Sp48: In the presence of recent systemic infection with a known organism before the onset of pyogenic spinal infection, can biopsy be avoided?

Kshitij Chaudhary, Haruki Funao

Response/Recommendation: In most patients with suspected pyogenic vertebral osteomyelitis, a spinal biopsy is still preferable even if they have had a recent systemic infection with a known organism. However, when attempts of isolating the organism from the spinal lesion have failed a recent systemic infection can be used to determine the choice of antibiotic therapy.

Level of Evidence: Low

Delegate Vote:

Rationale:
In cases of suspected pyogenic spondylitis, a known recent systemic infection with a specific organism does not necessarily mean that a biopsy can be avoided, but it can be a factor to consider when choosing the best course of action.

Identifying the specific microorganism causing pyogenic spondylitis is crucial for effective treatment.(1) The choice of antibiotics should be tailored to the specific organism. Empiric treatment with broad-spectrum antibiotics may be necessary when a microorganism is not identified, but this can lead to prolonged use of unnecessary medications and contribute to antibiotic resistance.(1)

Blood cultures are usually the first test in diagnosing pyogenic spondylitis. However, the positive rate of blood cultures varies, with a reported range of 40-60%. In addition, a study of 20 patients reported only 50% **of cases had the same organism identified in both blood culture and spinal biopsy samples**. No cases showed the same organism in urine culture and biopsy samples.(2) This means a significant number of cases will require spinal biopsy to identify the causative agent.(1)

If blood cultures are negative, a biopsy is generally recommended, even if there's a known recent infection. This is especially important because, in some cases, the causative organism of the spinal infection may be different from that of the recent systemic infection.
One study found that **concordance between blood and intraoperative tissue samples was 84.3%** (54/64), however, the concordance of coagulase negative staphylococcus (CNS) from intraoperative samples with blood cultures was much lower at 57.1% (8/14).(3) This suggests that some of the CNS isolates in blood cultures may be due to contamination. The study also noted that their lower concordance rate compared to a previous study (95.7%) could be due to the fact that they included positive blood cultures from the entire in-patient stay, which could have been caused by bacteremia from other sources.(4) In elderly patients, a positive peripheral culture can be misleading due to comorbid conditions and synchronous foci of infection with different organisms, which can lead to incorrect treatment decisions.(5) Due to the reported possibility of discordant results, **spinal biopsy is an important diagnostic procedure.**

If the microbial etiology remains unidentified despite blood cultures or spine biopsy, empiric treatment may be started based on the most probable microbial etiology.(6) When choosing

an empiric antibiotic regimen, a thorough history can give clues to a probable organism. If there is a known recent systemic infection with an identified organism, this can influence the choice of empiric antibiotic therapy. However, the potential for a different organism being responsible for the spinal infection must be considered.(5)

In conclusion, recent systemic infections with a known organism should not be used to start antibiotics in patients with spinal infection. All attempts should be made to isolate the organism from the infected site. A known recent systemic infection can help guide empiric antibiotic therapy, when biopsy and blood cultures are negative. However, these decisions should be based on clinical judgement, with consideration of the patient's overall condition, clinical scenario and the results of initial investigations.

References:

1. Kim NJ. Microbiologic Diagnosis of Pyogenic Spondylitis. Infect Chemother. 2021;53(2):238.
2. Vieira MMM, Navarro FAM, Nakao RY, Rodrigues LCL. BACTERIAL PROFILE IN SPONDYLODISCITIS: COMPARING BIOPSY, BLOOD CULTURE AND UROCULTURE. Coluna/Columna. 2024;23(2):e284761.
3. Stangenberg M, Mende KC, Mohme M, Krätzig T, Viezens L, Both A, et al. Influence of microbiological diagnosis on the clinical course of spondylodiscitis. Infection. 2021 Oct;49(5):1017–27.
4. Bae JY, Kim CJ, Kim UJ, Song KH, Kim ES, Kang SJ, et al. Concordance of results of blood and tissue cultures from patients with pyogenic spondylitis: a retrospective cohort study. Clin Microbiol Infect. 2018 Mar;24(3):279–82.
5. Velan G, Leitner J, Gepstein R. Pyogenic osteomyelitis of the spine in the elderly: three cases of a synchronous non-axial infection by a di erent pathogen.
6. Sheikh AF, Khosravi AD, Goodarzi H, Nashibi R, Teimouri A, Motamedfar A, et al. Pathogen Identification in Suspected Cases of Pyogenic Spondylodiscitis. Front Cell Infect Microbiol [Internet]. 2017 Mar 9 [cited 2025 Jan 30];7. Available from: http://journal.frontiersin.org/article/10.3389/fcimb.2017.00060/full