Advancing Diagnostic Assistance In Orthopedic Surgery: Differentiating Normal From Abnormal Wound Healing Post-surgery

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Disclosures:

INTRODUCTION: Surgical site infections (SSIs) are the most common nosocomial infections for surgical patients and the second most reported infection. Surgical site infections are also a substantial detriment to outcomes in orthopedic surgery. This issue is of particular note for patients receiving glucocorticoid injections, as they are shown to have a higher susceptibility. Current work has focused on perioperative mitigation of infection, but limited research has assessed early detection of infectious wound etiology after patient discharge.

METHODS: We analyzed thirty post-operative orthopedic wound images, including 15 normal and 15 abnormal or infected cases, gathered from case reports and verified sources. A board-certified physician authenticated these images as either well-healed or needing medical attention. The GPT-4 was the AI tool was tasked to determine the urgency of medical attention required for each wound based on a simple 'yes' or 'no' response.

RESULTS SECTION: The AI tool successfully identified 14 of the 15 infected wounds as requiring immediate medical attention and accurately recognized 10 of the 15 properly healed wounds. This reflects a sensitivity of 93.3%, a specificity of 63.3%, a positive predictive value of 58.3%, and a negative predictive value of 83.3%.

DISCUSSION: The study reveals the promising role of AI in enhancing wound assessment in orthopedic post-operative care. The high sensitivity in detecting potential complications is noteworthy. Nonetheless, given the current beta stage of the technology, further refinement is needed to improve its specificity and overall diagnostic precision. These findings support ongoing research and development of AI applications in orthopedic surgery, emphasizing their potential to revolutionize patient care and clinical efficiency.

SIGNIFICANCE/CLINICAL RELEVANCE: Accurate differentiation between normal and abnormal wound healing post-orthopedic surgery is vital for patient outcomes. This study's focus on AI-assisted diagnostic tools marks a pivotal advancement in post-surgical care. By improving wound assessment accuracy, it aims to promptly identify complications while reducing unnecessary clinical visits. This research aligns with the growing need for technological integration in healthcare, offering a pathway to more efficient, patient-focused orthopedic care and highlighting the importance of technological innovation in enhancing medical services.