Diagnostic Value of Ultrasound Imaging for Tibial Stress Fractures

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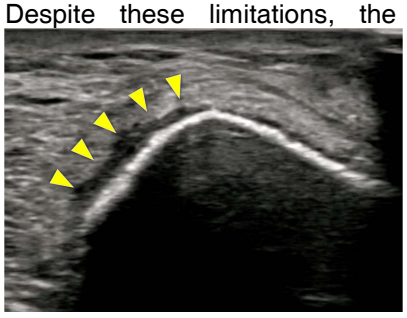
INTRODUCTION: Tibial stress fractures are common sports injuries. While MRI is the gold standard for diagnosis, it is not always feasible to perform MRI on all suspected cases. Recently, ultrasound imaging has gained attention as a simpler and less invasive diagnostic tool. This study aims to evaluate the diagnostic value of ultrasound imaging for tibial stress fractures.

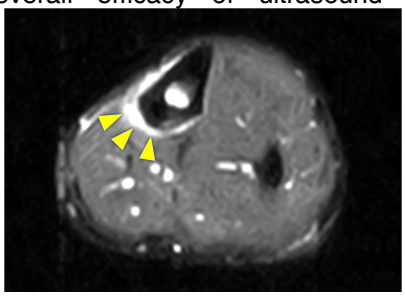
METHODS:

We conducted a retrospective review of patients who visited our facility between July 2018 and August 2023 with suspected tibial stress fractures based on history and physical examination. Patients who underwent ultrasound imaging followed by MRI were included. Ultrasound diagnosis of stress fractures was based on the presence of hypoechoic areas on the periosteum of the tibial medial edge. MRI diagnosis was based on the presence of high signal areas on the periosteum of the posterior medial tibia on T2-weighted images. We calculated the sensitivity and specificity of ultrasound imaging using MRI results as the definitive diagnosis.

RESULTS: A total of 155 tibiae (123 males, 32 females; average age 20 years) were analyzed. MRI confirmed tibial stress fractures in 118 tibiae. The sensitivity of ultrasound imaging for diagnosing tibial stress fractures was 91%, and specificity was 86%. There were 11 false-negative cases, mostly due to chronic stress fractures with cortical bone protrusion, making it difficult to assess hypoechoic areas. There were 5 false-positive cases, including instances where anterior tibial changes due to contusions were misdiagnosed as stress fractures by ultrasound.

DISCUSSION AND CONCLUSION: Ultrasound imaging demonstrates high sensitivity and specificity for diagnosing tibial stress fractures, making it a valuable diagnostic tool. However, challenges arise in cases of chronic stress fractures, where cortical bone protrusion can obscure hypoechoic areas, necessitating supplementary MRI for precise diagnosis. Despite these limitations, the overall efficacy of ultrasound imaging supports its use in clinical practice.





		Ultrasound		
		+	-	total
MRI	+	104	13	117
	-	6	26	32