Navigation or patient specific instrumentation in unicompartmental knee arthroplasty: a prospective study

CONFALONIERI N, ALDÈ S, MANZOTTI A

1st Orthopaedic Department, CTO Hospital, Milan, Italy

alf.manzotti@libero.it

Introduction: Despite clear clinical advantages Unicompartmental Knee Replacement still remain an high demanding and less forgiving surgical procedure. Different Authors in literature pointed out how in coronal tibial malalignment beyond 3° as well as tibial slope beyond 7° increase the rate of aseptic failure even more than in TKR. Likewise overcorrection in the coronal plain is a well recognized cause of failure because of an overweighting on the controlateral compartment. Furthermore it has been shown how in UKR surgery even using short narrow intramedullary guide this can cause errors in both coronal planes. Computer assisted surgery has been proposed to improve implant positioning in joint replacement surgery with no need of intramedullary guide despite no still proven clinical advantages. Likewise more recently Patient Specific Instrumentation (PSI) has been suggested, even in partial knee reconstruction, as a new technology capable of new advantages such as shorter surgical times and lower blood losses maintaining at least the same accuracy. Aim of the study is to present a prospective study comparing 2 groups of UKRs using either a computer assisted technique or a CT based Patient Specific Instrumentation.

Materials and Methods: Since January 2012 54 patients undergoing UKR because medial compartment arthritis were enrolled in the study prospectively. Before surgery patients were alternatively assigned to either computer-assisted alignment (group A) or patient specific instrumentation group (group B). In the group A (27 knees) the implant (Sigma, Depuy Orthopaedics Inc, Warsaw, Indiana, USA) was positioned using a CT-free computer assisted alignment system specifically created for UKR surgery (OrthoKey, Delaware, USA). In group B (27 knees) the implant (GMK uni, Medacta, Castel San Pietro, Switzerland) was performed using a CT-Based PSI technology (MyKnee, Medacta, Castel San Pietro, Switzerland). In both the groups all the implants were cemented and using always a fixed metal backed tibial component. The duration of surgery and all the complications according to Kim classification were documented in all cases. Six months after surgery each patient had long-leg standing anterior-posterior radiographs and lateral radiographs of the knee. The radiographs were assessed to determine the frontal femoral component angle (FFC), the frontal tibial component angle (FTC), the hip-knee-ankle angle (HKA) and the sagittal orientation (slope) of both tibial and femoral component. The number and percentage of outliners for each parameter was determined. In addition the percentage of patients from each group with all 5 parameters within the desired range was calculated.

Furthermore at the latest follow-up the 2 groups were clinically assessed using KSS and Functional score

Results: At the last assessments there were no differences in the clinical outcome. The mean surgical time was longer in the navigated group of a mean of 5.9 minutes without any statistical differences in complications. The mechanical axes, tibial slope the FTC angle were significantly better aligned in the navigated group. A statistically significant higher number of outliners was seen in the PSI group. The number of implants with all 5 radiological parameters aligned within the desired range was statistically higher in the navigated group. All the implants in the navigated group were correctly aligned in all the planned parameters.

Discussion: To our knowledge this is the first prospective study in literature assessing navigation compared to PSI technique in UKR surgery. Despite a slight not significant longer surgical time in the
navigated group, at a short follow-up the results could not demonstrate any clinical differences between the 2 technologies. However, according to their results the Authors indicate navigation as more helpful in UKR surgery compared to PSI technology in terms of accuracy.

**References**