



THE ROLE OF ULTRASOUND DIAGNOSTICS IN IDENTIFYING COMPLICATIONS OF PELVIC BONE FRACTURES

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Fractures of the pelvic bones are among the most complex and life-threatening injuries of the musculoskeletal system. According to the World Health Organization (WHO), there has been a steady increase in the number of patients with pelvic injuries in recent years due to the increase in road traffic accidents. In 2022-2024, the frequency of pelvic bone fractures was 25-37 cases per 100,000 population, which is 30-40% higher than in previous years. The injury rate is particularly high in patients over 60 years of age, which is linked to the prevalence of age-related degenerative changes in the musculoskeletal system. (Hughes R., Carter J., Nolan P.)

Fein A.M. et al. (2017) emphasize that "despite the implementation of modern medical technologies into practice, the number of complications and mortality in patients with pelvic injuries accompanied by retroperitoneal hemorrhage remains high." They note that high rates of general and local complications persist even with modern approaches to diagnosis and treatment. The main complications of pelvic fractures include: Massive bleeding (intra-abdominal and retroperitoneal) → leading to traumatic shock and hypovolemic shock (5-18% in severe fractures, according to Leone E. et al., 2022).

Other complications of pelvic ring fractures include nerve damage, especially in cases of sacral fractures.

Fractures of the pelvic ring in 15-20% of cases are accompanied by damage to the bladder or urethra. (Durkin A, Sagi HC)



Thromboembolic complications (thrombosis of deep veins in the lower extremities and pelvis up to 39-60%, according to Russian research, including Byalyk E.I. et al., 2012).

Neurogenic, infectious, and late complications (chronic pain, gait disorders, sexual dysfunction, urethral strictures).

Gudushauri Ya.G. in his work indicates a high frequency of diagnostic errors in acute pelvic injuries and emphasizes the relevance of the problem of complications from the urinary system and other organs in pelvic ring injuries.

The role of ultrasound in diagnosing complications of pelvic fractures is particularly high in pre-hospital and early hospital stages in patients with unstable hemodynamics. Ultrasound (as part of the FAST/eFAST protocol) allows for the rapid identification of free fluid (hemoperitoneum), retroperitoneal hematomas, and signs of ongoing bleeding. Leone E. et al. (2022) and other reviews emphasize that early and accurate imaging (including ultrasound for soft tissues and hematomas) is crucial for reducing preventable mortality from bleeding - the leading cause of death in unstable pelvic ring fractures.

Goal.

To evaluate the diagnostic capabilities of ultrasound examination in identifying complications from the pelvic organs in patients with pelvic bone fractures and to determine its role in monitoring the patients' condition.

Research materials and methods.

The studies were conducted at the Chirchik City Medical Association. Data from 40 patients with pelvic bone fractures aged 18 to 75 years were analyzed. Ultrasound examination (USI) was conducted using the "М сайын DC-40 Full HD" device (China) in real-time. Convex sensors with a frequency of 2.5–5.0 MHz were used to examine the abdominal organs and the pelvis. Patients with confirmed pelvic bone fractures of varying severity were under



observation. Ultrasound examination was performed upon admission, as well as in dynamics during the treatment process.

During the study, the condition of the bladder, the presence of free fluid in the pelvic cavity, soft tissue structure, the presence of hematomas, signs of inflammatory changes, and organ damage were assessed.

Research results.

Ultrasound examination revealed various complications from the pelvic organs in patients with pelvic bone fractures. In 40% of cases, hematomas of various localizations were identified, manifesting as echonegative or heterogeneous formations. In 25% of cases, the presence of free fluid in the pelvic cavity was noted. Injuries to the bladder manifested as deformation of its contours, the presence of echonegative contents outside its cavity, and the disruption of wall integrity. In 15% of cases, signs of inflammatory changes in the form of organ wall thickening, increased exogenicity of surrounding tissues, and infiltration were identified. Dynamic ultrasound observation allowed for monitoring hematoma sizes, assessing their organization or dissolution, and timely identifying signs of infection and other complications.

Conclusions.

Ultrasound examination is an effective, safe, and accessible method for diagnosing pelvic organ complications in pelvic bone fractures. The application of ultrasound in dynamics allows for the timely detection of pathological changes, the assessment of treatment effectiveness, and the adjustment of treatment tactics, which contributes to improving the prognosis of the disease.