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Titel: Diagnostic accuracy of ultrasound screening on suspicion of extremity fractures in adults.

Background: The conventional diagnostic approach on suspicion of upper and lower extremity fracture consists of a clinical and a radiographic examination. Fifty % of the patients go through an x-ray examination having no fracture. Studies indicate ultrasound (US) can effectively identify fractures in adults.

Aim of study: To determine the diagnostic accuracy of US screening to exclude extremity fractures in adults. Furthermore, to determine the inter-rater agreement of US images in this group of patients.

Materials and method: We consecutively enrolled 92 adults referred to x-ray at Regionshospitalet Viborg, on suspicion of extremity fracture. To ensure blinding, US was consistently performed prior to x-ray. Similarly, no clinical examination was performed. X-rays were reviewed for the presence of fracture and considered to be gold standard. Inter-rater agreement between one of the investigators and a blinded radiologist was conducted by evaluating 42 randomly selected US images.

Results: Prevalence of fractures was 27%. McNemars test found no systematic difference between the results of US and x-ray ($p=0.69$). The sensitivity of US in detecting fracture was 92% (95% CI: 74;1.0) and the specificity was 94% (95% CI: 85;1.0). The positive predictive value of US was 85% (95% CI: 66; 96) and the negative predictive value was 97% (95% CI: 0.89;1.0). The inter-rater agreement was 100%, equal to a kappa value of 1 (95% CI: 1;1).

Conclusion: US screening on suspicion of extremity fracture has a high accuracy and reliability. No systematic differences were found between the results of the two modalities. Due to the small study population, more studies are required before US can be recommended as a screening modality