Diagnosis

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QUESTION 1: Which open fracture classification system currently used (Gustilo-Anderson classification or the Orthopaedic Trauma Association's open fracture classification (OTA-OFC)) is preferred, based on interobserver reproducibility and predictiveness of outcomes?

RECOMMENDATION: OTA-OFC is preferred. Based on currently-available data, the OTA-OFC provides a more robust description of the injury with interobserver agreement that is comparable or superior to the Gustilo-Anderson classification. Additionally, the OTA-OFC, according to its subcategories, may predict outcomes such as the likelihood of early amputation and need for adjuvant treatments.

LEVEL OF EVIDENCE: Limited

DELEGATE VOTE: Agree: 95%, Disagree: 0%, Abstain: 5% (Unanimous, Strongest Consensus)

RATIONALE

The Gustilo-Anderson classification was introduced in 1976 for use in describing open fractures of the tibia [1,2]. Originally comprised of Types I through III, Type III was later subdivided into subtypes A through C to allow for the classification of "severe" fractures with greater specificity [2,3]. It has since been adopted for describing open fractures of all long bones and remains the most widely-used system for classifying open fractures [2].

The Gustilo-Anderson classification was found to have only moderate interobserver agreement when investigated by Horn et al. [4] and Brumbeck et al. [5], with an overall agreement of 66% and 60%, respectively. Clinically, the Gustilo-Anderson classification is well-established as a predictor of infection and amputation [1–3,6–8]. It provides a method of stratifying open fractures broadly into "mild" and "severe" categories.

The OTA-OFC was introduced in 2010 as a system for describing open fractures of all locations [9]. Rather than utilizing a single composite score, the OTA-OFC is comprised of five discrete components (skin, muscle, arterial, contamination and bone loss) each of which are independently rated mild, moderate or severe [9].

Studies suggest that inter-observer agreement throughout the OTA-OFC system is "moderate" to "good" overall [10,11], a statistic that is comparable or superior to that which has been reported for the Gustilo-Anderson classification [4,5,10]. This must be interpreted with caution, however, as the OTA-OFC is not aggregated and inter-observer agreement is not comparable among the five categories [10]. Studies assessing reliability have found that agreement is less robust within the muscle, bone loss, and contamination categories of OTA-OFC, suggesting that these categories may benefit from revision or clarification [10,11].

Initial studies in predictive utility of the OTA-OFC are promising. Agel et al. found different categories useful in predicting certain treatment modalities: the skin category for vacuum-assisted closure; bone loss category for antibiotic bead placement; skin and muscle categories for multiple debridements; and skin, contamination and arterial injury categories for early amputation [12]. Johnson et al. found it to be predictive of amputation and infection within 90 days [13]. Hao et al. found it to be predictive of amputation when the cumulative score was ≥ 10 [14].

While further studies validating the OTA-OFC are needed, the current literature suggests that it provides a method of describing open fractures with greater specificity compared to the Gustilo-Anderson classification with comparable inter-observer agreement.

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