

UAMS MEDICAL CENTER
TRAUMA and CRITICAL CARE SERVICES MANUAL

SUBJECT: Antibiotic Prophylaxis for Traumatic Pneumocephalus

SUPERSEDES: New

PAGE: 1 of 1

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APPROVAL: 4/18/2019

CONCURRENCE(S): All

EFFECTIVE: 4/18/2019

PURPOSE: To facilitate appropriate management of patients with traumatic pneumocephalus

BACKGROUND:

Skull fractures can place the central nervous system (CNS) into contact with the paranasal sinuses, nasopharynx, and/or middle ear.¹ Common bacteria located in this area include *s. pneumoniae* and *h. influenzae*.^{2,3} Exposure of the CNS to these pathogens increases the risk for developing meningitis; however, the use of prophylactic antibiotics in this setting is controversial.

Theoretical benefits of prophylactic antibiotics include maintenance of CSF sterility until dura closure and eradication of bacterial colonization.¹ However, this may lead to the development of resistant pathogens.⁴ The efficacy of antibiotics is also hindered by poor penetration into the CSF in the absence of meningeal inflammation.⁴

Meta-analyses describing the use of prophylactic antibiotics in the setting of basilar skull fractures have failed to show a decrease in the incidence of meningitis compared to no antibiotics.^{1,5} However, clinical data suggests that the presence of a CSF leak is an additional risk factor for developing meningitis, and patients who present with a CSF leak may benefit from antibiotic prophylaxis.^{6,7}

INDICATIONS FOR ANTIBIOTIC TREATMENT:

Patients with traumatic pneumocephalus will receive antibiotic prophylaxis only when they have a documented cerebrospinal fluid (CSF) leak as evidenced by CSF otorrhea or rhinorrhea.

TREATMENT:

Ceftriaxone 2 g every 24 hours for 48 hours

REFERENCES:

1. Ratilal BO, Costa J, Pappamikail L, Sampaio C. Antibiotic prophylaxis for preventing meningitis in patients with basilar skull fractures. *Cochrane Database Syst Rev.* 2015 Apr 28;(4):CD004884.
2. Matschke J, Tsokos M. Post-traumatic meningitis: histomorphological findings, postmortem microbiology and forensic implications. 2001; 115: 199-205 31.
3. Ioannis B, Soultana T, Pavlos S. Posttraumatic meningitis: bacteriology, hydrocephalus, and outcome. *Neurosurgery.* 1994; 35: 422-427.
4. Antimicrobial prophylaxis in neurosurgery and after head injury. *Infection in Neurosurgery Working Party of the British Society for Antimicrobial Chemotherapy. Lancet.* 1994 Dec 3;344(8936):1547-51.
5. Villalobos T, Arango C, Kubilis P, Rathore M. Antibiotic prophylaxis after basilar skull fractures: a meta-analysis. *Clin Infect Dis.* 1998 Aug;27(2):364-9.
6. Brodie HA. Prophylactic antibiotics for posttraumatic cerebrospinal fluid fistulae. A meta-analysis. *Arch Otolaryngol Head Neck Surg.* 1997 Jul;123(7):749-52.
7. Eftekhar B, Ghodsi M, Nejat F, Ketabchi E, Esmaeeli B. Prophylactic administration of ceftriaxone for the prevention of meningitis after traumatic pneumocephalus: results of a clinical trial. *J Neurosurg.* 2004 Nov;101(5):757-61.