HK21: Should saline be injected into a joint during a dry aspiration (tap)?

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Response/Recommendation: Routine saline instillation following a dry tap in suspected periprosthetic joint infection cannot be recommended due to limited evidence. The technique remains non-standardized and there is a known risk of contamination. While some studies suggest potential benefits, large-scale investigations are needed to establish its diagnostic efficacy and safety before considering widespread clinical application.

Level of Evidence: Moderate

Delegate Vote:

Rationale:

Dry taps, characterized by insufficient synovial fluid on aspiration, occur in up to 35% of cases, as noted by Mirzaei et al. (2018) [4]. This issue can arise either because of technical difficulties in accessing the joint, lack of adequate fluid in the joint, or the presence of other anatomical barriers [9].

Saline injection (also referred to as saline lavage) after a dry tap has been explored as a method to improve diagnostic accuracy in periprosthetic joint infection (PJI) by increasing the fluid available for cytological and microbiological tests.

Saline injection enhances sensitivity and specificity in diagnosing PJI, as reported in 3 of the studies [1,2,3]. Heckmann et al. found that while saline lavage significantly lowered synovial white blood cell (WBC) counts, the percentage of polymorphonuclear cells (%PMN) remained similar, providing reasonable sensitivity for detecting PJI [1]. Sensitivity for saline lavage ranged from 75 to 88.2% throughout our research, with specificity reaching up to 100% in some cases [3].

Partridge et al. [3] demonstrated that saline lavage improved culture yield compared to direct aspiration, particularly in dry tap cases where insufficient fluid was obtained initially.

Other studies [7] highlighted the role of saline lavage in achieving a culture sensitivity of 79.5% and specificity of 95.7%, reinforcing its diagnostic value. Although these studies suggest that saline lavage can facilitate additional fluid recovery, especially in scenarios where synovial fluid is scarce, most investigations included in this systematic review were retrospective, and the overall evidence is limited by small sample sizes and inconsistencies in protocols.

Percutaneous interface biopsy (PIB), as evaluated by Corona et al. [2], showed high sensitivity (88.2%) and specificity (100%), making it a reliable alternative, particularly in chronic PJI cases. However, its invasive nature limits standarized applicability.

Meanwhile, ultrasound-guided aspiration demonstrated a sensitivity of 95.7% and specificity of 74.1%, providing a non-invasive alternative for predicting dry taps and guiding re-aspiration. In this study, ultrasound-guided aspiration was used in the hip joint for diagnosis of PJI [4].

While saline injection may increase diagnostic accuracy, studies such as Li et al. [10] and Christensen et al. [5] highlighted the risk of contamination associated with the procedure. Also, Li et al. demonstrated that saline lavage and re-aspiration for culture in cases of insufficient synovial fluid can be a feasible method for diagnosing PJI, with good sensitivity and specificity. Standardized protocols are necessary to mitigate this risk [10].

Xu et al. [7] emphasized the importance of adjunct diagnostic tools like serological markers to complement saline lavage and reduce false positives or negatives.

Some authors, such as Treu et al. [8], underscored that dry taps are not inherently reassuring and require further diagnostic workup, often benefiting from saline lavage to increase fluid retrieval and culture sensitivity.

This systematic review presents varying levels of evidence. With only one of eight studies being prospective, the reliability of retrospective data requires further analysis. Some studies indicate that preoperative lavage accuracy varies, with inconsistent concordance rates between preoperative and intraoperative cultures in the absence of standardized methods. This underscores the need for further evidence to clarify its diagnostic reliability. [6]

References

Fix references according to JOA style→ no ampersands (&), etc.

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