Wagstaffe-Le Fort Fractures in 573 Ankle Fracture Patients: Retrospective Analysis of Prevalence, Morphology, Radiographic Detection, and Correlation with Fracture Classifications

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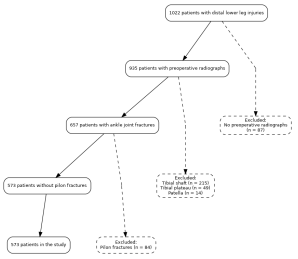
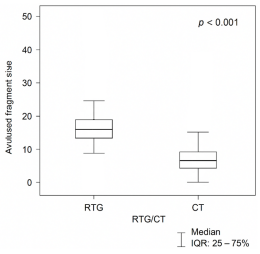
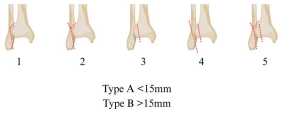
INTRODUCTION:
Wagstaffe-Le Fort fractures and avulsion injuries at the fibular insertion of the anterior inferior tibiofibular ligament (AITFL) are under-recognized in the setting of ankle fractures. The reported incidence varies widely depending on the imaging modality and the population. Their presence may indicate that syndesmotic instability requires surgical attention. This study aimed to assess the prevalence of these fractures, evaluate their detectability on plain radiographs versus computed tomography (CT), classify their morphology, correlate them with standard ankle fracture classifications, and determine the clinical relevance of fragment size.
METHODS: A retrospective analysis was performed on 1022 patients admitted to a level I trauma center with distal lower limb fractures between January 2016 and June 2024. After applying the exclusion criteria (absence of imaging, non-ankle fractures, and pilon fractures), 573 patients were included in the study. Imaging was independently reviewed by two blinded observers (radiologists and orthopedic surgeons). Wagstaffe-Le Fort fractures were classified into five morphological types based on the Birnie system. Each case was categorized using Weber, Lauge-Hansen, and Pott classifications. The fragment sizes were measured, and the detection rates were compared between X-rays and CT.
RESULTS: Wagstaffe-Le Fort fractures were identified in 116 of the 573 patients (20.2%). Detection was significantly higher with CT (68.0%) than with radiography (13.4%; p<0.001). Type 2 fractures were the most common (82.8%), followed by Type 4 fractures (8.6%). Types 1 and 5 were rare (<2%). Fracture type 2 correlated strongly with supination-external rotation (SER) and Weber B patterns, whereas type 4 correlated with pronation-external rotation (PER) and Weber C. Fragment sizes showed substantial variability (median 16.6 mm, IQR 9.2–21.5 mm), and were significantly larger on radiographs (median 18.5 mm) compared to CT (median 12.0 mm), p<0.001. A size threshold of 15 mm was proposed as more clinically relevant for surgical fixation than the previous cutoffs (<5 mm).
DISCUSSION AND CONCLUSION: This study demonstrates that Wagstaffe-Le Fort fractures are far more prevalent than commonly reported, particularly when CT is employed. Detection by CT not only reveals smaller fragments but also reveals associations with more complex injury patterns. These findings support a re-evaluation of the current classification and fixation criteria, including a proposed new size threshold of ≥15 mm as an indicator of potential fixation. Type 2 and type 4 fractures show reproducible patterns correlating with specific injury mechanisms, offering insight into the risk of syndesmotic injuries. Future research should focus on the prospective validation of a morphology-based classification system that includes fragment size, displacement, and associated injury configuration to guide operative decision making and improve functional outcomes.







Variable	Category	N (%)
Imaging Modality	Radiography (X-ray)	501 (87.44%)
	Computed Tomography (CT)	72 (12.56%)
Weber Classification	Type A	10 (1.81%)
	Type B	437 (78.89%)
	Type C	107 (19.31%)
	Not classified (no fibula fracture)	19 (3.32%)
Pott Classification	Unimalleolar	176 (30.71%)
	Bimalleolar	128 (22.34%)
	Trimalleolar	262 (45.73%)
Lauge-Hansen Classification	Supination-External Rotation (SER)	431 (75.22%)
	Pronation-External Rotation (PER)	104 (18.15%)
	Pronation-Abduction (PA)	18 (3.14%)
	Supination-Adduction (SA)	13 (2.27%)
Other Fractures	Isolated Tillaux-Chaput fracture	7 (1.22%)