Revision hip arthroplasty: principles of management and surgical techniques.

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The problem: osteolysis, bone loss.
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The problem

Polyethylene wear and fracture of the acetabular cup
The problem: stem fracture.
The problem: osteolysis, bone loss, infection.
Surgical strategy

- Posterolateral approach
- Femoral access route: (a) endofemoral; (b) bone “window”; (c) transfemoral (femoral flap)
Surgical strategy

Hip reconstruction: implants + bone allografts or Bone graft substitutes

Metallic roof reinforcement ring, conical cementless stem, (diaphyseal fixation), particulate cancellous bone allograft – the most commonly used - Trabecular metal acetabular cup + particulate/morselized cancellous bone allograft

Metallic antiprotusio/ilioischial cage (Burch-Schneider) + particulate cancellous bone allograft and/or massive bone allograft
The most commonly used reconstruction technique: transfemoral approach, metallic reinforcement ring, conical stem, cancellous bone allograft.
Capsular closure
PU 1937..... 2012....good function
Bone graft substitute
Bone graft substitute
Cryopreserved cancellous bone allografts
Particulate/morselized cancellous bone allografts

Coimbra University Hospitals Tissue Bank

Bone miil
Cortical strut (biological plate)
Demineralized bone matrix (DBM) Cryopreserved

Cortical bone allograft superficially demineralized

DBM is the only osteoinductive bone allograft material (BMP)
Coimbra University Hospitals Tissue Bank

ALLOGRATS 1982-2011

Total 6319

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MDF.. Rheumatoid Arthritis...

Trabecular metal + cancellous bone allograft

12 Y
Cancellous bone allograft

Trabecular metal

HUC

6 y
Metallic antiproptusio/ilioischial cage + particulate cancellous bone allograft
Metallic antiprotusio/ilioischial cage + bone allograft
Bone allografts: femoral head, femoral condyles (HUC)
Acetabular reconstruction with a massive allograft (femoral condyles)
JFP 1916...... 90 y, cardiac risk

22 y

2006

Cement-within-cement femoral arthroplasty revision
Cement-within-cement femoral arthroplasty revision

Indications

cement mantle is intact
the stem is broken
to improve exposure for an acetabular revision, increase femoral offset or femoral head diameter, or place a new bearing femoral head
removing a debonded femoral component.
Transfemoral approach
Transfemoral approach
Cortical strut (biological plate)
Cortical strut (HUC)
Cortical strut (HUC)
Osteoporotic periprosthetic fracture of the femur in a 78 years old patient
Periprosthetic fracture

70 Y femal

1 y
Periprosthetic fracture
1952..femal, 15 y of follow-up, loosening of the femoral stem, large cement mantle
Instable arthroplasty of the hip treated with a simple technique of acetabular augmentation

“Butée” with cement, 3 screws
Dislocation with fracture of the cement, retroversion of the cage. Reconstruction with acetabular augmentation (3 screws in the cage + cement)
Severe bone loss of the proximal femur with a rapid progression in a stable revision hip prosthesis.
Intra-operative finding: large amount of a brownish fluid under great pressure (400 cc) in the pseudojoint cavity and in the joint space.
The specimen from the surgical operation revealed fibrous and necrotic material
Femoral reconstruction with cancellous bone allograft
PU 1940.... male, 2007, severe femoral ectasia
Femoral reconstruction with cancellous bone allograft
Pu 1935..femal...2009....transfemoral approach + cortical strut
PU 1932..... male, NOV 2010
PU 1932..... male,  NOV 2010

Transfemoral approach
Removal of the implants
Infection of a revision THP

9 m post-excision

First-stage revision
The past: two-stage revision procedure of a periprosthetic fracture with femoral loosening

Serviço de Ortopedia dos HUC
The past
Final Notes

• Revison hip arthroplasty is a complex procedure with a higher risk of complications (dislocation, leg length discrepancy, pain, infection, abductor dysfunction) and unforeseen circumstances.

• Surgical planning is indicated for every revision hip arthroplasty, whether it is a straightforward or a complicated case. The preoperative planning is defined in the outpatient clinic and should be repeated just before surgery. Templating may allow the surgeon to predict intraoperative difficulties and possible complications.
• Preoperative planning is required for: the surgical approach and patient positioning; the type of implants to be used; the method of the prosthesis fixation (cemented, uncemented, hybrid); the need for bone grafting; help to reduce surgical time; minimize risks; decrease the stress level of the entire surgical team and increase the rate of the successful outcomes for patients.

• The removal of cemented and well-fixed porous-coated implants can be done with adequate preoperative planning and a thorough knowledge of numerous implant removal techniques.
• The anatomy is usually distorted. Proximal femoral varus remodeling is observed in up to 30% of the patients with a loose femoral stem. The subsequent surgical reconstruction is challenging due to the deformed femoral bone. The transfemoral approach can be indicated in this situation.

• The aims of surgical procedures are to restore bone stock, the center of hip rotation, the offset, the leg length and to obtain optimal alignment of the implants.

• We used cementless implants associated to cryopreserved morselized cancellous bone allograft in the majority of the patients submitted to hip replacement prostheses.
References