Does extension balance affect flexion balance on TKA?

KAWAMOTO T, IIDA S, SUZUKI C, SANO S, SHINADA Y

Department of Orthopaedic, Matsudo City Hospital, Chiba, Japan

chibanokumagoro@yahoo.co.jp

Background: Computer-assisted navigation surgery has been developed to help surgeons achieve improved alignment.And precise pre- and post operative anatomic measurements are important to evaluate the function of total knee arthroplasty.It is also necessary to obtain accurate intraoperative soft tissue balancing. Especially on varus total knee arthroplasty cases, appropriate medial soft tissue releases are important to get good balance in the coronal plane, but medial soft tissue affects occasionally gaps in flexion 90-degree. We aimed to evaluate the soft tissue balance in extension 0-degree and the flexion 90-degree and the correlation between these two balances on total knee arthroplasty with computer-assisted navigation.

Methods I: We analyzed sixty four primary total knee arthroplasty, carried out by a single surgeon, from July 2008. The patients were 46 women (56 knees) and 8 men (8 knees) who had a mean age of 72.4 years old. All patients had been diagnosed with oateoarthritis. Surgeries were performed with CT-free computer-assisted navigation (The OrthoPilot system; Aesculap, Tuttlingen, Germany). The prosthesis used was cruciate retention type. A modified vastus medialis obliquus muscle approach was made, which allowed for exposure of the knee without everting the patella. After cutting tibia and femur, we measured the joint gaps of medial and lateral in extension 0-degree, those in flexion 90-degree, and the femoral external rotation cutting angle.

Methods II: We analyzed 100 primary TKA, carried out by a single surgeon, from February 2006. We divided them into two groups: group1 =CAS (computer-assisted surgery) and group2 = STA (standard instrumentation). There was no significant difference between the Japan Orthopedics Association Knee scores (JOA) of the two groups before operation. Computer-assisted navigation (The OrthoPilot system; Aesculap, Tuttlingen, Germany) was used for 48 TKAs, whereas conventional extramedually tibial and intramedually femoral guiding systems were used for 52 TKAs.

Results I: The mechanical axis aligned optimally in TKAs using computer-assisted navigation. The mechanical axis of was 2.3°(±2.1") With the tension meter, the average difference of joint gaps between lateral and medial side in extension 0-degree was 2.5mm and that in flexion 90-degree was 2.3mm. Average of the femoral external rotation cutting angle was 2.9 degree. On the correlation between the difference of gaps in flexion 90-degree and the femoral external rotation cutting angle, we found the tendency that the more the lateral laxity in flexion 90-degree increases, the more the femoral external rotation cutting angle. With regard to the correlation of the gaps between in extension 0-degree and in flexion 90-degree, the more the lateral laxity in extension 0-degree increases, the more likely the lateral laxity in flexion 90-degree.

Results II: The average operating time for group1 was 175±19.4min and the time for group2 was 129.8±16.3min. There was a significant difference between the two groups. The JOA score and range of motion between the two groups were similar. The blood loss volume was significantly smaller in group 1. The mechanical axis aligned more optimally in TKAs using computer-assisted navigation. The mechanical axis of group1 was 2.3°(±2.1") and the axis of group2 was 3.4°(±2.8°), respectively.

Conclusion: The use of CT-free computer-assisted navigation in TKA increases the accuracy in limb alignment.The lateral laxity in extension 0-degree could(or might) affect the lateral laxity in flexion 90-degree. The increased lateral laxity in flexion 90-degree might result in the increased femoral external rotation angle.