SMR Metal Back Glenoid in Total Shoulder Arthroplasty

The SMR metal back glenoid is a popular implant in total shoulder arthroplasty in New Zealand. Some metal back glenoid designs have been reported to have early problems.

How was the SMR metal back glenoid performing in New Zealand?

Specifically, I wanted to answer these three questions:

Is there a problem with liner dissociation?

Is there a problem with early loosening or failure of the metal back glenoid?

Is osteointegration of the metal base plate reliable in the medium term?

To answer the first two questions, I reviewed data from the New Zealand Joint Register. To answer the last question, I reviewed a series of patients at minimum three years post surgery with CT scan analysis.

For approximately 50% of the surface area of the implant, images were analysed with a musculoskeletal radiologist. None of the components were loose. In 85% of the zones, there was no gap at the bone to component interface. In 11% of the zones, there was a lucency of up to 2 mm. This was sometimes likely due to artefact in some cases, especially artefact related to the humeral head. In 4% of the zones there was osteolysis, all in the one patient. This patient had a revision procedure for superior instability 4 years 3 months after his initial procedure. The glenoid was not loose at revision and the metal back base plate was retained.

Artefact was an issue in assessing the interface, especially superiority. Cost and additional radiation exposure would limit the clinical utility of this form of radiological assessment in routine practice. However, it was clear from our study that reliable osteointegration occurs in the SMR metal back glenoid. The central peg showed reliable osteointegration and appears to be an important part of the metal back design.

Does reliable osteointegration occur?

Yes, we found reliable osteointegration on CT analysis. CT has been found to be a more sensitive and reliable tool for assessing loosening than conventional imaging in cemented polyethylene glenoids. We examined 20 consecutive patients with 64-slice CT scan at a mean of 3 years 9 months from surgery (range 3-5 years). For analysis, the glenoid was divided into 8 zones, with 4 zones around the central peg and 4 zones on the surface of the metal base plate. The central peg accounts for approximately 50% of the surface area of the implant.

SMR System is a truly modular shoulder system to cover all indications, from resurfacing to reverse.

Come and visit us:
Lima Corporate Booth #653 (Hall A)

References:

Indianapolis, IN, November 28, 2011
LIMA USA INC. IS OFFICIALLY ON!

Following the path of internationalization Lima Corporate has eventually found its way to make its “American Dream” real. The incubation of the project USA has gone through different ideas, initially thinking about using preexistent partners, then moving to the more challenging and fascinating task of creating Lima USA directly, reflecting Lima Corporate philosophy. Therefore the organization has been defined basing on a few solid pillars: the main logistic structure will be based in Dallas, TX and will care about receiving the products from Italy and sending them over the different US States where and when they will be needed.

On the field, instead of using mere stock distributors, Lima has decided to put its face on the market, fostering branding and awareness, and has been looking for authentic after sales agents who will, in fact, become authentic partners. The said strategy will be supported by a net of agents spread upon the different territories, covering from the beginning some determined areas, like for instance the South-East, Texas, California and Nevada. They will not be left on their own, since they will be able to count on the backup from the main Headquarters in Italy, in terms of products information, updates and impulses to keep the momentum.

In order to boost the penetration in the States, Lima will push its most innovative and renowned products: the SMR Shoulder System and the DiPHOS H plate.
Two-Stage Revision for infected Shoulder Arthroplasty

Infection after shoulder replacement is a painful and potentially devastating complication, occurring in up to 3.5% of cases and management is still controversial. Two stage revision procedures are the most accepted treatment. Despite this, the procedural technique has not been standardised. We present 8 cases of infected shoulder implants treated between 2007 and 2009 by two stage revision with re-implantation of a modular, non cemented (SMR, Lima Corporate) hemiarthroplasty, focusing on the importance of a standardized diagnostic and therapeutic protocol. Patients were clinically evaluated with the Constant score. Diagnosis of infection was diagnosed in collaboration with the Department of Infectious Disease of the research institution, on clinical signs and symptoms (painful decrease of shoulder motion, pain at rest, presence of fever, presence of sinus, elevation of leucocytes count, erythrocytes sedimentation rate and CRP), in association with signs of component loosening on standard radiographs (>1mm lucent lines), and CT scan. We performed a pre operative culture of the fluid only in the two cases presenting a draining sinus. Subacute infection was diagnosed in 4 patients, chronic in 3, acute in one patient. Staphylococcus aureus was the bacterium responsible of the infection in four cases (50%) and Propionibacterium acnes in four cases (50%) and responsible of the infection was diagnosed in 4 cases (50%). In two consecutive cases normal results were seen, treatment was suspended and a three-phase bone isotope scanning was performed. Patients were re-operated, with a mean interval of 7.5 months (5-14) between surgeries. Intra operative biopsies and joint fluid were taken for culture. The cement spacer was removed, and a modular non cemented hemiarthroplasty (SMR, Lima Corporate) was implanted, in order to restore biomechanics and deal with bone loss. In 6 cases (75%) a simple hemiarthroplasty was implanted and in two cases a CTA hemiarthroplasty. In the last two cases, the quality of the cuff was very poor and the subacromial space was significantly reduced. After surgery, all patients followed a similar rehabilitation programme of between 10 and 14 weeks. The mean clinical and radiological follow up was 20 months (14-39). In all cases infection was eradicated, as biopsies and fluid cultures were negative. No major complications were observed. Medium value of the Constant Score improved from a pre operative value of 21 (7-30) points to a value of 43 (40-48) at follow up. Radiological evaluation did not show pathologic changes of the implants. No case required revision surgery.

The correct management of infected shoulder prostheses is not standardised. A proper diagnostic work up, as a multidisciplinary approach can lead to eradication of the infection and satisfactory results. The use of a modular CTA (SMR, Lima Corporate) prosthesis system at re-implantation time can optimally deal with the possible situation of compromised biomechanics and bone loss.
The Use of an Eccentric Glenosphere in Reverse Total Shoulder Arthroplasty

In 2005 Lima developed an eccentric glenosphere, with the aim of lowering the centre of rotation, maintaining the correct position of the metal back, in order to prevent the scapular notch occurring with concentric designs. We performed a retrospective study with the aim to evaluate clinical and radiographic outcomes of the eccentric glenosphere and to ascertain if this design can be a solution to prevent scapular notchting. This study reports the results of 20 patients, treated between 2006 and 2008, with a minimum 24-month follow up. Clinical and radiographic evaluation was performed preoperatively and at 1 month, 3, 6 months, 1 year and annually thereafter. All patients have been evaluated with MRI or CT scan preoperatively and with x-rays postoperatively to evaluate the scapular notchting and to measure prosthesis-scapular neck angle (PSNA), peg-glenoid rim distance (PGRD) and the distance between the scapular neck and glenosphere.

Outcomes of Shoulder Resurfacing Arthroplasty in correlation to aetiology

Over the past twenty years, shoulder resurfacing arthroplasty has been widely adopted as an alternative to conventional stemmed shoulder arthroplasty for the treatment of glenohumeral arthropathy. Shoulder resurfacing consists of reaming the proximal portion of the humeral head and fitting a metal-alloy cap over the remainder of the head, no intramedullary stem is used. The cap may or may not be coupled with a glenoid component. The early clinical results, developments, and new innovations of shoulder resurfacing have paralleled similar advances in hip surgery. However, there are functional and anatomic differences between the two joints: the shoulder joint generally supports lower loads, has a greater range of motion, and has a decreased offset.

The proper indications for resurfacing shoulder arthroplasty are important for successful outcomes. The aim of our study was to compare clinical outcomes in correlation to aetiology. Between September 2005 and December 2007, 39 patients (average age 61.7±11.9 years) treated in 3 centers (Mare-Klinikum and Universitaet Kiel (Germany), A.Ø. Bezirkskrankenhaus St. Johann in Tirol (Austria), Polyclinique du Parc, St. Saulve (France)) with the SMR resurfacing shoulder arthroplasty were assessed in a retrospective study with a mean follow up of 42.9± 7.8 months. Primary diagnosis was cuff tear arthropathy in 46.1%, primary osteoarthritis in 38.5%, secondary osteoarthritis in 10.3% and rheumatoid arthritis in 5.1%. Glenoid analysis found concentric erosion in 92.3%, eccentric erosion in 7.7%. 61.5% were a type A1 offset. The early clinical results, developments, and new innovations of shoulder resurfacing have paralleled similar advances in hip surgery. However, there are functional and anatomic differences between the two joints: the shoulder joint generally supports lower loads, has a greater range of motion, and has a decreased offset.

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At last follow up (average 27.5 months, range 24–46 months) the Constant Score and ROM improved significantly. The average PSNA was 92± 23 mm, the average PGRD was 21.2 mm ± 9 mm and the average distance between the inferior bony glenoid rim and the inferior edge of the glenosphere was 4.3 mm ± 0.8 mm. No scapular notchting and no implant-related complications were observed.

Our conclusion is that this data suggests that the use of an eccentric glenosphere allows the lowering of the COR, with correct positioning of the metal back in reverse shoulder arthroplasty. And this can reduce the risk of scapular notchting.
Proximal humeral fractures of the human humerus are a hard to solve problem for the orthopaedic surgeon. Open reduction and internal fixation with anatomical plate and locking head screws are nowadays the gold standard treatment. A new plate for the repair of proximal fractures or the humerus has been designed and mechanically tested. The authors hereewith present the new device and the preliminary results at one year follow up.

Material and methods
Twenty-two fractures of the proximal humerus have been treated by deltopectoral approach then reduced and fixed respecting as much as possible the blood supply to the fragments. The plate (DiPhos H, Hilt Medica, San Marino, Italy) is manufactured in CFR peek (30% carbon fibre reinforced peek). The titanium screws are designed with a self tapping head. The mean age of the treated patients was 64 ys (range 41-78) while the average follow up was 9 months (range 13-6). The plate was removed in three cases after healing of the fracture one year from the implant. The scar tissue covering the plate was retrieved at the time of explantation. No problems related to galvanic corrosion at the screws-implant interface have been reported during the follow up.

Results
All fractures healed at follow up, the mean Constant Score was 91 (85-97) and the Dash Score was 31(27-53). The mean age of the treated patients was 64 ys (range 41-78) while the average follow up was 9 months (range 13-6). The plate was removed in three cases after healing of the fracture one year from the implant. The scar tissue covering the plate was retrieved at the time of explant and submitted to histological examination for the detection of signs of local reaction. The screws revealed extremely reliable self-tapping stabilization properties into the plate holes proving to be very useful for their polyaxial properties in every case. Histological examination of the tissue around the plate confirmed the optimal tolerability of the new material. Due to these very satisfactory preliminary results a multicenter trial will soon be started to further validate this new internal fixation device.

Discussion/Conclusions
The new internal fixation device presents the following unique features. PEEK is a material that allows ideal hole tapping by the screw and optimal locking screw stability in multiple directions, according to the surgeon’s needs. The locking screws revealed extremely reliable self-tapping stabilization properties into the plate holes proving to be very useful for their polyaxial properties in every case. The PEEK translucency at X-ray evaluations allows the surgeon to have a precise view in the X-ray and to follow the bone healing process in time. No problems related to galvanic corrosion at the screws-plate interface has to be expected, in fact all implants could be removed uneventfully. Histological examination of the tissue around the plate confirmed the optimal tolerability of the new material. Due to these very satisfactory preliminary results a multicenter trial will soon be started to further validate this new internal fixation device.

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