated in a lateral decubitus posture through a standard posterior approach. The deep attachments of the gluteus Maximus had to be released to get adequate 360° exposure of the proximal femur. There was severe soft tissue contracture, and it was almost impossible to dislocate the hip. The decision was made for the insitu neck cut, and a wedge of the femoral neck was taken with to get access to the hip joint. The femoral head was removed piece meal, and all the osteophytes around the acetabulum were taken out. A 360° exposure of the acetabulum was obtained after the release of the deep head of rectus femoris and with the use of a Stryker MIS retractor. osteophytes around the trochanter were removed. After 360° soft tissue release around the hip and the neck of femur, after sufficient soft tissue release, we were able to get the hip adducted and the leg at 90degree to the back of the thigh to get proper anteversion of the femur. Acetabular reaming was done, starting with the smallest reamer to take the medial osteophytes out, and continued sequentially up to a size of 50mm. A cemented capitol c (Evolutis) cup of 49mm was press-fitted with 4th generation cementing technique with simplex cement with gentamicin. The cup was held in 45° inclination and 20° anteversion until the cement was set. All the cementophytes and osteophytes were removed around the cup, and thorough lavage was done.

The leg was held to 90-90 for femoral reaming, which was done using a Stryker reamer. Trailing with a 37.5-0 rasp with a 28mm standard head and a 39mm poly DM head showed good leg length, adequate shuck test, and a stable hip in extension, external rotation, and hip flexion at 30, 60, 90 and 20-30 IR. A 37.5mm Exeter stem was press-fitted into the femur using 4th generation cementing technique. Trailing

with a 28mm head with a 39mm DM polyethylene head showed shallow leg length and good stability. Hence, a 28+4mm definitive head was press-fitted onto the femoral stem. The wound was closed in layers after augmented repair of short external rotators. Because the patient had a history of ASA > 3 and alcoholism, which are powerful indicators of dislocations, it was decided to restrict internal rotation by using a simple knee brace. The post-op X-rays were satisfactory, and the patient was mobilized to full weight bearing from day one post-surgery and made an uneventful but full recovery. The Harris hip score improved from 33 to 95 at

4 weeks post-op, and the patient is able to climb stairs independently.

Discussion

Identification of patients at risk of dislocation can assist with pre-operative patient education and informed consent. Also, in the management of THA instability when planning complex primary and revision surgery. Whether we are considering prevention or treatment of hip stability, it is fundamental to consider its multi-factorial etiology.

Patient factors that lead to an increased risk of dislocation or continued instability have been studied extensively. These include increasing age^[5] and patient gender^[6], with females older than 80 years at greatest risk^[7]. Medical co-morbidities, as highlighted by an ASA score of 3 or more, can lead to a ten-fold increase in dislocation risk^[8]. Neurological disease, in particular, is a concern^[9]. The indication for THA, especially in hip fracture patients, increases the dislocation risk significantly^[10]. Also highly significant are patients undergoing revision THA and those patients who have multiple previous surgeries^[11]. Alcoholism and poor patient cognition or compliance are also risk factors^[12].

The effect of high BMI and increasing dislocation risk has also been reported^[13]. Head size is one component of implant design that has a major effect on THA stability. Apart from the head size, the presence of a skirt or collar around some modular head designs, used particularly in longer head sizes, can promote impingement and increase instability^[14]. The use of a skirted femoral head in association with a constrained liner is a combination to particularly avoid. On the acetabular side, designs that have a hood or elevated rim can reduce the primary arc of motion leading to dislocation^[15]. On the stem side, the shape of the femoral neck again influences the point at which impingement occurs^[16].

It is the surgeon who selects the specific implant inserted and intra-operatively determines the precise combination implanted. Clearly, therefore, the implanting surgeon should understand the design implications of the various modular components that constitute the hip replacement as a whole. It is here where surgeon experience with a particular implant pays dividends.

Results

Total hip replacement in AVN hips with an ASA grade >3 is always a challenging problem. It requires surgical expertise, proper implant selection, and pre-operative planning to prevent intraoperative and post-operative complications. A cemented dual mobility cup and cemented stem are a very good option for managing these types of patients.

In this article, we have highlighted the importance of ASA grading and its relation to hip instability. As this patient not only had an ASA grade 3 but also suffered from alcoholism, the concept of using a cemented Monoblock DM cup and a

cemented stem was employed, as it is supported by the latest evidence

Conflict of Interest

Not available

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