

Paper #157

Periprosthetic Bone Mineral Density Change after Total Knee Arthroplasty: Titanium Alloy versus Cobalt-Chromium

Seung-Bin Im, MD, KOREA, REPUBLIC OF
Woo-Cheol Shin, MD, KOREA, REPUBLIC OF
Du-Hyun Ro, MD, MS, KOREA, REPUBLIC OF
Jae-Young Park, MD, KOREA, REPUBLIC OF
Oh-Hyo Kwon, MD, KOREA, REPUBLIC OF
Jangyun Lee, MD, KOREA, REPUBLIC OF
Myung Chul Lee, MD, PhD, Prof., KOREA, REPUBLIC OF
Min-Ku Song, MD, KOREA, REPUBLIC OF

Department of Orthopaedic Surgery, Seoul National University Hospital
Seoul, KOREA, REPUBLIC OF

Summary:

Total knee arthroplasty may cause postoperative periprosthetic bone mineral density (pBMD) change due to stress shielding. This study aimed at comparing effect of implant materials (Titanium alloy vs. Cobalt-chromium) on pBMD change through prospective randomized controlled study.

Abstract:

<Introduction>

Little is known about the relationship between implant material and periprosthetic bone mineral density (pBMD). The purpose of this study were 1) to confirm the change of pBMD after total knee arthroplasty (TKA) and 2) to compare the pBMD change between two different implants of different materials

<Method>

Prospective randomized controlled study was performed on 33 patients who underwent bilateral TKA. Patient were randomly allocated to received a titanium nitride coated implant (TiN group) in one knee and conventional cobalt chrome implant (CoCr group) in the contralateral knee. pBMD was evaluated using Dual-energy X-ray absorptionmetry before and after TKA (1 and 2 year). pBMD was evaluated at 3 different areas in anteroposterior plane and 6 different areas in lateral plane. pBMD was then compared before and after TKA and also between the groups.

<Results>

Preoperative pBMD was not different between the groups. Between baseline and 2 years after TKA, Both groups showed pBMD decrease in femur and tibia. And pBMD was decreased remarkably within 1 year and thereafter tended to be maintained. CoCr group showed larger decrease of pBMD in femur and tibia compared with TiN group. Among these areas, pBMD of anterior and medial proximal tibia showed significant difference between two groups at 2 years postoperatively.

<Conclusion>

After TKA, Significant decrease of pBMD was confirmed in both groups. Titanium alloy implant showed a lower decrease of pBMD compared with cobalt chromium implant. Consequently, titanium alloy implant is beneficial for lessen pBMD decrease than cobalt chromium implant.