When Intravenous Vancomycin Prophylaxis is Needed in Shoulder Arthroplasty, Incomplete Administration is Associated with Increased Infectious Complications

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INTRODUCTION: Vancomycin is often used as antimicrobial prophylaxis for shoulder arthroplasty (SA) either when first generation cephalosporins are contraindicated or colonization with resistant bacteria is anticipated. In general, vancomycin necessitates longer infusion times to mitigate potential side effects. When infusion is started too close to the time of the incision, administration may not be complete during surgery. This study evaluated whether incomplete administration of intravenous (IV) vancomycin prior to shoulder arthroplasty (SA) affects the rate of infectious complications.

METHODS: Between 2000 to 2019, all primary SA types (hemiarthroplasty, anatomic total shoulder arthroplasty, reverse shoulder arthroplasty) performed at a single institution for elective and trauma indications using IV vancomycin as the primary antibiotic prophylaxis and a minimum follow-up of 2 years were identified. The time between the initiation of vancomycin and skin incision was calculated. Complete administration was defined as at least 30 minutes of infusion prior to incision. Demographic characteristics and infectious complications including survival free of prosthetic joint infection (PJI) were generated. Multivariable analyses were conducted to evaluate the association between vancomycin timing and the development of PJI.

RESULTS:

A total of 461 primary SA were included. Infusion was complete (>30 minutes preoperatively) for 163 [35.4%] and incomplete (< 30 minutes preoperatively) for 298 [64.6%] SA. The incomplete group demonstrated higher rates of any infectious complication (8% vs. 2.3%; P = .005), PJI (5.5% vs. 1%; P = .004), and reoperation inclusive of revision due to infectious complications (4.9% vs. 1%; P = .009). Survivorship free of PJI was worse in SA with incomplete compared to those with complete vancomycin administration. Survival rates for incomplete and complete administration were 97.6% and 99.3% at 1 month, 95.7% and 99.0% at 2 years, 95.1% and 99.0% at 5 years, and 93.9% and 99.0% at 20 years, respectively (P = .006). Multivariable analyses confirmed that incomplete vancomycin administration was an independent risk factor for PJI compared with complete administration (hazard ratio [HR], 4.22 [95% confidence interval (CI), 1.12 to 15.90]; P = .033), even when other independent predictors of PJI (age, male sex, prior surgery, MRSA colonization, and follow-up) were considered.

DISCUSSION AND CONCLUSION:

When vancomycin is the primary prophylactic agent used at the time of primary shoulder arthroplasty, incomplete administration (infusion to incision time under 30 minutes) seems to adversely increase the rates of infectious complications and PJI. Prophylaxis protocols should ensure that complete vancomycin administration is achieved in order to minimize infection after SA.