

CLINICAL EFFICIENCY OF PERIPROSTHETIC HIP AND KNEE INFECTION PREVENTION BY LAMINAR CLEAN AIR IN OPERATION ROOMS

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Introduction. Surgical treatment for periprosthetic infection (PPI) in the hip and in the knee has a higher risk of failure than revision arthroplasty without infection. PPI prevention is of primary importance. John Charnley studied vertical laminar airflow systems in 1972 and found that their use decreased the PPI rate from 9% to 1%. Only 30% hospitals in the USA performing hip or knee replacement are equipped with laminar clean air supply; however, over 75% procedures are done in these hospitals. The influence of laminar clean air in operating room on total and fractional suspended particles count, microbial count of the air and surgical site infection (SSI) rate, including PPI, needs further investigation. The aim of the study: evaluating the clinical effect of laminar clean air in orthopedic operating rooms on SSI incidence after THA or TKA.

Material and methods. 1,000 consecutive cases of primary TKA or THA performed in an operating room with laminar clean air (research group) were retrospectively analysed. Mean postoperative hospital stay, early PPI, number and reasons for readmissions were analysed. Control group included 1,000 consecutive cases of primary THA or TKA performed in an operating room without laminar clean air.

Results and their discussion. Mean postoperative hospital stay after primary THA or TKA, reflecting early postoperative complications in general and namely PPI, was 8.64 ± 2.84 days in research group, and 11.10 ± 4.01 days in control group. The most frequent postoperative hospital stay in research group was 6-8 days (62.6%), whereas in control group 9-11 days (66.8%). Patients in research group with postoperative hospital stay over 14 days comprised 2.2%, and in control group 7.3%. Therefore, the rate of patients requiring prolonged inpatient treatment after joint replacement decreased by 3.3 times.

Case histories database analysis revealed 2 (0.2%) hospital readmissions due to PPI after primary THA or TKA in the research group. 9 other patients (0.9%) received outpatient treatment for superficial SSI. In control group, 8 (0.8%) readmissions due to PPI and 25 (2.5%) patients receiving outpatient treatment for superficial SSI were registered, respectively. The low hospital readmission rate due to PPI after primary THA or TKA might omit part of the patients who might refer to other hospitals and thus be lost to follow-up.

Conclusions. Laminar clean air supply in the operating room was associated with a decrease in mean postoperative hospital stay from 11.0 to 8.64 days, a decrease in percentage of patients who stayed inpatient over 14 days after surgery from 7.3% to 2.2%, and a decrease of PPI incidence after primary THA or TKA from 3.3% to 1.1%.

Key words: prevention, prophylaxis, surgical site infection, SSI, periprosthetic infection, PPI, TKA, TKR, THA, THR, laminar clean air, HEPA.