Sp 49: What is the optimal management of patients with spinal infection and inconclusive biopsy?

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Recommendation: There is no reliable current literature or evidence for the optimal management of patients with spinal infection and inconclusive biopsy. There is a low evidence for second percutaneous image guided biopsy and when blood cultures and two consecutive needle biopsies are negative, open biopsy is recommended. In cases where all attempts to isolate the organisms has not been successful, antibiotic management must be based on the spectrum of the bacterial infection usually observed in the geographical location.

Level of Evidence: Consensus statement

Delegate Vote:

Rationale:

Administering empirical antibiotics without identifying the causative pathogen in spinal infections is universally discouraged, except in cases of sepsis or severe immunocompromise. Spinal infections are primarily caused by hematogenous spread, therefore blood cultures are an integral part of workup in spinal infections, even though their sensitivity is low with a yield of less than 60%. Surgical debridement, when indicated, provides sufficient quantities of both bone and soft tissue from accurate area of infectious lesion for comprehensive microbiological analysis with a 68% to 93% success rate in identifying the organism.[3] In patients where medical management would suffice, CT-guided needle biopsy of bone and whenever possible soft tissue aspirate remains to be the first choice despite a low sensitivity of 52.2%.[4] Nucleic acid amplification testing (NAAT), including polymerase chain reaction (PCR) and of late metagenomic sequencing, is valuable in cases where aerobic and anaerobic cultures yield negative results, particularly in patients who have already received antibiotics and also for detecting rare microorganisms.[5]

Although a second percutaneous image-guided biopsy is commonly recommended after an initial negative biopsy, a recent systematic review of eight studies found no conclusive evidence to support this practice.[6] When blood cultures and two consecutive needle biopsies are negative, an open biopsy is recommended before considering empirical antibiotics. In addition, it has been recommended to rule out other sources of infection like Infective endocarditis, gastrointestinal and genitourinary systems.[7] The pathogens causing spinal infections can vary by geographic location. For example, brucellosis is more common in Mediterranean and middle eastern countries, while tuberculosis is more prevalent in southeast Asian countries and therefore additional immunological testing might be required before concluding the attempts to isolate the pathogen.[8]

Unlike routine antibiotics, antimycobacterial drugs have a higher adverse drug profile and also carry a significant risk of antibacterial resistance. Hence empirical anti-tuberculous chemotherapy is no more advocated. Histopathology is valuable for diagnosing granulomatous infections such as tuberculosis. It provides more specificity, making it particularly useful for starting antituberculosis chemotherapy, especially when mycobacterial cultures are negative. In endemic regions of Southeast Asia and Sub-Saharan Africa, if clinical or imaging signs worsen despite standard antibiotic treatment, antitubercular chemotherapy is promptly initiated despite being culture negative.

Currently there is lack of literature on management of culture negative spinal infections and management is usually based on the spectrum of bacterial infections observed in culture positive spinal infections in that particular geographical location and background clinical setting. The University of Michigan recommends combination therapy with vancomycin and ceftriaxone for culture negative spinal infections.[7] Overall globally, such a dual antimicrobial therapy is recommended when the bacterial cause remains unidentified. This approach uses broad-spectrum antibiotics targeting gram-positive bacteria (such as Staphylococcus, Streptococcus, and Methicillin-resistant Staphylococcus aureus) with options like clindamycin, flucloxacillin, vancomycin, or teicoplanin. For gram-negative bacteria which are the most likely culprits in elderly population, preferred choices include fluoroquinolones (ciprofloxacin) or third/fourth generation cephalosporins (cefepime/ceftriaxone). Cordero-Delgado et al. in a systematic review of 642 articles recommended the use of fluoroquinolones in association with rifampicin in the empirical treatment of pyogenic spondylodiscitis.[9]

In a retrospective analysis of 8 patients with culture negative pyogenic vertebral osteomyelitis, the authors could not find an improvement in clinical outcome despite 6 weeks of combination empirical antibiotic therapy.[10] The duration of antibiotic therapy is again debated, and parenteral therapy is usually initiated and continued for 2-4 weeks depending on clinical recovery. The ideal time of switch over to oral antibiotics is again debatable but is usually continued for 4-6 weeks.[11] There is only a single retrospective study comparing the outcomes of culture positive and culture negative spine infections which found no major difference in recurrence rates between microorganism based antibiotic regimen and empirical broad spectrum antibiotic therapy.[12]

Failure of conservative treatment is considered when there is no improvement in clinical features or when inflammatory markers such as ESR and CRP are persistently high and surgical debridement is usually advocated. There is no sufficient current literature on the management of culture negative spinal infections, and the above recommendations are only based on consensus.

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