

Sp45: In the presence of early infections with bony vertebral edema and absent vertebral destruction, can empirical treatment be initiated without a tissue diagnosis?

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Response/Recommendation: Studies comparing culture-negative and culture-positive patients have shown that initiating empirical treatment in culture-negative patients has resulted in comparable long-term outcomes to culture-positive patients started on specific antibiotic treatment. Hence, empirical treatment can be initiated under close monitoring in early infections with bony vertebral edema and absent vertebral destruction and should include broad-spectrum antibiotics covering both gram-positive and gram-negative organisms.

Level of Evidence: Weak to moderate

Delegate Vote:

Rationale:

Identification of the causative organism and the use of appropriate antibiotics are necessary to achieve successful treatment and favorable outcomes in spinal infection. Despite considerable effort and an aggressive diagnostic approach, pathogen identification is not possible in approximately 10-50% of cases [1]. Moreover, there is no established guideline for empiric antibiotic administration in patients without tissue confirmation, and there is a paucity of data comparing clinical outcomes in patients with and without confirmation of the microbial agent by tissue diagnosis.

In a retrospective study involving 97 patients with pyogenic spinal infections, Urrutia et al. demonstrated that there was no difference in clinical outcome between patients receiving specific antibiotics to identified pathogens (76.3%) and patients receiving empirical antibiotics to non-identified pathogens (23.7%). Moreover, they demonstrated that the length of hospital stay and neurological outcome were comparable between both the study groups [2].

A similar study by Yu et al., in 73 patients, evaluated the treatment response of culture-negative (n=41) versus culture-positive (n=32) pyogenic vertebral osteomyelitis and found no significant differences between the two groups with respect to ESR, CRP, and VAS back pain scores after three months of treatment. Despite a trend toward a longer duration of antibiotics in the culture-positive group (CP group 101 days vs. CN group 84 days), there was no significant difference in outcome and recurrence rates (CN group 7.3% vs. CP group 6.3%) between the two groups [3].

Cervan et al., in their study of 23 patients, highlighted the importance of starting empirical antibiotics in immunocompromised patients on hemodialysis. They pointed out that these patients are prone to late diagnosis, and the majority present with culture-negative

spondylodiscitis. Therefore, symptomatic immunocompromised patients should undergo MRI for early diagnosis, followed by prompt empiric antibiotic therapy [4].

Yoon et al. evaluated the predictive value of the identification of causative organisms and laboratory indicators on clinical outcomes in pyogenic spondylodiscitis. Out of 43 patients, 10 were in the negative culture group and were treated with empirical antibiotics alone. The study's results highlighted that the identification of the causative organism had no significant effect on treatment outcome in pyogenic spondylodiscitis, as both culture-positive and culture-negative patients had similar outcomes. So, a good outcome can be expected after initiating empirical treatment (cefazolin or vancomycin for 6 weeks) without biopsy [5].

Foreman et al., in their retrospective study involving 87 patients with clinically suspected spondylodiscitis, found that previous antibiotic administration prior to CT-guided biopsies did not affect biopsy yield and hence concluded that empirical antibiotic treatment can be initiated even without a tissue diagnosis [6].

Based on an international-only survey by the European Association of Neurosurgical Societies Spine Section Study, Kramer et al. found significant variability in the treatment of spondylodiscitis among European neurosurgeons, with most neurosurgeons opting for conservative treatment. Surgery was indicated in cases of relevant neurological deficits, prolonged spinal deformity, or failure of conservative therapy. Nevertheless, conservative therapy, including empirical medical treatment, was often considered as a first-line strategy in the absence of vertebral destruction [7].

In summary, the limited literature on the outcome of empirical therapy initiated in early infections without tissue diagnosis recommends focusing on gram-positive organisms (*Staph. Aureus*) being the most common organisms isolated from culture-positive biopsy specimens. However, empirical therapy should be initiated according to the individual situation, as it has not been shown to be harmful when comparing the long-term outcomes of culture-negative and culture-positive patients. In patients with negative microbiological tests under empirical therapy, favorable outcomes have been reported with a two-drug regimen [parenteral antibiotics: β -Lactam, glycopeptide $\pm$ others and/or oral antibiotics: β -Lactam, Quinolone] [1,3,7]. All papers highlighted that it is critical to monitor the effectiveness of empirical antibiotics (treatment response, follow-up imaging studies, laboratory markers) closely in all cases of pyogenic spondylodiscitis [1–7].

References:

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