

Streszczenie rozprawy doktorskiej lek. Marleny Bereźniak p.t. „Diagnostyka rentgenowska ostrych uszkodzeń kręgosłupa piersiowo-lędźwiowego z uwzględnieniem chorób usztywniających” w języku angielskim

Conventional radiography and computed tomography in the diagnosis of acute thoracolumbar injuries with particular emphasis on ankylosing spinal disorders

The incidence of thoracolumbar (TL) fractures in patients with blunt trauma is 6.9%. A special group consists of patients with ankylosing spinal disorders, in whom 39% of injuries are caused by falls from standing height. Ankylosis alters spinal biomechanics, increasing susceptibility to injury and raising the risk of neurological complications even after minor trauma.

The studies conducted as part of this publication series involved the evaluation of computed tomography (CT) and radiographs (X-rays) performed after TL spine trauma in patients with and without rigid spine.

The aims of the study were: 1) assessment of location and morphology of TL spine fractures depending on the presence and type of ankylosis; 2) comparison of the frequency of unstable fractures, multilevel fractures, and fractures in multiple spinal regions in patients with short- and long-segment ankylosis; 3) evaluation of the effectiveness of X-rays in detecting acute TL spine fractures in patients with and without ankylosing spinal disorders, using CT as the reference method; 4) analysis of the impact of reader experience on the sensitivity, specificity, and diagnostic accuracy of X-rays.

The first study analyses the impact of different types of spinal ankylosis on the location and morphology of TL spine fractures. In both groups of patients without and with rigid spine, fractures were most commonly located in the TL junction, and in the rigid spine group, most fractures were located within the ankylosed spinal segment (46.96%). In the rigid spine group, multilevel fractures and unstable type B and C fractures occurred more frequently (2.53 and 2.1 times more often than in the control group, respectively). Multilevel and unstable fractures were seen almost exclusively in patients with long-segment (≥ 4 segments) ankylosis. The frequency of multilevel non-contiguous spine fractures and fractures in multiple spinal regions was 2.1 and 1.76 times higher in the rigid spine group than in the control group, respectively.

The second study evaluates the diagnostic value of X-rays compared to CT in detecting acute TL spine fractures after minor trauma. The sensitivity of X-ray in fracture detection was low: 44.1% for the resident and 53.6% for the attending radiologist, respectively, with high specificity (95.5% and 98.8%). The rate of unrecognized fractures was higher in rigid spine group than in the non-rigid spine group, and fractures located in the thoracic region were more frequently unrecognized than in the lumbar region. Misclassification of acute fractures as chronic deformation was identified as an important cause of unrecognized type A fractures.

Based on the conducted analyses, it can be concluded that X-rays, regardless of the experience, do not provide sufficient diagnostic accuracy in evaluating acute TL spine fractures in patients after minor trauma, especially in cases of rigid spine, where multilevel fractures, fractures in multiple spinal regions, and unstable type B and C fractures occur more frequently.