The AAHKS Clinical Research Award

Intraosseous Regional Prophylaxis Provides Higher Tissue Concentrations in High BMI Patients in Total Knee Arthroplasty: A Randomized Trial

Notes

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Introduction: Obesity is an established risk factor for deep infection following total knee arthroplasty (TKA). Lowdose vancomycin via intraosseous regional administration (IORA) obtains tissue concentrations 6-10 times greater than systemic administration, and provided more effective prophylaxis in an animal model of TKA. Enhancing prophylaxis is appealing in the higher-risk obese patient, but the pharmacodynamics of IORA in this population group are unknown. This study compared low-dose vancomycin via the IORA versus a body-weight adjusted systemic IV dose in primary TKA in obese patients.

Methods: Twenty-two patients with a body mass index >35 undergoing TKA were randomized into two groups. The IV group received 15mg/kg (maximum of 2g) of systemic IV prophylactic vancomycin over a two-hour infusion into an arm vein, timed to finish immediately prior to incision. The IORA Group received 500mg vancomycin in 150ml saline as a bolus injection into a tibial intraosseous cannula, below an inflated thigh tourniquet, immediately before skin incision. Subcutaneous fat and bone samples were taken at regular intervals until skin closure. Tissue antibiotic concentrations were measured using high performance liquid chromatography.

Results: The mean BMI was 41.1 (range 37-52) in the IORA group and 40.1 (range 35-52) in the IV systemic group. The overall mean tissue concentration in subcutaneous fat was 39.3ug/g in the IORA group and 4.4ug/g in the IV systemic group (p<0.01), and in bone were 34.4ug/g in the IORA group and 6.1ug/g in the IV systemic group (p<0.01). Two patients in the IV systemic group developed superficial wound infections, no deep infections occurred in either group.

Conclusion: Low-dose IORA was effective in the high-BMI population group, providing tissue concentrations of vancomycin 6-8 times higher than systemic administration. This was despite an IORA unadjusted dose of 500mg, compared to a weight-adjusted systemic dose.