

Diagnostic Accuracy of Radiology Reports in Atypical Femoral Fractures is Improving but Remains Low

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INTRODUCTION:

Atypical femoral fractures (AFF) are a new entity of insufficiency fractures with a strong association to bisphosphonate treatment. Because these fractures are so rare a high level of suspicion and awareness of the radiological features is needed to correctly identify patients.

The purpose of this study was to investigate if the diagnostic accuracy of written radiology reports to identify AFF features had improved between an early time period, where AFF were poorly defined, and a later time period, where worldwide diagnostic criteria had been established.

METHODS:

Through previous investigations, 171 patients with AFF were identified among all fractures in the femoral shaft registered in the Swedish National Patient Register (NPR) between 2008 and 2010 (Period 1). In a later period, between 2015 and 2018, where the diagnostic criteria of the American Society of Bone and Mineral Research were well-described, 104 patients with AFF were captured through the Swedish Fracture Register (Period 2) (Figure 1). The Swedish Fracture Register (SFR) is a nationwide register where fractures and their treatment are entered by the treating physician. The patients ages ranged from 46 to 94 years (median 77 years) with the majority of the patients being female (163 of 175 cases, 93%) (Table 1). AFFs were identified through individual review of plain radiographs based on the American Society of Bone and Mineral Research (ASBMR) criteria and in consensus among several reviewers. Available written radiology reports of the first diagnostic examinations were obtained from all radiology departments in Sweden and searched for descriptions of AFF or stress/insufficiency fractures (true positives). All other reports were considered false negative. For statistical comparison, the number of true positives and false negatives was compared between the time periods using Chi squared and Fisher's exact test (Jamovi v1.6, the Jamovi project 2021).

RESULTS:

Written radiology reports could be obtained for 98 of the 171 AFFs (period 1) and 77 of 104 in period 2. In period 1, seven of 98 radiology reports (7%) were true positive compared to 21 of 77 cases (27%) in period 2, ($p < 0.001$). The improvement in diagnostic accuracy was similar for academic hospitals, from 3 of 39 cases (8%) in period 1 to 6 of 19 cases (32%, $p = 0.018$) in period 2, compared to non-academic centers, 4 of 59 cases (7%) and 15 of 57 cases (26%, $p = 0.004$). There was no difference in the diagnostic accuracy for women, compared to men, $p = 0.948$ or fractures with a diaphyseal versus a subtrochanteric fracture location, $p = 0.338$.

DISCUSSION AND CONCLUSION:

Despite a significant improvement over time, the diagnostic accuracy of radiology reports for AFF remains low and emphasizes the need for educational efforts among reporting radiologists. AFFs in period 2 were all reported by orthopaedic surgeons in the Swedish Fracture Register, which might indicate that awareness of AFF among orthopaedic surgeons is higher compared to our colleagues at the radiology department increasing the likelihood for adequate surgical and adjuvant treatment in a joint venture.

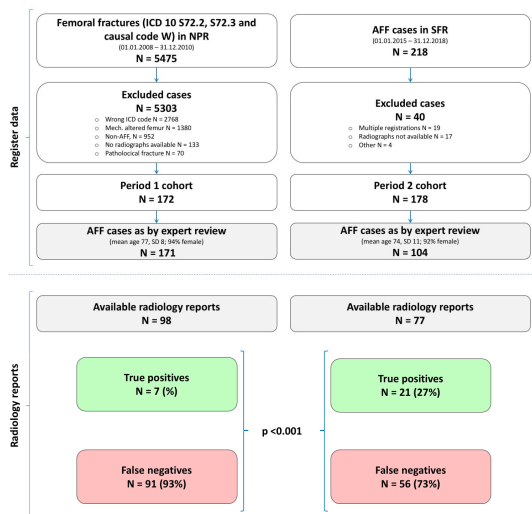


Table 1: Patient characteristics

	Period 1	Period 2	
AFF reports available (of total)	98 (171)	77 (104)	$p = 0.001$
Gender			
- male	6	6	$p = 0.664$
- female	92	71	
Median age, years			$p = 0.017$
- men	77	75	
- women	75	57	
- women	79	76	
Side			$p = 0.386$
- right	43	33	
- left	47	38	
- bilateral	2	0	
Location			$p = 0.371$
- subtrochanteric	13	14	
- diaphyseal	85	63	