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"Prophylactic Antibiotics Do Not Prevent CNS Infection in Civilian Gunshot Wounds to the Head"

Introduction: Civilian gunshot wounds to the head (GSWH) are an ongoing epidemic in the US, with incidence rising each year. They are frequently devastating, with case fatality rates approaching 91%, accounting for fatalities occurring in the hospital and at the scene of injury. Although military GSWH are robust, data and management guidelines for civilian GSWH is relatively lacking. Specifically, the administration of prophylactic antibiotics in GSWH patients remains controversial. Prior studies indicate the incidence of intracranial infection after civilian GSWH to be as high as 25%, with significant impact on morbidity and mortality.

Objective: To assess the factors that increase risk for intracranial infection following GSWH and to examine the efficacy of prophylactic antibiotics

Methods: We retrospectively reviewed survivable GSWH at our level 1 trauma center between 2012-2017. Patients were assessed for CNS infection and categorized with regard to the use of prophylactic antibiotics, length of stay, GCS at presentation, bullet trajectory, and demographics.

Results: 236 patients sustained survivable GSWH. 12/236 (5.1%) patients developed CNS infection following GSWH, and 3/12 (25%) of those patients had not received prophylactic antibiotics. Of the 133 patients who received prophylactic antibiotics, 10 (7.5%) subsequently developed CNS infection. Infection was diagnosed more commonly in patients who received antibiotics, but this was not statistically significant (p=0.138). Bullet trajectories through the paranasal sinuses or oropharynx were significantly more likely to result in CNS infection (OR 3.04, p=0.0624). Patients who underwent decompressive surgery and patients who underwent invasive ICP monitoring had significantly higher odds of developing CNS infections (OR 3.04, p=0.00616; OR=4.17, p=0.048).

Conclusion: Decompressive surgery, invasive ICP monitoring, and bullet trajectory were statistically significant factors associated with development of CNS infection following GSWH. Prophylactic antibiotics did not reduce the incidence of CNS infection and therefore do not have a clear protective role in these patients.