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Single antibiotic prophylaxis for Gustilo-Anderson type II/IIIA open fractures

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Introduction: Open fractures present unique challenges to soft tissue healing, bony union and infection prevention. GA II/IIIA open fractures are historically treated with multidrug antibiotic prophylaxis. Our hypothesis is that there is no difference in the rate of deep infection between monotherapy and multidrug antibiotic prophylaxis.

Methods: A retrospective review of all open fractures treated at a Level I academic trauma center from 2010-2014 was performed to identify Type II/IIIA open fractures treated with antibiotic therapy within 24 hours of injury. The primary study outcome was deep infection. Differences in continuous variables were assessed with Student's independent t-test. Differences in categorical variables were assessed with Fisher's exact test. A binary logistic regression was performed with infection as the dependent variable and age, gender, duration of antibiotics, soft tissue coverage, tobacco use, diabetes and external fixator use as independent predictor variables. Statistical significance was set at $\alpha=0.05$.

Results: 286 patients with 340 fractures (Type II: 170; Type IIIA: 170) were studied. Mean age was 41 years (11-96). Overall deep infection rate was 9.7% (II: 9.4%; IIIA: 10%, $P>0.05$) at a mean of 63 days (2-941) after injury. Using Fisher's exact test it was found that there was a significant difference between frequency of infection between monotherapy ($n=206$, rate=6.5%) and multi-drug therapy ($n=124$, rate=15.3%), $P=0.012$. There were significant differences between infection groups for duration of antibiotic therapy ($P=0.032$) and tobacco use ($P=0.025$). There was no difference between groups for age (Student's t-test, $P>0.05$) or frequency of diabetes, external fixator use, or drug abuse between infection groups (Fisher's exact test, $P>0.05$). In binary logistic regression with infection as the dependent variable, tobacco use was the only significant independent predictor variable in the model, $P=0.046$. Duration ≤ 24 hrs), of ge antibiotics der, soft (>24 hrs tissue vs. coverage, diabetes and external fixator use were not significant in the model, $P>0.05$.

Conclusions: Antibiotic monotherapy prophylaxis in patients with Type II/IIIA open fractures prevents deep infection at rates similar to previously reported studies using multi-drug antibiotic therapy. Duration of antibiotic use >24 hrs was not a significant predictor of infection. Tobacco users had significantly higher infection rates.

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