

IN-DEPTH ORAL PRESENTATIONS

KNEE ARTHROPLASTY REVISION 2

Acetabular reconstructions with dual articulation cups: results of 81 hips

P.O. Pinelli, J.Y. Arlaud, B. Gassend, S. Delpech

(Florence, IT and Marsiglia, France)

Hip dislocation occurs more frequently after Total Hip Revision than after primary hip arthroplasty. Better rates of stability are observed when dual articulation cups are used. 81 patients were operated on by the same surgeon with a minimum follow-up of 3 years. The device that was used for the acetabular reconstruction was always the BIOMET® Advantage Rev cup. The mean PMA score has grown up from 9 before surgery to 16 one year after the surgical procedure and no dislocations were observed during the follow-up period. Complications were limited to 3 cases of early failure of fixation which required further revision surgery. This device requires a very demanding technique but is also helpful for very difficult cases: it allows cementless reconstructions and needs few bone grafting.

The painful unicompartmental knee arthroplasty

V. Sessa¹, F. Forconi¹, P. Beatrice¹

¹Ospedale San Giovanni Calibita, Fatebenefratelli (Rome, IT)

Many conditions can cause pain following unicompartmental knee arthroplasty (UKA) surgery. Most pain is related to complications such as polyethylene wear, aseptic loosening of tibial component, arthritis in non-involved compartments and patellar impingement. If any of these problems appear, the decision for revision surgery is recommended. To critically evaluate the painful UKA, the surgeon should perform a thorough history and physical examination, as well as radiography. Nevertheless, in painful UKA, cases where no complications are detected are not infrequent, neither at physical examination nor at standard X-ray, and that could generate doubts in making decisions regarding revision surgery. More investigations such as fluoroscopy, sonography, MRI, CT and nuclear scanning are often carried out, but none of them is reported as really effective. Reoperation, without a clear indication, is unwise and frequently associated with suboptimal results. The aim of this study is to review indications and timing of available diagnostic and imaging tools and to review the appearance of most common complications after surgery. Furthermore, we used CT scanning in patients with unexplained UKA postoperative pain. CT scan evaluates the dimensional congruity of tibial and femoral components, possible conditions of impingement (patellar impingement or

impingement between components) and the rotational alignment with much more accuracy than standard radiography. These are possible causes of unexplained pain in the early post-implantation period and could lead to a rapid polyethylene wear, aseptic loosening, particle-induced osteolysis and components subsidence. Periodic repeat evaluations are recommended until the etiology of pain is clearly determined, so as to assure the proper timing of revision surgery and the kind of revision, if uni or total knee.

Revision total knee arthroplasty: clinical results and patients satisfaction

F. Giacco, F. Giangrosso, F. Boniforti

Fondazione San Raffaele Giglio (Cefalù, IT)

Aim Revision total knee arthroplasty (RTKA) is a challenge procedure. To achieve satisfaction of the patient we cannot always rely on clinical and radiological results. Aim of the study is to evaluate clinical results and satisfaction in patients which have had RTKA.

Material and methods From January 2005 to December 2007 at the Fondazione San Raffaele Giglio, Cefalù, Italy, 22 patients had a RTKA. Indication for revision arthroplasty was done when pain, function, range of movement, and bone scan positive for loosening were present. A three steps technique was utilised for surgery: (1) establishing tibial platform, (2) stabilising knee in flexion, (3) stabilising knee in extension. Two-stage revision was done for septic loosening. We measured function, pain, ROM, and patient satisfaction one, 6 and 12 months after surgery. Five patients treated for septic loosening were excluded from the study. Seventeen patients were evaluated. Postero-Stabilized prosthesis with intramedullary stem (CCK Nexgen, Zimmer-Warsaw) were implanted in 7 cases, and 10 were semi-constrained prosthesis (Endomodel, Link-Hamburg).

Results One month after surgery 14 patients had knee pain, 13 patients bent the knee more than 90°, and 9 patients were satisfied. Six months after surgery 10 patients had pain, 13 patients bent the knee more than 90°, and 12 patients were satisfied. Twelve months after surgery 6 patients had pain, 13 patients bent the knee more than 90°, and 13 patients were satisfied.

Conclusions Clinical and functional results in revision total knee replacement surgery evolve during the first 12 months after surgery. Knee pain has significantly decreased from 6 months to 1 year since surgery. Patient satisfaction is strictly related to pain and less with range of motion.

Anatomical landmarks for coronal and sagittal alignment in total knee arthroplasty

G. Cinotti, A. Greco, E. Ferrari, N. Luciola, A. Della Rocca

I Clinica Ortopedica, Università la Sapienza (Rome, IT)

Objective Although satisfactory clinical outcomes are reported in most of the patients undergoing total knee arthroplasty (TKA), several

studies showed that a sub-optimal implant positioning may compromise the long-term survival of the prosthesis. Tibial alignment in both planes is commonly achieved using different anatomical landmarks. However, the reliability of such anatomical points has been scarcely investigated. In the present study, we analysed the accuracy of different anatomic landmarks for tibial cut in TKA.

Material and methods Ninety dried cadaveric tibiae belonging to the Department of Human Anatomy were analysed. In each sample the mechanical axis in the coronal and sagittal planes were identified and pointed out on the proximal and distal epiphyses. The tibiae were then positioned on a suitable frame and the projection of both mechanical axes on the tibio-talar joint, tibial crest and anterior tibial tuberosity were evaluated.

Results and conclusions The results showed a high variability between specimens in the anatomical landmarks commonly used in TKA for the tibial cut. In particular, torsional deformity in the meta-diaphyseal portion of both proximal and distal tibia may lead to inaccurate determination of the mechanical axes, particularly in the sagittal plane. The effects of this variability may be limited, and the implant positioning improved, by using concomitant anatomical landmarks during TKA.

SHOULDER ARTHROPLASTY REVISION

Revision reverse shoulder arthroplasty for unstable glenoid implant

E. Siuni¹, I. Pusceddu², B. Orrù², A. Mastellone²

¹Shoulder Surgery Unit and ²Division of Orthopaedic Surgery, Marino Hospital (Cagliari, IT)

Objective Revision of Reverse Shoulder Arthroplasty (RSA) should be offered to patients with mechanical failure of glenoid baseplate showing bone cavitory defects and reporting severe pain and poor shoulder function. The purpose of the present study was to evaluate the clinical and radiographic results obtained in the first 3 patients undergoing revision reverse shoulder arthroplasty (RSA) by hemiarthroplasty CTA without bone grafting.

Material and methods Between February 2006 and December 2007 we treated 23 patients with RSA (20 women and 3 men; mean age 71 years). Two of these patients undergoing RSA already had 2 surgeries for stabilisation of a fracture of the proximal humerus and successive hemiarthroplasty (one with infection). One patient already had hemiarthroplasty of a recent fracture. Two patients already had one operation for rotator cuff tear. Eighteen patients had no previous operations and received RSA for painful pseudoparesis due to irreparable rotator cuff dysfunction. Three patients out of 23 (13%) needed revision RSA because of mechanical failure of glenoid baseplate with severe pain and poor shoulder function. One of these 3 patients was the one who had revision of hemiarthroplasty with infection treated and healed. The other 2 patients had primary RSA. Since inadequate glenoid bone stock precluded implantation of a new prosthetic component in all 3 patients revision RSA was performed by hemiarthroplasty CTA without baseplate implantation and without bone grafting. Post-operative follow up after revision RSA was 9–12 months.

Results Radiological evaluations (Rx and CT scans) demonstrated a progressive improvement of bone glenoid defects in all 3 patients. Clinical evaluations demonstrated a significant shoulder pain relief in all 3 patients whereas shoulder function was improved in 2 out of 3 patients. As for subjective patients' satisfaction, only one patient was unsatisfied.

Conclusions Hemiarthroplasty CTA may represent a temporary rescue solution after mechanical failure of RSA in cases of severe glenoid erosion and scapular cortical bone thinning.

Mini-invasive prosthetic surgery of the shoulder: the Durom resurfacing prosthesis

S. Giannotti, V. Bottai, M. Ghilardi, G. Dell'Osso, G. Guido

Orthopaedic Clinic, University of Pisa (Pisa, IT)

It is important to emphasize that in recent years shoulder resurfacing prosthesis has returned in fashion after Copeland's experience. On the market there are different designs of these prosthesis and our broader experience has been made on the shoulder durom cup.

We reviewed 53 prostheses implanted on 50 patients from June 2004 to June 2009, 34 patients were females and 16 males (3 cases are bilaterally) with a mean age of 68.7 years old. The average follow-up was 27.5 months. For the evaluation we have based on Constant score and of course radiographic imaging.

From the review of this patient population, we can state that the indications for this type of system are very limited and must have as a key point a valid morpho-functional rotator cuff. The indication is therefore concentric osteoarthritis of scapulo-humeral joint in the presence of a normal morpho-functional rotator cuff such as necrosis of the head and RA. In cases where we have forced the indication and we have implanted a resurfacing prosthesis where there were a rotator cuff injuries, we had very good outcomes on pain, but poor recovery of the function of joints, because of the poor quality of the rotator. Thus excluding borderline cases we can state that in the proper indication the outcomes proved to be optimal also in terms of functional recovery.

Suggested readings

1. Fink B, Singer J, Lamla U, Rùther W (2004) Surface replacement of the humeral head in rheumatoid arthritis. *Arch Orthop Trauma Surg* 124(6):366–373
2. Levy O et al (2004) Copeland Surface Replacement Arthroplasty of the Shoulder in Rheumatoid Arthritis. *J Bone Joint Surg* 86-A(3)
3. Copeland SA, Levy O (2001) Cementless surface replacement arthroplasty of the shoulder. *J Bone Joint Surg Br* 83-B(2)

PAEDIATRIC ORTHOPAEDICS I

Treatment with Kirschner wires of supracondylar humeral fractures in children: review of 152 cases

M. Scaglione, G. Guido, L. Fabbri, F. Lenzi, D. Giovannelli

U.O. Traumatologia, Clinica Ortopedica, Università di Pisa (Pisa, IT)

We analyze here the results obtained in 152 pediatric patients treated for supracondylar humeral fractures. The patients were aged between 20 months and 12 years. They were treated in emergency with percutaneous synthesis and cast, according to Arino method, and evaluated with a follow-up of 5 years. We analyzed the epidemiology of these fractures and reviewed various surgical techniques used in literature.

The surgical technique was performed in emergency (within 12 hours), provided in reducing the fracture by longitudinal traction to the forearm placed in supination in order to correct possible varus or

valgus deformity, later we placed the forearm in pronation and avoided tilt of the distal fragment, and finally flexed the elbow in order to correct the angle of the two fragments. Once reduction was obtained we inserted two parallels Kirschner wires (1.5–2.0 mm) from the condyle of the humerus to medial, penetrating the fracture and finally engaging the opposite cortex of humeral bone. After the surgery, we packaged plaster for 28 days and at the end there was the necessity of a brief physiotherapy.

We also reviewed the recent literature on the biomechanics and surgical techniques.

The results were evaluated according to the criteria proposed by Flynn and according to radiological measurement of the Baumann's angle. We noted 80% of excellent results, 11% of good results, 6% of medium results and 3% of bad results related to aesthetic damage. In eleven cases we found post-traumatic nerve damage: in four cases the median nerve is involved, the radial nerve in five cases and in two cases the anterior interosseous nerve, only one patient needed a further surgery, the lysis of the nerve. The remaining patients resolved the damage spontaneously. It was not observed any acute ischemia or Volkmann's syndrome.

We have thus conducted a critical review of the surgical technique, biomechanical issues, and the obtained results. The conclusion is that this method, with the immediate stabilization, decreases the risk of nerve and vascular complications with a limited number of varus/valgus axial rotations, reducing hospitalization time and costs, and also reducing discomforts for these young patients.

Correction of pronation syndrome by subtalar arthroereisis with talar cone-shaped screw in developmental age

M. Di Stadio, F. Becchetti, S. Boero

Orthopaedics Unit, G. Gaslini Institute (Genoa, IT)

Idiopathic flatfoot in developmental age can be subdivided in two main categories. The first accounts for the higher number of cases and is represented by flatfoot without associated functional disorders requiring only orthosis with associated physiotherapy to improve the deformity. The second category accounts for the lower number of cases and is represented by flatfoot characterized by progressive worsening with subsequent onset of functional disorders that become important in adolescence and adulthood. This latter category is an indication for surgery.

The essential pathophysiological element contributing to the onset of this clinical picture is anomalous pronation of subtalar joint.

We illustrate our experience in the treatment of this condition by subtalar arthroereisis with talar cone-shaped screw.

Arthroereisis is generally performed in a single session at ages ranging from 8 to 9 years and from 12 to 13 years, i.e. when the foot has already developed but still retains some growth potential. This procedure is performed under local anesthesia by the bilateral subtalar inoculation of 5 cc of carbocaine without using a tourniquet at the root of the thigh nor any postoperative immobilization.

From 1993 to 2004, in the Orthopedics unit of the Giannina Gaslini Institute, 1,398 feet corresponding to 700 patients underwent this surgical procedure; in 698, the deformity was bilateral and in 2 unilateral. Of the 700 patients, 423 were males and 277 females. Age ranged from 8 to 14 years. Minimum follow-up was 4 years. Results were evaluated radiographically by identifying Meary axis in the lateral projection and talocalcaneal angle in the dorsoplantar

projection, and clinically by considering the following parameters: morphology, pain, motility, ability to practise sports, patient satisfaction.

The evaluation of the results obtained was extremely positive.

The talar cone-shaped screw proved to be a very good solution, in most cases requiring a single surgical session, to stabilize bone relationships of hindfoot. Simple and rapid execution associated with efficacy and preservation of anatomic integrity are some of the characteristics that made this procedure preferable as compared to other equally curative methods.

PAEDIATRIC ORTHOPAEDICS 2

Caffey-Silverman disease: case report of a familiar form

R. Marrocco, L. Oggiano, M. Venosa, S. Piantelli, F. Serra

Department of Orthopaedics and Traumatology, Catholic University School of Medicine, Largo A. Gemelli 8 (Rome, IT)

Caffey–Silverman disease or infantile cortical hyperostosis is considered a rare self-limiting idiopathic affection of early infancy. This disease is characterized by a triad of hyperirritability, bone cortical thickening and soft-tissue swelling. Caffey–Silverman disease must be carefully differentiated from fractures, bone infections, hypervitaminosis A, scurvy, syphilis, primary or secondary bone neoplasia because it requires just observation and basic medical treatment. The incidence is of 3/1000 with two subtypes, spontaneous and familiar. The familiar recurrence suggests the presence of a hereditary defect of periosteal arterioles; bacterial, viral, metabolic, immunologic causes have been investigated but the real etiology remains unknown. The mandible is the most commonly affected site. Other frequent sites are radius, ulna, femur, tibia, clavicle and scapula. Fibula, ilium and metatarsal can be occasionally involved with no involvement of the vertebrae or of the phalanges. It often shows a bilateral and asymmetric presentation. In the long bones the hyperostosis is limited to the diaphysis with no epiphysal or metaphysal involvement. Caffey–Silverman disease is a benign self-limiting idiopathic affection presenting with spontaneous healing within 6–9 months from onset.

A 6-month-old girl presented at our Department of Orthopaedics with persistent pain of both lower limbs. Radiographic evaluation showed a bilateral involvement (cortical hyperostosis) of radius, femur, tibia. At 7-days, clinical evaluation the infant presented with pain and diffused swelling of upper limbs, stiffness of the right hip and of the right knee, pain, and swelling of the mandibular region. A depth familiar anamnesis showed the recurrence of a similar clinical presentation in four elements of the same family (the mother and 3 first-cousins, healed spontaneously) as confirmed by radiographic examination. The infant showed a progressive healing in few months in absence of a specific treatment (only symptomatic therapy), as confirmed in the next follow-up visits. This infant was assessed to be affected by Caffey–Silverman disease.

Caffey–Silverman disease (infantile cortical hyperostosis) is a benign self-limiting idiopathic affection of early infancy (within the first 5–6 months). Differential diagnosis with other bone diseases is crucial for avoiding unuseful treatments and achieving good results. It is important to avoid unnecessary invasive investigations and treatments because this disease only needs a high risk of suspicion, observation and simple treatment methods.

Guided growth for angular deformities of the knee in idiopathic adolescents: minimally invasive treatment with the 8-plate

S. Boero, N. Catena, M.B. Michelis

Orthopaedics and Traumatology Unit, G. Gaslini Institute (Genoa, IT)

Introduction Adolescents often go for orthopaedic consultation due to idiopathic knee deformity. Genua deformities are not merely a cosmetic problem but a common cause of anterior knee pain in teenagers, which compromises daily activities. Conservative treatment has proven to be ineffective. Various surgical treatments have been developed to provide an alternative to the osteotomy, but surgeons are still looking for a minimal invasive approach that allows an effective and secure deformity correction. The 8-plate is an extra-epiosteal device that acts as a tension band taking advantage of the growth power to gently correct the deformity.

Material and methods 30 patients with idiopathic knee deformities were treated between December 2005 and June 2008 with the 8-plate system using the prescribed operative technique by the team of the Gaslini Institute of Genoa. All patients were encouraged to ambulate and return to activities as tolerate. They were followed clinically and radiologically during the treatment until the correction had been achieved and the plates removed.

Results There were 14 boys and 16 girls, aged between 8 and 14 (average 12 years). All adolescents had a valgus bilateral deformity ranging from 12° to 19° with an average of 14°. A total of 84 plates were implanted. The average duration of the surgery was 51 minutes (ranging from 20 to 100 min). At the beginning of September 2008, 26 patients (87%) had the plates removed with an average duration of treatment of 11 months (range 3–18 months). All the patients have corrected their angular deformities with an average correction of 1° degree per month (ranging from 0.3 to 4 degrees/month) and a total average correction of 9° (range 5°–13°). In 4 patients the hardwares were not removed even if the deformity correction had been achieved in all the cases: 3 patients were awaiting removal surgery, the other one had reached skeletal maturity and his relatives decided to not remove the plates. There were no vascular or neurological complications, no plate nor screw migrations, nor breakages and no physis were arrested.

Conclusions The 8-plate method compares favourably in terms of safety, speed and quantity of correction, and most importantly patient and relatives acceptance. It satisfies the concept of minimally invasive approach as it implies a brief surgical intervention, a short period of hospitalisation and a prompt return to daily activities.

Mini-invasive surgery for pediatric tibial spine fractures

F.M. Sénès, A. Andaloro, N. Catena

Orthopaedics and Traumatology Unit, Scientific Institute G. Gaslini (Genoa, IT)

Introduction Fracture of the tibial spine is an uncommon event in knee trauma during developmental age. The lesion is significant because of the involvement of the cruciate ligaments insertion, especially the anterior one, although the fracture is not a true articular fracture. Meyers and McKeever have proposed a classification of tibial spine fractures: (1) Type I: simple undisplaced fracture or with minimal displacement; (2) Type II: partially displaced fracture, i.e. with partial anterior and proximal displacement of the fragment; (3) Type III: completely

displaced fracture. Cast with knee hyperextension, open reduction and osteosynthesis or arthroscopic reposition are the treatments generally offered. We illustrate the preliminary data on treatment with closed reduction and stabilization with percutaneous Kirschner wires.

Methods Two patients, with type I fracture according to Meyers and McKeever classification, were treated in our Orthopaedics Unit. They underwent arthrocentesis, with aspiration of synovial fluid with blood effusion, closed reduction under spinal anesthesia and osteosynthesis with Kirschner wires to stabilize the displaced fragment. Treatment was completed by a cast with extended knee, maintained for 5 weeks. At the end of this period, cast and Kirschner wires were removed after X-ray examination. Patients kept a posterior mold cast overnight for 3 weeks; in the mean time they started rehabilitation and gait, initially aided by crutches and, after 8 weeks, without any aid.

Results and conclusions Healing of the fracture was obtained in both cases within a shorter time lapse compared to the time generally required by treatment with cast alone. At long-term follow-up, none of the patients had gait problems or anterior cruciate ligament laxity. In spite of the small case series, we believe that the proposed technique is applicable to type II fractures of the tibial spine. We also believe that the technique allows early bone consolidation, time saving and material sparing.

ORAL COMMUNICATIONS

SESSION 15

Our experience with HLS mobile-bearing total knee replacement

L. Nalbone, A. Macaione, M. Ferruzza, A. Abbruzzese, M. D'Arienzo

Clinica Ortopedica e Traumatologica del Policlinico, Università degli Studi di Palermo (Palermo, IT)

Our study has been carried out with HLS total knee mobile-bearing replacements. From 2003 to 2007 we operated 25 patients and 28 knees (3 patients had bilateral operations). 23 patients had varus or valgus knees due to osteoarthritis and among them one had serious bilateral varus deformity. Two patients with rheumatoid arthritis were operated bilaterally; in one of these a serious fracture of the tibial plateau had already taken place. The patients with osteoarthritis were between 60 and 79 years of age; those with rheumatoid arthritis were 37 and 51 years old. 18 knees were subjected to a 4-year follow-up. 4 patients operated for osteoarthritis reported moderate pain on walking for a long time and in going up and down stairs. The 37-year-old patient, suffering from rheumatoid arthritis, operated bilaterally, walks with a stick. There was no case of serious complications that has made us carry out reprosthesization.

Various studies have shown that in severe osteoarthritis of the knee, when there are macroscopic alterations in the LCA, there is also degeneration in the fibres of the LCP even if it is apparently healthy. In knees with osteoarthritis, especially in cases of serious deformity, in very elderly patients, in the outcome of complex joint fractures and in patients with rheumatoid arthritis, the anatomy and the biomechanics of the LCP present several problems in balancing the ligaments, positioning and designing the prostheses.

The HLS prosthesis is stabilized posteriorly and is of original design. It has given us favourable results comparable to other total knee prostheses.

Biomechanics study comparing mobile bearing versus fixed bearing total knee arthroplasty. Fluoroscopy and gait analysis study of 34 patients operated on bilateral total knee arthroplasty

F. Bove¹, F. Volpatò¹, L. Berti², F. Catani², S. Giannini²

¹Italian Neurotraumatological Institute (Grottaferrata, Roma, IT);

²Department of Orthopaedic Surgery, Gait Analysis Lab., Istituto Ortopedico Rizzoli (Bologna, IT)

The aim of this study is to compare at 2 years of follow-up the lower limb and knee joint biomechanics and clinical outcomes of 34 patients operated on bilateral total knee arthroplasty (TKA). The patients had in one knee a mobile bearing TKA design and on the contralateral side a fixed bearing TKA design. Surgery was performed in all patients by one of the senior surgeon (FB). Bilateral TKA was performed with a two stage procedure. The mobile bearing TKA design is the ESKA (cruciates sacrificing design, single radius of curvature of the femur and full conforming polyethylene dishing). The fixed bearing TKA design is the Stryker Skorpion CR (posterior cruciate retaining, single radius of curvature). The clinical outcome has been assessed using the American Knee Society Score (AKSS) and the WOMAC score at 6 weeks, 3, 12, 24 months after the surgery. Clinical outcomes related to the overall assessment, knee range of motion demonstrated slightly better results for the fixed bearing TKA. Gait analysis and fluoroscopy data are in processing and will be presented.

Total knee arthroplasty: how to improve longevity

G. Lensi, M. Della Monaca, M. Capone

Orthopaedic Unit of Versilia Hospital (Lido di Camaiore, Lucca, IT)

Total knee prosthesis is one of the most frequent surgical procedure performed in Orthopaedic Units. Many factors are important in order to obtain excellent results and reduce failures. Some of these are relative to implant and others to the surgical technique. We describe prosthesis characteristics and some devices of the surgical technique, considered very important to improve surgical results and therefore prosthesis longevity.

Stiffness in total knee arthroplasty

A. Schiavone Panni, S. Cerciello, M. Tartarone, M. Vasso, D. Santaiti, C. Mazzotta

University of Molise, Department of Science for Health (Campobasso, IT)

Stiffness is a multifactor and uncommon complication after total knee arthroplasty. Its definition is still debated, however most of the authors define it as a painful limitation in the postoperative range of movement (ROM). Its pathogenesis is still unclear although some risk factors have been identified. They can be divided into three groups: patient related factors, intraoperative and postoperative factors. Preoperative factors include a wide spectrum of conditions. Among these, preoperative ROM is the most important, even if an association with diabetes, reflex sympathetic dystrophy, and general pathologies such as juvenile rheumatoid arthritis and ankylosing spondylitis has been demonstrated. Moreover, multiple surgery of the involved knee, may

represent an additional source of stiffness. Factors related to the surgical technique represent the most common cause of stiffness: they include errors in soft tissue balancing, components malpositioning and incorrect component sizing. Finally, postoperative factors include infections, arthrofibrosis, heterotrophic ossifications, and incorrect rehabilitation protocol. They represent difficult challenges for the orthopaedic surgeon both in terms of diagnosis and treatment. Infections should always be suspected in case of difficult and painful rehabilitation and their treatment may require long periods of antibiotics administration.

Arthrofibrosis and heterotrophic ossifications are frequent causes of stiffness and may be caused by an improper postoperative rehabilitation protocol. Thus an accurate pain management and an aggressive rehabilitation are mandatory for a good functional recovery. Once the stiffness is recognized and the pathogenesis is understood several treatment options may be proposed.

Even though closed manipulation, arthroscopic or open arthrolysis have been proposed, they may lead to unpredictable results and incomplete ROM recovery. Revision surgery represent the best option in case of well documented surgical errors. Since these operations are technically demanding and may be associated with high risk of complications they should be accurately planned and properly performed.

SESSION 16

Medium-term results of modular SPH acetabular cup

G. Cinotti, E. Ferrari, N. Luciola, F.R. Ripani, F. Postacchini

I Clinica Ortopedica, Università la Sapienza (Rome, IT)

Objective In the presence of extensive periacetabular bone loss, revision cages with iliac and ischiatic or obturator fixation have been successfully used. The cage, avoiding excessive loads on the graft material, promotes its maturation and incorporation until periacetabular bone ingrowth takes place. Currently used implants including a polyethylene cup cemented within the cage, led to satisfactory results at medium-long term. However, the presence of a triple interface between the cup and host bone could limit the longevity of such implants. Aim of this study was to analyze the medium-term results of a non-cemented modular revision cage.

Material and methods From January 2000 to December 2006, 23 non-cemented acetabular cages were implanted. The cup has multiple holes for fixation in the residual periacetabular bone, a triple wing for iliac bone fixation and an obturator hook. A metal back is connected to the cage through 3 interconnecting screws with the same orientation of the cage or with an inclination and/or anteversion of 20° with respect to the cage. Preoperative diagnosis included aseptic and septic loosening in 19 and 3 cases, respectively, and previous acetabular fracture in 1. All patients were followed-up clinically and radiographically 3, 6, 12 months after surgery and after a minimum of 3 years.

Results Radiographic results at the latest follow-up showed a satisfactory cup positioning in 19 patients with apparent incorporation of the cage. In one patient in whom the cage showed a vertical alignment from the index surgery, an early aseptic loosening occurred with subsequent cup revision. In other 2 patients periacetabular radiolucent lines were observed which, however, did not change over time. Three patients showed a failure of the iliac fixation (rupture of iliac wings of the implant) which did not influence the clinical outcome. Nineteen patients (83%) reported satisfactory clinical outcomes.

Conclusions The SPH modular acetabular cup led to satisfactory results in the majority of the patients analyzed at medium-term

follow-up. The unsatisfactory results were mainly due to a non-optimal implant positioning at the index operation. Long-term follow-ups should evaluate whether the absence of cement interface between the liner and the cage may improve the longevity of the implants or, on the contrary, whether the interface between the cage and the metal back may represent an additional source of debris leading to periprosthetic osteolysis and loosening of the implant.

Mini-invasive anterolateral approach in THR

U. Fusco, R. Bonaglia, D. Farioli, M. Ghignone, R. Sottocasa, F. Pizzetti, M. Lodi

U.O. Ortopedia e Traumatologia, Ospedale di Tradate (Tradate, Varese, IT)

Mini-invasive does not mean small scar, but preservation of internal tissues. Modified anterolateral approach [1, 2], passes between the gluteus medius muscle and the tensor fasciae latae like the traditional one. The modification consists in not cutting the gluteus medius and preparing the femoral canal by means of crossing the operating leg in hyperextension, adduction and external rotation, under the contralateral one. This solution allows to preserve an intact medius gluteus and makes the approach atraumatic. The supine position makes easier the cup orientation, the legs discrepancy check and also the anaesthesiologist takes advantage by this. Posterior structures are not damaged by this approach and the risk of dislocation is much lower. It is possible to perform this approach on the regular operating table and also on the orthopaedic traction table. We prefer to use the regular one preparing both legs. In this way it is easy to switch to the conventional Watson-Jones approach, that could be useful during the learning curve. We have been operating 53 patients since July 2008. We have been using Zymuller stems in all cases. Radiographic results are comparable to the traditional approach. Short terms clinical results are definitely better. Patients walks easily with two sticks since the second postop day; they stand up without problem from the chair. They do not have to observe any particular restriction and their rehab program is very quick. We have had two complications: one superficial infection of the wound solved by means of antibiotic treatment and one hematoma that healed by itself. The modified anterolateral approach with the operating leg in hyperextension, adduction and external rotation, crossed under the contralateral one is enough easy and reproducible. The supine patient position allows a good prosthetic components orientation. It is at low risk of complications and it enables a quick rehabilitation program.

References

1. Bertin KC, Rottinger H (2004) Anterolateral mini-incision hip replacement surgery: a modified Watson-Jones approach. *Clin Orthop Relat Res* 409:248–255
2. Pfluger G, Junk-Jantsch S, Scholl V (2007) Minimally invasive total hip replacement via the anterolateral approach in the supine position. *Int Orthop* 31:7–11

ALDI (Anterior Lateral Decubitus Intermuscular) approach: new developments in total hip arthroplasty with anterior approach

S. Carta, M. Fortina, D. Scipio, P. Pichierri, A. Riva, P. Ferrata

Azienda Ospedaliera Universitaria Senese (Siena, IT)

The developments of arthroplastic surgery recently mainly focused on the possibility of performing joint replacement causing as little harm

as possible while fully protecting the muscular and tendon structures, as well as and the vascular and nervous ones.

In our experience, the most widely used access was Bauer's lateral direct approach, with the patient in lateral decubitus position on a traditional bed, while the posterior lateral one was used for selected cases only, such as congenital hip dysplasia or iliac dislocation of the femoral head.

In the past, to us and to most surgeons, the most important issue within replacement surgery was the obvious need to place the prosthetic components in the right position. It was therefore necessary to have an adequate view of the acetabulum and the femoral metaphysis, sometimes entailing more extended surgical access than necessary ("large access, great surgeon"). In addition, the shape of the femoral stems demanding introduction along the diaphyseal axis, required greater trochanter's adequate isolation as well as the sacrifice of a lot of its bone during the preparation of the femoral canal.

Recently, the study of smaller femoral stems, an evolution of previous ones which had already proven effective, the possibility of a curvilinear insertion rather than an insertion along the diaphyseal axis and the attempt to protect the periarticular structures led the need of Tissue Sparing Surgery.

This development in the orthopaedic scenario first allowed us to reduce the size of surgical accesses through minimally invasive direct lateral approach with the patient still in lateral decubitus position. Direct lateral access, however, requires an incision of tendon and muscular structures even in its minimally invasive technique, and we therefore started thinking of performing hip replacement with an approach that would wholly protect the periarticular structures, without having to revise our experience in terms of patient position, preparation of the operating field and position of the surgeon during surgery at the same time.

The goal was that of leaving the acquired knowledge unchanged and, above all, to preserve unchanged the anatomical landmarks (especially on the acetabulum) that had previously been developed and consolidated for the correct positioning of the prosthetic components. The only hip access that really safeguarded the periarticular structures, was the anterior one (or ileofemoral/Smith Petersen), which actually entailed placing the patient in supine decubitus position, with obvious drawbacks in preparing the operating field and a complete change of the anatomical landmarks for the surgeon. We therefore wanted to combine the advantages of the anterior access with the obvious ones linked to the lateral decubitus position, while leaving the surgeon in the traditional position for the replacement of the acetabulum. The result was the access that we currently use in most cases of primary hip arthroplasty: the anterior lateral decubitus intermuscular approach: (1) patient in lateral decubitus position; preparation of the operating field the same as that of lateral direct and posterior-lateral access; (2) no special bed or supports required; (3) the inferior limb can be easily moved to gain the most favourable position; (4) anterior surgical access with a 10 cm longitudinal incision along the anterior 1/3 of the tensor fasciae latae; (5) surgeon placed traditionally on the posterior side of the patient during the acetabular time.

A new single block conical stem in hip arthroplasty and new indications

A. Belluati, E. Lupetti, C. Goretti, Y. Rizquallah

AUSL Ravenna, U.O. Complessa di Ortopedia e Traumatologia, Ospedale S.M. delle Croci (Ravenna, IT)

Good articular functionality and implant stability are consequent to a perfect biomechanical reconstruction. There are many options in order to obtain the best results, first of all the choice of the fittest

protesic offset for the patient that help us to obtain the best stability. Stability is crucial to avoid luxation risk. Primary mechanical stability (and resistance to torsion strengths) is also necessary to obtain cohesion between stem and bone.

ADR stem has been recently introduced in some important Units. It is a conic uncemented femoral stem with a circular symmetric section, which allows us to modify anteverision and/or retroversion without changing the preparation of the femoral canal during the surgical operation. This stem is provided with a system with two offset options for every size, so that we can modify abductor muscles strength without changing the position of the articular rotation centre. Besides, ADR stem is provided also with 8 longitudinal wings, as long as the stem is, with the same high, to get an extraordinary rotational stability.

Previous experiences with similar stems were crucial to obtain today this new product, which has a bigger contact bone surface to get a better stability. It is important to consider that we can choose between two offset options even if this is a single-block structure. We can use this product for normal arthritic hip, and even for more difficult cases, even in that cases where it is important to fix the off-set and the anteverision. Therefore, our best indications are for primary coxarthrosis, hip dysplasia, pelvic corrective osteotomy, coxa vara and coxa valga, fractures and femoral neck osteotomy.

The use in our Unit of this device has so far confirmed in 15 cases treated in total hip arthroplasty characteristics and capabilities even in so-called “difficult” hips to correct angle and torsional defects towards the search for the best offset.

In selected cases ADR stem was implanted in patients with medial fractures of the femur neck associated with great trochanteric fractures, even in combination with biarticular endoprostheses domes where there was no indication to total implant, and in all those patients where there was the need of finding a good distal fixation to obtain a good primary stability. The 20 cases so far treated in this way, with the limits of the short average follow-up (3 months), provided promising both clinical and radiographic results, and therefore constitute an incentive to pursue a deeper study on the validity of the indication.

Short term evaluation of periprosthetic bone mass loss in collum femoris preserving stem (CFP)

R. Cecchinato¹, R. Gogue², U. Mezzadri¹, G. Frascini¹, P. Sirtori¹

¹IRCCS San Raffaele (Milan, IT);

²Specialization School in Orthopaedics and Traumatology (Perugia, IT)

Periprosthetic bone resorption in hip prosthetic surgery is nowadays an open debate in the scientific international community, being considered one of the main causes of prosthetic mobilization. Design and material features of prosthetic stems, associated with particle-related loosening, are thought to play a fundamental role in determining prosthesis' longevity. We decided to analyse periprosthetic bone mineral density variations in a femoral neck preserving stem (CFP), that's an hydroxyapatite-coated component that preserves femoral neck, with morphological and material features thought to be ideal for an optimal spreading of loads in the proximal third of the femur.

Periprosthetic bone mineral density (pBMD) had been studied in 28 patients that underwent a first total hip arthroplasty with a CFP stem. pBMD had been evaluated with DEXA scans (Hologic QDR 4500 with a metal removal software). Densitometric analysis had been done in the first week after surgery and after 3 and 6 months.

pBMD analysis in these patients demonstrated the great osteointegrative capacity of this stem, having a bone mass variation (−4.5% and −5% at 3 and 6 months after surgery, respectively) firmly lower than those had by other stems. Stems like ABG II, MH and CLS demonstrated in

literature a worse behaviour of periprosthetic bone density than in CFP, indirect sign of a better osteointegration and of a more physiologic spread of loads in the proximal metaphysis of the prosthetised femur.

SESSION 17

TTS (Tissue Sparing Surgery) in total cementless hip arthroplasty with neck femur preservation: our experience with TOP and Betacup acetabular component

G. Turi, M. Bonato, P. Barbera, S. Santini, T. Maluta

Regional Hospital “S. Bortolo” (Vicenza, IT)

The concept of hip arthroplasty with tissue sparing surgery is based on the use of a conservative prosthesis. The CFP stem represents the evolution of the Biodinamica prosthesis. The CFP reproduce the geometry of the proximal femur according to the CCD angle of 126° (this the average value of normal femur), the elitorision (combination of 10° of anteverision and 14° of antetorsion) and the two available curvatures (A and B). The TOP cup is hemispheric and it have a bi-equatorial polyethylene insert, while the Betacup provides the option of using ceramic Biolox Delta insert.

From 01/08/2002 to 31/01/2009 we implanted 843 total hip prostheses and in 123 patient we used a CFP stem (15% of all prostheses). TOP cup implanted were 96, with polyethylene-ceramic and 28 mm diameter in femur head. The Betacup was implanted in 25 patients with ceramic-ceramic combination and 36 mm diameter femur head. In 2 patients was realized a combination with cementless Fitmore cup and CFP stem. The indications were 98 osteoarthritis, 19 avascular necrosis, 2 post-traumatic arthrosis, 2 psoriasis arthritis and 2 dysplasic arthrosis.

The surgical approach was antero-lateral in 70% and direct lateral in 30%, with respect of the minimal invasion surgery as possible.

We compared the clinical results of the two different surgical approaches, as regards blood loss, time of weight bearing and ROM evaluation. Furthermore we compared the results at short and medium follow-up as regards the ROM in patients with TOP or Betacup acetabular component. In our experience we found no difference between antero-lateral and lateral surgical approach, in relation to functional outcome, time of weight bearing, pain and especially for blood loss. In fact, from 2008 patients going to hip surgery did not make blood self donation, because they did not need transfusion after surgery. We did not report dislocation, periprostheses calcification more than 2° grade according to Brooker, septic or aseptic failure of the implants. In patient treated with Betacup component, the subjective and objective results regards ROM was reported just like a “normal” hip. Furthermore, we found no clinical differences between young and old patients at follow-up. In our experience, we can say that CFP prosthesis can be implanted in patients aged more than 70 years, as long as they have a good cancellous bone without osteoporotic disease.

Fitmore stem: preliminary results and evaluation of surgeon's learning curve

P. Caldora, D. Lup, A. Baldini, P. Indelli, R. Guarracino

U. O. Orthopedia e Traumatologia, Ospedale S. Margherita Valdichiana (Cortona, IT); AUSL 8 (Arezzo, IT); Casa di Cura S. Chiara (Florence, IT)

Introduction As the number of young and active patients undergoing THA is increasing, there is more and more need of using new uncemented prosthetic designs which may allow both contemporary restoration of the length and offset and the saving of bone stock. The authors report the preliminary results of their experience with Fitmore Stam (Zimmer, Warsaw, Indiana, USA), which has a design planned to preserve the bone stock and allows the saving of the trochanteric region and of the soft tissues with an optimal restoration of the anatomy through the perfect combination of the medical bending and the offset. The purpose of the study was the evaluation of intra-operative and early post-operative complications, the positioning of the prosthetic intra-operative components, the preliminary clinical and X-ray results and above all the surgeon's learning curve.

Material and methods 40 Fitmore stems were implanted at our units from January 2008 to June 2008. We used the Durom system in 20 cases, the Trilogy cup in 15 cases and a TMT modular cup in 5 patients. Twenty-one patients were men and 19 were women, the average age was 53 (range 29–68). In all the cases we performed a mini postero-lateral approach. The pre and post-operative evaluation was done using the Harris Hip Scores (HHS). The post-operative x-ray analysis was performed to evaluate the correct positioning of the components compared to the pre-operative planning.

Results At an average follow-up of 9 months (range 6–13 months), the clinical X-ray results have been good and satisfactory in all the patients. We have not detected any cases of luxation, infection or aseptic early mobilization. We have always been able to restore the planned length and offset during the operation. In 95% of cases the size of the stem corresponded to the planned one.

Conclusions The Fitmore stem represents a correct and progressive evolution of the right, un cemented stems used so far, even having the same initial press fit it allow the saving of trochanteric bone stock, and inferior percentage of ectopic post-operative ossification, very good versatility with the consequential restoration of the length and offset. In our short experience the Fitmore stem represents a reliable choice and a safe procedure with the possibility for the surgeon to learn quite more about the problem even if longer follow-ups are necessary to evaluate the long-term percentage of failure.

Hip arthroplasty using a short modular stem: navigation versus conventional free-hand

N. Confalonieri, A. Manzotti, F. Montironi, D. Piccinini

1st Orthop. Dept., CTO Hospital (Milan, IT)

Introduction Discrepancy of leg is often considered as a significant problem after Total Hip Replacement (THR) and has been associated to patient dissatisfaction. In cup and stem navigation advantages are not limited to a better positioned acetabular component but even to a real-time limb length, lateral offset and ROM assessing. Furthermore the introduction of modular stem offers to surgeon more option in following what suggested by navigation. We performed a matched paired study between 2 groups: computer assisted THR (Ca-THR) versus conventional freehand techniques for primary hip arthritis. We hypothesized that Ca-THR permits a significant better control on leg length discrepancy and offset restoration with an improved outcome and lower rate of dislocation.

Material and methods From April 2006 to June 2008, 32 patients with primary hip arthritis, who underwent a Ca-UKR using used a CT-free computer assisted alignment system, were included in the study (group A). Every single patients in group A was matched with a patient who had undergone a conventional free-hand THR (group B) between February 2006 and May 2008. In both the groups the same postero-lateral approach was used to implant the same prostheses with

a modular short stem. Criteria of matching were age, sex, arthritis level and pre-operative limb length discrepancy. Pre- and post-operatively both limb discrepancy and offset restoration were assessed radiologically with a digital software. Furthermore, at latest follow-up the clinical outcome was evaluated using the Harris Hip Score and any dislocation was registered.

Results There were no significant differences in pre-operative limb length discrepancy between the 2 groups. The surgical time was statistically longer in group A. Post-operatively in group A the mean discrepancy was reduced to 0.3 cm with no cases of discrepancy greater of 1 cm. In group B the mean discrepancy was reduced to 0.8 cm but with 2 cases of discrepancy greater of 1.0 cm. The post-operative offset was statistically closer to the pre-operative values in group A. We registered a post-traumatic dislocation in group B.

Discussion According to our experience, despite a longer surgical time, navigation of both stem and cup in THR permits a further significant better control of limb length discrepancy and offset restoration. In the computer assisted group we did not register any dislocation until the latest follow-up. We believe navigation in total hip replacement as a valuable tool to lower complications and improve implant performances/survivorship.

SESSION 18

Mini-invasive technique of derotative osteotomy by endomedullary nails

S. Reverberi

Struttura Semplice di Chirurgia Ortopedica Funzionale, Arcispedale S. Maria Nuova (Reggio Emilia, IT)

Introduction Derotative osteotomies were commonly performed by means of plate osteosynthesis. The use of plates requires a rather long incision, is accompanied by significant blood loss, rarely allows the immediate or early weight bearing and in some cases, especially in the presence of osteoporotic bone, we saw hardware mobilization or rupture. To overcome these problems we began to use locked endomedullary nail in derotative osteotomies, femoral and tibial; we report our results on claims, bone healing, post-operative pain, observed complications.

Material and methods From 2004 to 2008 we operated 18 patients, aged between 12 and 28 years, suffering from significant torsional defect of the lower limbs. Treatment consisted in the correction of deformity using transverse or tibial femoral osteotomy and endomedullary blocked nailing. Skin incisions were of minimum size and are all healed by first intention. Derotative osteotomy was actually a compattotomy performed through a surgical incision of up to 1–1.5 cm. We did not apply any immobilization. The results, clinical and functional characteristics, were compared with those of similar osteotomies with plate.

Results All osteotomies healed at final inspection. We did not limit weight bearing in the post-operative, as far as pain was tolerated by the patient. In many cases weight bearing was complete after 30–40 days. X-rays showed bone healing in all cases within 90 days. Motor recovery and functional status was closely related with the size of the initial neurological injury. The disturbances that we observed were minimal and rare, mainly due to bruising or hematoma at the osteotomy or screws. We did not encounter any major complications such as infection or nerve damage or vascular.

Discussion We studied the results of femoral and tibial derotative osteotomies by endomedullary nailing and plates; in both cases we found an excellent healing of the osteotomy, although the technique

with locked nailing has a lower morbidity, does not require the use of gypsum and allows a more rapid weight bearing.

Suggested readings

1. Chapman ME, Duwelijs PJ, Bray TJ, Gordon JE (1993) Closed Intramedullary Femoral Osteotomy: Shortening and Derotation Procedures. *Clin Orthop Rel Res* 287:245–251
2. Massobrio M, Lucarini F, Esposito C, Postacchini F (2005) Interlocked nailing in comparison to external fixation in deformities of the inferior limb. *J Bone Joint Surg (Br)* 87-B [Supplement II]:189

SESSION 19

Prospective randomized study to evaluate the effect of a new method of intraoperative coagulation by radiofrequency bipolar sealer versus conventional method by electrocautery in total knee replacement surgery

D. Lup, P. Caldora, E. Nizami, R. Guarracino, M. Zucchini

U.O. Ortopedia e Traumatologia, Ospedale S. Margherita Valdichiana (Cortona, IT)

Objective The aim of this prospective, randomized study is to evaluate the effect of a new irrigated radiofrequency bipolar sealer (Aquamantys 6.0™, Salient Surgical) on blood loss and postoperative recovery in patients undergoing total knee replacement (TKR).

Material and methods Forty patients undergoing primary TKR were randomized in two groups. The group A consisted of twenty patients in which the bipolar sealer Aquamantys 6.0™ was used, while the group B consisted of twenty patients in which a conventional electrocautery was used. Exclusion criteria were: grave heart diseases, platelet level <150,000, serious vascular peripheral diseases, known coagulation diseases, haemoglobin (Hgb) pre-operative <12g/dl, haematocrit (Hct) pre-operative <36%. The protocol includes detailed clinical examinations during the stay in hospital, before surgery and 4, 24 h, 3 days after surgery, and on the day of discharge; besides that, clinical examinations after 1 and 3 months. In all the patients we used the same antithrombotic prophylaxis, always haemostat loop, the same surgical technique, the same implant, and the same rehabilitative protocol.

Results The evaluated criteria were: loss of blood during the operation, minimum level of postoperative haemoglobin, postoperative haematomas, number of transfusions, reduction of edema and pain, postoperative ROM. The decrease of haemoglobin level in group A was 17% to that of group B and even if the difference is not statistically relevant there is a trend towards significance in the study group ($p = 0.088$). We found that the minimum value of Hgb postop and the minimum value of Hct postop were statistically lower in group A. The blood loss was lower in group A, but the difference is not statistically relevant. We have detected as secondary aims in group A: a significant reduction of pain up to 3 months, a statistically significant faster functional recovery which stops after 3 months, a significant reduction of hematoma and edema together with a statistically faster recovery of ROM in the immediate post-operative period up to 1 month.

Conclusions Although we did not detect statistically relevant differences concerning the total blood loss in the two groups, even considering lower values in the study group, the clinical results in the period immediately after the operation were clearly better in the Aquamantys study group.

Short-term results after reverse shoulder arthroplasty (Delta III)

L. Murena¹, F. Valli¹, F.A. Grassi², P. Cherubino¹

¹Orthopaedics and Traumatology Department, University of Insubria (Varese, IT);

²Orthopaedics and Traumatology Department, University of Piemonte Orientale (Novara, IT)

The purpose of this study was to describe the clinical and radiographic results and complications of the Delta III reverse prosthesis. Between January 2000 and January 2005, 24 women and 2 men aged 62–84 (mean 75) years underwent total shoulder replacement using a Delta III reverse prosthesis. Patient diagnoses were massive rotator cuff tear ($n = 20$), disabling sequelae of proximal humeral fractures ($n = 3$), and failure of an unconstrained arthroplasty ($n = 3$). Clinical and functional results were assessed using the Constant–Murley scale. Active range of motion (ROM) was measured. Scapular notching and radiolucent lines around the humeral component were evaluated using radiographs at 3, 6, 12 months and then annually. We evaluated also patient satisfaction by direct interview. 23 patients were followed-up for 26–86 (mean 44) months. Two patients had loosening of the glenoid component (at 6 months and 5 years) and underwent revision surgery. There were no instances of infection, instability, or acromial fracture. The mean value of Constant–Murley scale at pre-op evaluation was 23.2 (range 12–52) and at the final follow-up evaluation was 55.6 (range 33–68). Only active elevation improved significantly after surgery, 66° (range 10–110) pre-op to 132° (range 70–160) at the final follow-up evaluation. 12 patients were completely pain-free, 9 complained of slight pain, and one complained of moderate pain. The severity of scapular notching progressed with time (65% at 1 year, 90% at 3 years and 6/6 patients at >5 years follow-up). 15 patients were satisfied with the treatment, 6 were partially satisfied and 2 were unsatisfied. The Delta III prosthesis restores shoulder function but has biomechanical limits. Its use should be limited to elderly patients with severe impairment of the glenohumeral joint. Scapular notching is a main concern for the long-term survival of the implant.

SESSION 20

The prevalence of concomitant pathologies and smoking habit in patients with rotator cuff tear

A. Rita, V. Arceri, S. Carbone, S. Gumina

Department of Orthopaedic Surgery, University “La Sapienza” (Rome, IT)

Purpose The aim of our study was to establish if concomitant heart diseases, peripheral vascular diseases, lung diseases and smoking habit may increase in the incidence of cuff tear and influence the size of rotator cuff tear.

Material and methods We studied 203 consecutive patients (93 males, 110 females) mean aged 64 years (range 41–68) with a chronic full-thickness postero-superior rotator cuff tear. Dimension of the tendon tear was determined in each patient at the time of operative intervention. A medical history evaluating the presence of

comorbidities (hypertension, diabetes, hypercholesterolemia, arrhythmia, myocardial ischemia, lung diseases), duration of therapy and smoking habit was submitted to the studied cohort. 200 volunteers (97 males, 103 females) mean aged 66 years (range 45–70) without shoulder pathologies were recruited as the control group.

Results The prevalence of hypertension was 38.9 and 28.5% in patients with rotator cuff tear and in control group, respectively. The prevalence of hypercholesterolemia was 21% in patients and 11% in control group ($p < 0.032$; $p < 0.041$). Among those who had medical therapy for hypertension longer than 5 years 65% had rotator cuff tear and 35% belonged to the control group ($p < 0.024$). The prevalence of all pathologies responsible for peripheral vascular deficiency was 69 and 55.5% in patients and control group ($p < 0.027$). We observed 47 small, 99 large and 57 massive cuff tears. The prevalence of hypertension in patients with small, large and massive tear was 25.5, 39.4, and 49.1%, respectively. The prevalence of hypercholesterolemia was 12.8, 24.2 and 22.8% in patients with small, large and massive tear. The difference between patients with small tear and patients with large and massive tear was significant ($p < 0.025$; $p < 0.028$). The prevalence of smokers was 29% in patients with rotator cuff tear and 27% in control group ($p > 0.05$).

Conclusions Hypertension and hypercholesterolemia were correlated with prevalence and size of rotator cuff tears. These pathologies may be associated with hypoxia of tendons. The consequent degeneration may predispose to the cuff tear.

Level of evidence Level IV, case prognostic series.

Results of conservative treatment in patients with subacromial impingement associated with scapula dyskinesia

V. Bellotti, A. Cozzolino, P.G. Manna, B. Corrado, D. Rosa, C. Milano

Department of Orthopaedic Surgery, University Federico II (Naples, IT)

Objective We report 12 cases of subacromial impingement linked to scapula dyskinesia successfully treated with conservative treatment. Patients with scapula dyskinesia could clinically present a subacromial impingement caused by an excessive anterior acromion tilt. This kind of external impingement is dynamic and must be distinguished from degenerative rotator cuff tears or impingement linked to a Bigliani type II or III acromion, as therapeutic options differ. Clinically, patient's age is frequently less than 40 years, Neer, Hawkins and Jobe test are often negative. X-rays are usually negative and MRI may show bursal sides partial tear of supraspinatus tendon. Observation of scapular rhythm from the lateral and the posterior side of the patient is fundamental.

Material and methods All patients were aged under 45 years (min 27, max 45). Constant score is not so reduced in this pathology as strength and motility are usually normal. We observed a mean value of 89 pts (min 83, max 96), with pain value most commonly affected (mean 6 in a scale ranging from 0 to 15, where 0 is no pain). A protocol consisting of daily isometric and isotonic strengthening of both scapulo-thoracic and rotator cuff muscles was adopted. A subacromial infiltration with triamcinolone 40 mg/1 ml and Carbocain 1%/4 ml was used in 10 out of 12 patients to control pain at the beginning of treatment. We followed-up our patients monthly for min 6, max 10 months.

Results After 2 months, pain reduced on the VAS to a mean value of 2 (min 0, max 3), Constant score raised to a mean of 94 (min 92, max

100). Results were stable at 6 months. One patient who stopped exercises after 4 months of daily therapy, came back after 8 months from the diagnosis for a new comparison of pain.

Conclusions In our small series, conservative therapy is successful to reduce pain in patients suffering from subacromial impingement caused by scapula dyskinesia. However, the results of this treatment are not permanent and exercises must be repeated daily also in absence of pain.

Suggested reading

1. Burkhart SS, Morgan CD, Kibler WB (2003) The disabled throwing shoulder: spectrum of pathology Part III: The SICK scapula, scapular dyskinesia, the kinetic chain, and rehabilitation. *Arthroscopy* 19(6):641–661

SESSION 21

Resection-stabilization of the caput ulnae according to Darrach in the RUD joint's pathology

R. De Vitis, V. Cilli, F. Fanfani, G. Taccardo, A. Pagliei, S. Serpieri, F. Catalano

Complesso Integrato Columbus, U.C.S.C. (Rome, IT)

Introduction When there is a ulno-carpal conflict or an inveterate radio-ular instability or an inveterate dislocation of the caput ulnae or a primitive or secondary arthritis of the RUD, the surgical treatments described in literature are fundamentally the followings:

1. complete resection of the distal extremity of the ulna according to Darrach or selective resection of the caput ulnae Bowers;
2. distal radio-ular arthrodesis with creation of a proximal non-union in ulnar metadiaphysis according to Sauvé–Kapandji;
3. prosthesis of the ulnar head;
4. tenoarthroplasty for triangular fibrocartilage's reconstruction with redress of the length of the bony segments (Atzei A., Luchetti R. and others).

Material and methods Ours study consists in an analysis of the results related to patients treated in our Operational Unit, between 1997 and 2008, with resection-stabilization of the caput ulnae according to Darrach. We underwent 255 wrist resections of caput ulnae according to Darrach, diagnoses were as follows:

- 156 cases (61.17%), post-traumatic condition in which ulno-carpal conflict resulted from fracture of the radio, inveterate dislocation of the RUD, secondary arthritis of the RUD;
- 69 cases (27.05%), rheumatic pathology with sub-dislocation or pathological dislocation of the caput ulnae and possible tendon's injury;
- 16 cases (6.28%), post-traumatic inveterate radio-ular instability;
- 14 cases (5.59%), primary arthritis of the RUD.

Results All the patients were satisfied and recovered a good movement of the wrist, particularly of the prono-supination. Only in some cases a partial recovery of the prono-supination occurred, results were never inferior to 120° total. Only in some cases the patients complained deficit of strength.

Conclusions The reconstruction of the radio-ular complex with redress of the length of the bony segments is still little documented and however a surgical treatment is reserved to young patients with recent injuries. The Sauvé–Kapandji surgical technique described in 1936 for the treatment of the inveterate dislocations of the distal radio-ular joint, although still very used, sets the problem of the secondary instability of the proximal ulnar stump so much more

marked and hardly corrigible as wider and proximal results the level of segmentary resection of the ulna. The prosthesis of the caput ulnae is also today in the more authoritative casistic burdened from a percentage of complications between 12 and 20%. In our opinion the resection–stabilization of the distal extremity of the ulna according to Darrach today represents the surgical treatment of election in the ulno-carpal conflict and in cases selected in the radio-ulnar instability because it allows to eliminate the ulno-carpal conflict and the distal radio-ulnar incongruity to benefit of the recovery of the prono-supination having care to avoid the instability of the proximal ulnar stump for which a good dorsal capsular plastic must be realized with ri-tension of the extensor's tendon retinacula and the dorsalization of the tendon of the ECU's tendon.

Suggested readings

1. Darrach W (1913) Partial excision of lower shaft of ulna for deformity following Colles fracture. *Ann Surg* 57:764–765
2. Sauvè I, Kapandji M (1936) Nouvelle technique de treatment chirurgical des luxations recidivantes isolees de l'extremite inferieure du radius. *J Chirurg* 47:589–594
3. Lichtman DM, Ganocy TK, Kim DC (1988) The indication for and techniques and outcomes of ablative procedures of the distal ulna: the Darrach resection, hemiresection, matched resection and Sauvè–Kapandji procedure. *Hand Clin* 14:265–277

Utilisation of RCPI prosthesis in post-traumatic chronic disease of wrist

A. Marcuzzi, A. Russomando, A. Landi

Struttura complessa di Chirurgia della mano e Microchirurgia, Azienda Ospedaliera Policlinico di Modena (Modena, IT)

Objective We report our experience about the surgical procedure of proximal row carpectomy associate to resection of capitate head and prosthetic replacement with Resurfacing capitate pyrocarbon implant (RCPI), performed on 20 patients suffering from scaphoid non union advanced collapse (SNAC) at III and IV stage and semilunate advanced collapse (SLAC) at III and IV stage.

Material and methods Between 2003 and 2008, 20 patients underwent proximal row carpectomy associated to prosthesis replacement of capitate head (17 men, 3 women, mean age 51, range 75–22); eleven patients suffered from SNAC at III and IV stage, 8 from SLAC at III and IV stage, and one had a Fenton lesion (dislocated fracture of capitate head). Compromised cartilage surface of capitate head was the basic indication to RCPI implantation. We performed a dorsal surgical approach because it is the most adequate to achieve a good exposure of capitate head and a correct implantation of RCPI. The results were assessed with the use of pre and post-operative clinical and radiographic studies, and measurements of active and passive range of motion, grip strength, pulp and key pinch strength. The mean follow-up was 21 months.

Results No implant break or luxation was encountered at radiographic studies. Post operatively pain relief was achieved in all patients, with the exception of one who complained moderate pain after long lasting efforts. Wrist motion and grip strength were found improved, they reached more than the 80% compared to the uninvolved side.

Conclusions We conclude that this kind of surgical procedure represents a good alternative to total and partial wrist arthrodesis.

Suggested reading

1. Van Amrongen A, Schuurman AH (2009) Four-corner Arthrodesis using the Quad memory staple. *J Hand Surg (European Volume)* 34E.2:252–255

SESSION 22

Arthrodesis radio-scapho-lunate with excision of the distal scaphoid pole: our experience

N. Galvano, A. Abruzzese, A. Macaione, A. Parlato, M. D'Arienzo

Department of Surgical and Oncology Disciplines, Orthopaedic and Traumatology Unit of Palermo University (Palermo, IT)

Objective The degenerative alteration of the articulation radio-scapho-lunate is frequent and it can be related to many post-traumatic or degenerative pathologies. The arthrodesis radio-scapho-lunate with excision of the distal scaphoid pole can be proposed. The objective of our study is precisely to describe the different stages of this technique and to introduce the results through a series of cases.

Material and methods Six normal medio-carpal articulation patients, with an alteration of the radio-scapho-lunate articulation, were operated. We performed a stabilized arthrodesis with threads of K. through the dorsal access. The excision of the distal scaphoid pole was performed in all patients.

Results In a 37 months follow-up, 3 patients had not pain, 2 patients had pain under effort and 1 patient had pain during the daily activities. Wrist average mobility was 32° in flexion and 35° in extension.

Muscular strength was 76% of pre-operation strength. We got the arthrodesis consolidation in all patients. A following medio-carpic articulation arthrosis was observed in 2 patients.

Discussion Few surgical techniques can be proposed, in case of damage of the radio-scapho-lunate articulation with a preserved medio-carpic interline.

Conclusions The arthrodesis radio-scapho-lunate is an excellent indication. The excision of the distal scaphoid pole is very important to avoid following conflicts between scaphoid and trapeze. Moreover, complications like pseudo-arthritis and ulno-carpic conflict are exceptional, if the different steps are respected.

Lateral Resurfacing Elbow (LRE): a new therapeutic option in post-traumatic and degenerative elbow diseases

G. Giannicola, F.M. Sacchetti, A. Greco, G. Bullitta, F. Postacchini

Department of Orthopaedics and Traumatology, University “La Sapienza” (Rome, IT)

The Lateral Resurfacing Elbow (LRE) is a new therapeutic option recently proposed for the treatment of degenerative and inflammatory conditions of the elbow. The necessity for a prosthesis that exclusively replaces the lateral compartment arises from pathological studies. Cadaver and biomechanical investigations, in fact, suggest that the radio-humeral joint is more prone to wear than the ulnohumeral joint. Other studies have shown that degenerative changes can develop in the radio-capitellar (lateral) compartment of elbow joint while the humero-ulnar (medial) compartment remains well

preserved. During axial loading, the forces are transmitted primarily on the lateral compartment due to the physiological valgus of elbow axis; this may explain the precocity and severity of the degenerative changes of the humero-radial joint.

The articular surfaces of the lateral compartment of the elbow appear to be more vulnerable to traumatic injuries, i.e. radial head fractures, capitellum fractures, terrible triad and Monteggia fractures; these fractures often cause secondary degenerative arthritis due to articular deformity, chondral damage and biomechanical alterations.

We report the clinical results of two patients with severe stiffness of the elbow associated to anatomical changes of the lateral compartment. The patients underwent open release and resurfacing of the lateral compartment with LRE prosthesis with good functional results at short term.

The LRE consists of two components that replace the capitulum humeri and the radial head. If the radial head is relatively well preserved it is possible to use the LRE as Hemi-Lateral Compartment Arthroplasty (capitellar resurfacing only). The proposal of this prosthesis has also been dictated by the observation that the humero-ulnar (medial) compartment often remains well preserved. Therefore total elbow joint replacement (TEJR), which involves replacement of the relatively uninvolved articular surfaces of the medial compartment of the joint, appears unnecessary because of its invasivity. Moreover in young patients TEJR is often contraindicated. The other therapeutic options, such as arthroscopic or open release, often give unsatisfactory results at middle and long term. This is often caused by overload of the humero-ulnar compartment, responsible for early degenerative changes of the medial articular surface. LRE prosthesis, which restores the function of the lateral compartment, increases joint stability, avoids overload of the medial compartment and early degenerative changes of the medial compartment. The short-term results of this prosthesis appear to be encouraging, with pain relief and a good recovery of range of motion. However, long-term studies are necessary to confirm the survival of the implant.

Dynamic external fixation in the treatment of complex elbow instability

G. Giannicola, F.M. Sacchetti, E. Manauzzi, G. Bullitta, F. Postacchini

Department of Orthopaedic Surgery, University “La Sapienza” (Rome, IT)

A particular pattern of complex instability of the elbow is “the terrible triad”, in which elbow dislocation is associated with fractures of the coronoid and radial head. Other frequent patterns are the variant of Monteggia lesions (Bado II) described by Jupiter which is characterized by ulnar fracture associated with fracture-dislocation of proximal radius, and the articular fracture of the distal humerus associated with elbow dislocation. The goal of treatment is to restore the primary stabilizers of the elbow such as the coronoid process, olecranon and both collateral ligaments by internal fixation and reconstruction of the ligaments. If elbow stability obtained at operation is unsatisfactory or internal fixation not enough stable, there an indication for applying a dynamic external fixator (DEF). The latter allows: (1) the articular congruence to be maintained and the ligaments to heal in adequate tension and position, (2) internal fixation and ligaments reconstruction to be protected, and (3) immediate joint motion to be carried out.

From 2005 to 2008, we surgically treated 31 patients with complex instability of the elbow. DEF was applied in 38% of cases, namely 3 terrible triads, 5 fracture-dislocations of Monteggia and 4 articular

fractures of the humerus associated with elbow dislocation. The mean age of patients was 44 years (range 30–74). All patients underwent ORIF, reconstruction of ligaments and dynamic external fixation. The OptiROM elbow fixator was used in 2 patients, the Orthofix fixator in 1 and the DJD fixator in 9. In all cases, active elbow motion was allowed without restrictions from the second postoperative day. Indomethacin was consistently administered for 5 weeks to prevent heterotopic ossifications. The DEF was removed after 6 weeks. The mean follow-up was 25 months (range 5–44 months). At last follow-up, the clinical results, evaluated according to the MEPS, were excellent in 10 patients (83%), who had had a fast recovery of range of motion (ROM). The elbow was painless in all patients and stable in all but 1. Moderate osteoarthritis was found in 60% of cases. Complications included: 1 elbow stiffness, 1 pseudarthrosis of capitulum humeri and troclea, 1 transitory radial nerve palsy, and 1 superficial pin tract infection.

In conclusion, DEF is a helpful tool for treatment of complex elbow instability, particularly when stable internal fixation cannot be obtained or instability persists after ligaments reconstruction. However, DEF increases morbidity, and implies a longer operative time and prolonged exposure to radiation.

SESSION 23

Double-bundle anterior cruciate ligament reconstruction: a comparative cadaver study of the femoral tunnels performed with in-out and out-in techniques

L. Pederzini¹, M. Ronga², P. Punzetto², L. Callegari³, P. Cherubino²

¹U.O. di Ortopedia e Chirurgia Artroscopia (Sassuolo, IT);

²Dipartimento di Scienze Ortopediche e Traumatologiche, Università dell’Insubria (Varese, IT);

³Cattedra di Radiologia, Università dell’Insubria (Varese, IT)

Introduction Many authors developed different techniques for reconstruction of both bundles (anteromedial AM; posterolateral PL) of the anterior cruciate ligament (ACL), in order to restore a normal kinematics. There are several factors that can influence biological integration of graft and the bundle’s mechanical behavior. The difference in diameter between tunnels on the intra-articular side and graft is one of most important. The aim of this study is to evaluate by CT-scan the femoral tunnel diameters performed using two different techniques.

Methods The study included 8 knees of 8 different cadavers divided into 2 groups. Group A: femoral tunnels were performed using an in-out technique: the PL tunnel from AM portal and the AM tunnel from transtibial PL tunnel. Group B: both tunnels were performed using an out-in technique with a guide developed by “senior author” (LP). A 7 mm reamer was used for all tunnels. The knees were then evaluated by CT-scan on coronal and axial planes. The diameters of the two tunnels were measured on both planes.

Results In group A, AM tunnel measured 7.07 mm (range 7–7.1) on axial plane and 7.02 mm (range 7–7.1) on coronal plane. In group B, AM tunnel measured 7.1 mm (range 7–7.2) on axial plane, and 7.15 mm (range 7–7.3) on coronal plane ($p > 0.05$). In group A, PL tunnel measured 8.32 mm (range 8.2–8.4) on axial plane and 8.45 mm (range 8.4–8.5) on coronal plane. In group B, PL tunnel measured 7.15 mm

(range 7–7.3) on axial plane and 7.02 mm (range 7–7.1) on coronal plane ($p < 0.05$).

Discussion There is no consensus on which is the best technique for double-bundle ACL reconstruction in terms of joint stability. Tunnel widening is one of the causes that may jeopardize the success of reconstruction and eventually a revision procedure. Several authors reported some difficulties in ACL revision surgery after single-bundle reconstruction when diameter of tunnel was larger than graft. Out-in technique shows a PL tunnel diameter similar to graft on intra-articular side. Theoretically, this approach can reduce the micro movements of the graft inside the tunnel due to the mismatch. Biomechanical and prospective randomized control studies between in-out and out-in techniques could confirm this hypothesis.

SESSION 24

FIN arthroplasty: 20 years of experience

G. Annaratone, F. Rivera

S.C. Ortopedia e Traumatologia, Presidio Sanitario Gradenigo (Turin, IT)

Objective Cementless total hip replacement have gained considerable popularity, particularly in the treatment of younger, active patients with end stage arthritic conditions of the hip. Controversy exists as to whether cementless femoral stems should be tapered, anatomic, or cylindrical in design [1, 2]. The purpose of the current study was to assess the 20 years results of a second generation, cementless tapered total hip replacement.

Material and methods Between March 1989 and March 2009, according to our database, 1786 consecutive total hip arthroplasties were performed in 1742 patients. In all cases Fin arthroplasty. In 47 cases the preoperative diagnosis was aseptic loosening of femoral and/or acetabular components. 324 patients with follow-up less than 2 years were excluded from the study. The average age of the patients was 73.8 years (range 25–96 years). The average follow-up was 11.5 years.

FIN stem (Gruppo Bioimpianti, Peschiera Borromeo, Milano, Italy) is a straight collar stem designed with a proximal dorsal fin ensuring rotational stability. The proximal part of the stem is coated with oxide-free pure titanium (Ti-Pore 300). The proximal design is characterised by a 135° neck-stem angle, an anti-rotational dorsal fin, a wedge shape and a small collar on the calcar. The central design is sized to allow a gradual reduction of stresses. The distal part is tapered. FIN cup is a pres-fit cup with external coating Plasma Spray (300 micron) in pure titanium (99.4%). Three fins, supero-anterior, superior and postero-superior stabilize the cup against rotational forces. In all patients polyethylene liner was used until 2001 [3]. Since 2002 ceramic liner was used in case of patients younger than 60. All implants were inserted by postero-lateral approach. Postoperatively, all patients were managed with a standardized protocol and allowed full weight bearing during second post-op day.

Results Our database review showed a cup survival rate of 97.7% and a stem survival rate of 98.8%.

Conclusions We conclude that a tapered stem with anti-rotational fin and a press-fit cup with stabilizing superior fins offer an efficacious, durable stability of the implants. This stability allows excellent long-term clinical results also in active patients.

References

1. Bourne RB, Rorabeck CH, Patterson JJ, Math JG (2001) Tapered titanium cementless total hip replacement. *Clin Orthop* 393:112–120
2. Lombardi AV Jr, Berend KR, Mallory TH (2006) Hydroxyapatite-coated titanium porous plasma spray tapered stem: experience at 15 to 18 years. *Clin Orthop* 453:81–85
3. Macchi R, Annaratone G, Gallino M, Salerno P (2000) Nine years of follow-up with cementless hip prosthesis. *GIOT* 26:127–134

Total hip arthroplasty in young patients. 10 to 18 years results using cementless hip arthroplasty

F. Rivera, G. Annaratone

S.C. Ortopedia e Traumatologia, Presidio Sanitario Gradenigo (Turin, IT)

Objective There is no according in literature about the definition of young patient, but most of the authors use to define young patient a patient younger than 50 [1–3]. Long-term results are inferior in younger patients in comparison with the general population having THA. This is for the high activity and life expectancy but also for the pre-operative diagnoses. In fact causes of THA in young patients make implanting technically more demanding [1, 2]. The purpose of this study was to evaluate the 10- to 18-years results, with regard to osteolysis and durability of fixation, of total hip arthroplasty performed using an cementless hip arthroplasty in patients who were 50 years of age or younger.

Material and methods Between March 1990 and March 1997, 94 consecutive total hip arthroplasties were performed in 88 patients. The Fin stem (Gruppo Bioimpianti, Milano, Italy) is a straight collar stem designed with a proximal dorsal fin ensuring rotational stability. Fin cup is a pres-fit cup with three fins stabilizing the cup against rotational forces. In all cases Fin stem were implanted. In 89 cases Fin cup was implanted. In 4 cases the preoperative diagnosis was aseptic loosening of femoral and/or acetabular components. The average age of the patients was 43.8 years (range 25–50 years). The average follow-up was 14.2 years.

Results Seven patients were lost to follow-up. This left 87 hips in 81 living patients. Average Harris Hip Score at final follow up was 96.2 (range 84–100). Failures was observed in five cases (5.7%), although only in three cases failure was correlated to mobilization of the components. In one patient post-traumatic ceramic head rupture was observed 1 year postoperatively. In one patient polyethylene liner rupture was observed 8 years postoperatively; two cups and one stem has required revision, for a cup survival rate of 97.7% and a stem survival rate of 98.8%.

Discussion Despite more conservative implants are now available to face osteoarthritis in patients younger than 50, our results support the continued use of a traditional press-fit arthroplasty in patient with long life expectancy.

References

1. Archibeck MJ, Surdam JW, Shultz SC, Junick DW, White RE (2006) Cementless total hip arthroplasty in patients 50 years or younger. *J Arthroplasty* 21:476–483
2. Beaulè PE, Dorey FJ, Hartley WT (2001) Survivorship analysis of cementless total hip arthroplasty in younger patients. *J Bone Joint Surg* 83A:1590–1591
3. McAuley JP, Szczyzewicz ES, Young A, Engh CA (2004) Total hip arthroplasty in patients 50 years and younger. *Clin Orthop* 418:119–125

Cementless modular revision stem “Restoration” use for replacement in femoral component loosening and periprosthetic femoral fractures

M. Caresio, M. Fiammengo, M. Sabra, M. Dolfin, E. Novarese

Orthopaedic and Traumatologic Division, “Ospedale Maggiore” (Chieri, Turin, IT)

Objective To evaluate the clinical and radiographic early outcomes.

Methods 17 femoral stem revisions in hip prosthesis were performed in 11 females and 6 males (mean age 73 years, range 64–82) between January 2005 to December 2008 with the use of Restoration stem: 10 cases of loosening (3 septic) and 7 of periprosthetic fractures were followed prospectively. We evaluated femoral bone defects in loosening group using the Paprosky classification: type IIB n.2, type IIC n.3, type III n. 5. Periprosthetic femoral fractures were classified according to Vancouver classification: type A n.1; type B2 n.3, type B3 n.3. The follow-up was performed at a mean period of 25 months (range 7–36). All patients were evaluated clinically with Harris Hip Score and radiographically after 3, 6, 12 months and every year. In the fracture group we revised only the stem. In the loosening group both femoral and acetabular components were revised in 5 hips.

Surgical technique Transgluteal approach was used in nine hips of loosening group, in one patient we performed the preceding posterolateral arthroplasty approach. In the fracture group we used a transgluteal approach distally extended below or trans lateral vastus muscle. In three septic loosening cases the revision was performed with the two stages-technique.

Results In the loosening group the mean value H.H.S. was 84 (range 67–100) compared with preoperative 49. The periprosthetic fractures healed in 100 days (range 85–125). No implant was re-revised, no case of instability, no tight pain was evaluated. No patient was limited to bed or chair, five patients needed a device for walking. No significant limb-discrepancy (>1.5 cm) was found. In two hips (aseptic loosening group) we found heterotopic ossification: 1 Brooker grade 2 and 1 grade 3. In the loosening group axial migration of the stem occurred in the period between operation and second radiological review: mean 5.8 mm, while in the fracture group no subsidence was observed. One intraoperative fracture occurred: greater trochanter and adjacent diaphyseal shell area of osteolysis.

Discussion In hip arthroplasty revision the challenge for the surgeon is to find the best method to secure the implant in a femur with deficient bone proximally that will provide stability for load bearing and motion, in addition the implant must be durable and allow for augmentation of host bone. The conical design with a taper angle of 2° and the presence of 8 longitudinal ridges in circle around the stem were directed to obtain intimate diaphyseal fit and fill and biologic fixation. The modularity in cementless femoral revision stem permits less demands from the damaged proximal metaphyseal bone, correct adjustment of length, offset and version to facilitate the reconstruction of the proximal femur, thus improves the function of pelvi-trochanteric

muscles and reduces the risk of dislocation. We can conclude that revision cementless modular stem Restoration is a golden solution with different indications, although long term results are required.

Suggested readings

1. Bohm P, Bischel O (2004) The use of tapered stems for femoral revision surgery. *Clin Orthop* 420:148–159
2. Rayan F, Dodd M, Haddad FS (2008) European validation of the Vancouver classification of periprosthetic proximal femoral fractures. *J Bone Joint Surg* 90-B:1576–1579
3. Weber M, Hempfing A, Orler R, Ganz R (2002) Femoral revision using the Wagner stem: results at 2–9 years. *Int Orthopaed* 26:36–39

MRS Lima: resurfacing cementless THR in the treatment of coxarthrosis

F. Stacca, M. Del Giudice, O. Laselva, F. Munari

Clinica Ortopedica, Policlinico di Modena, Università di Modena e Reggio Emilia (Modena, IT)

Introduction The use of resurfacing THR gives the possibility of the maximum respect of the bone stock, due to the theory of the tissue sparing surgery, and an anatomical dimensioning of the load with all the advantage of a large diameter head.

Material and methods The MRS Lima cementless system is a modular system based on a cervico-cephalic cementless straight stem, resurfacing cementless head and a cementless thin acetabular component. MRS system allows to reduce the cytological damage of the cement and to find a good bone integration in the head and especially in the femoral neck thanks to cervico-cephalic titanium conical stem. In the period 2004–2009 we implanted 28 MRS system in 26 patients, 41- to 74-year-old, they were all controlled with a F.U. from 6 to 59 months. Evaluation was performed with Rx scan examination and Harris Hip Score.

Results Only 3 patients needed revision treatment. The survived prosthesis give excellent results with good stability of the implant and elevate satisfaction of the patient. Revisions regard 3 fractures of the neck, one based on a trauma and 2 based on osteoporotic notching; they were all postmenopausal 65-year-old women. In both 3 cases a neck conservation stem was used for the revision. One case presented infection resolved with antibiotic washing.

Conclusions MRS system is a excellent alternative in young patients with high functional request. Our indication look at patients less than 65-year-old, postmenopausal women are not included because of the elevate risk of poor quality of the femoral neck. This system allows a considerable bone saving, particularly useful in young and active patients with a long life expectancy. In case of revision, the conversion of the MRS in a first implant stem can be easily performed by resection of the femoral neck.