SOME FEATURES OF THE THEORY OF ETIOPATHOGENESIS AND TREATMENT OF THE ACETABULAR FRACTURES

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Abstract: Fracture’s of the acetabulum is occurred often under 50 year old peoples and it has social-economical means for government, it is importance to recovering as soon as possible in short time period for keep on daily activity all patients. Often reason of this damage’s is road-traffic accident and falling from height. Firstly observed mechanism of the trauma and established rules of the occurrences. By improving surgical methods of the treatment of acetabular fractures described base of the acetabulum, as an iliac segment, level of the displacement of the fragments which has high meaning for prognosis and results of the treatment.

Keywords: hip a joint, acetabulum, surgical approach, diagnostics, treatment, rehabilitation treatment, preventive maintenance, depth of a wound, an index of depth of a wound, a corner of an inclination of an axis of operational action.

After treatment by long period, many sciences determined seriously complications such as inability load of the damaged limb and pain syndrome, which cause of permanent disaster in 30-67,7% (Charles, 2005; Lavrov, 1965; Miliukoff, Pronskih, 2006). Recently many scientists consider that the acetabular fractures are referred to the complex types of pelvic damages and account from 7,0 % to 22,2 % (Charles, 2005; Lavrov N., 1965; Miliukoff, Pronskih, 2006). The number of acetabular traumas among the other skeletal bone injuries achieves 0,05 %-0,32 % (Babosha, Adonin, 1999; Kutepov et al., 1995; Yezhov, 1996). Letournel E. (1994) and other authors believe that the most often causes of the acetabulum seem to be injuries of the traffic accidents (50-89 %), including automobile driving (71-86 %) and motorcycle accidents (3 %). The acetabular injuries of the pedestrians occur in 3-16 % of accidents (Anagnostakos, 2009; Balaberba, 2001; Bashurov, 1984; Beaule, 2003; Chevalier, 1993; Grigoryan, 1994; Kumar et al., 2005; Kutepov, 1995; Lazarev, 1992; Miliukoff, Pronskih, 2006; Mineev, 1993; Tikhilov et al., 2005; Yezhov, 1996). The prevalence of acetabular traumas among the males (on the average 69,4 %) is related to their high social and professional activity Anagnostakos, 2009; Bashurov, 1984; Charles, 2005; Chevalier, 1993; Grigoryan, 1994; Kutepov et al., 1995; Lavrov, 1965; Lazarev, 1992; Tikhilov et al., 2005; Tikhilov et al., 2011; Yezhov, 1996). The acetabular fractures are found more often among the people under 50 years of age and this appeared to be of great social and economic importance for the state (Balaberba, 2001; Bashurov, 1984; Chevalier, 1993; Ginnoudis et al., 2005; Grigoryan, 1994; Kutepov et al., 1995; Kutepov, 1995; Lavrov, 1965; Tikhilov et al., 2005; Yezhov, 1996). The statistical data show 28-35% of the acetabular fractures among the other injuries. At the majority of the victims of traumas the acetabular fractures were the components of the associated traumas (76-89 %), and at 22-30 % of the patients in the clinical picture the damages of a head dominated, at 8-14 % – trauma of a breast, at 2-7,9 % – damages of the abdominal organs. At the patients with acetabular fractures there were observed extremity damages (38-43 %), peripheral nerves (basically of sciatic nerve – 14-20 %), genitourinary system organs (14-17 %), spine (2-3 %), and rupture of the pelvic ring integrity (6,2 %) (Anagnostakos, 2009; Babosha, Adonin, 1999; Balaberba, 2001; Bashurov, 1984; Beaule, 2003; Chevalier, 1993; Grigoryan, 1994; Kutepov et al., 1995; Lazarev, 1992; Mineev, 1993; Tikhilov et al., 2005; Yezhov, 1996) present time the term "acetabular dome" has been used, which shows the part of the acetabulum that is located above the acetabular notch in a direction of summary vector of forces acting to acetabulum. On the computer tomograms it looks like as a hemisphere, which border is located in 10 mm below the acetabular top (Tikhilov et al., 2005).

The size of acetabular dome should be rather extended providing normal hip joint functioning, distribution of loading to all accessible articular surface, reduction of loading on the articular cartilage, balance of the forces effecting on the acetabulum (Balaberba, 2001; Bashurov, 1984; Chevalier, 1993;
Kutepov et al., 1995; Miliukoff, Pronskih, 2006; Mineev, 1993; Tikhilov et al., 2005; Yezhov, 1996). It is considered, that the sizes of the dome should exceed limits of a scope of loading (Miliukoff, Pronskih, 2006). Matta J. et al. have developed a method of a quantitative estimation of dome damage and have established, that the displacement of the acetabulum fragments more than 3 mm at a range of posterior and middle arches of the acetabular dome up to 30º, and of anterior arch up to 20º led in negative results (Miliukoff, Pronskih, 2006). As they failed to achieve satisfactory reposition of the similar fractures by conservative methods they concluded that at the angle of the acetabular dome less than 45º in each of three measurements it is necessary to apply operative treatment (Lavrov, 1965; Miliukoff, Pronskih, 2006; Tikhilov et al., 2011).

At fractures of both acetabular columns, Letournel E. (1993) believed that the destruction of the dome has less importance for outcome of treatment in comparison with other damages (Lazarev, 1992; Yezhov, 1996). The complex fracture of both columns is isolated in a separate type because all acetabular fragments separated with an axis of a skeleton, that is, posterior part of a wing of the iliac bone. In a case, when one of acetabular fragments is displaced with rotation, but with saving of relative congruence of the acetabular joint surfaces and head of the femur, and the hip joint remains to be stable, then the injured patients need not operative treatment in most of cases (Tikhilov et al., 2011). The stability of hip joint is the important factor dependent on safety of bones, forming it. At serious defects of posterior or anterior acetabular walls and the fracture of the tetrahedral plate the instability of hip joint preserves even after reposition of the femur dislocation (Lavrov, 1965; Mineev, 1993; Tikhilov, Shoubniakov et al., 2011).

The acetabulum redistributes loading from the lower extremities through the femoral head to the skeleton axis. Depending on circumstances and kind of a trauma, the type of fracture and accompanying damages are defined (Mineev, 1993; Tikhilov et al., 2011). So, the indirect trauma arises at throw of the bent knee about an instrument board of the automobile ("dashboard injury") into the area of greater trochanter or foot at the unbent knee joint (Bashurov, 1984; Kumar et al., 2005; Miliukoff, Pronskih, 2006; Mineev, 1993; Yezhov, 1996). In the long-terms after a trauma of the acetabulum many researchers revealed significant disturbance of the left lower extremity function in the majority of patients, which was the reason of the persistent disability in 30-67,7 % of the patients (Charles, 2005; Lavrov, 1965; Miliukoff, Pronskih, 2006; Tikhilov et al., 2011; Yezhov, 1996). In opinion of many authors, the consequences of the acetabular fractures are late complications. They include necrosis of the femoral head, heterotopic ossificates, posttraumatic arthrosis of the hip joint (Shevaliev, 1993; Brooker et al., 1973; Ruesch et al., 1994).

During the time degenerative-dystrophic changes in the hip joint arise in 12-57 % of the injured patients, deforming osteoarthrosis in 20 %, heterotopic ossificates in 25,6 %, and aseptic necrosis of the femoral head in 10 % (Kutepov, 1995; Anglen, Moore, 1996; Triantaphillopoulos et al., 2007). Posttraumatic aseptic necrosis of the femoral head was found in 2-40 % of the patients (on the average in 5,6 %) with a posterior dislocation (on the average in 9,2 %) (Matta et al., 1986). D. C. Perry, W. Delong (1997) and R. K. Sen with the co-authors (2010) have established the same diagnosis in 25 % of the injured victims in the risk groups – with posterior dislocation-fracture, fractures of the acetabulum and femoral head. Aseptic necrosis of the femoral head developed more often at conservative (14 %) and delayed operative treatment of the fracture (13,8 %) (Johnson et al., 1994; Mears, 1997).

Heterotopic ossificates occur on the average in 25,6 % of cases (Mayo, 1987; Perry, Delong, 1997), more often in posterior or extended approaches during osteosynthesis of the acetabulum (Webb et al., 1990; Rommens, 2004; Karunakar et al., 2006). Disturbance of the hip joint function and ossificates required resection were revealed only in 5,7 % of cases (Gianoudis et al., 2005; Manidakis et al., 2009). Posttraumatic arthrosis was found by K. Hougard, P.B. Thomsen (1987) and P. Ruesch with the co-authors (1994) in 5-60 % of the patients, it became the cause of disability state of the patients with the acetabular fractures (Buachtze, 1971; Kutepov, 1995; Sahin et al., 2003).

The development of the posttraumatic arthrosis is caused by quality of the fracture reposition. From 1000 observations performed by E. Letournel, the arthrosis was found at achievement of anatomic reposition in 5% of suffered patients and with incomplete reposition in 60 % of the patients (Letournel, 1993; Madhu, 2006). In opinion of M. Heeg (1990), the development of consequences of the acetabular fractures is related to incomplete reposition of the fragments, however the other researcher believed that possibility of the development of posttraumatic arthrosis achieved 30-57% in spite of the fact that the purpose of operative treatment during osteosynthesis after fracture of the acetabulum was achieved (Pennal et al., 1980; Ragnarsson, Mjoberg, 1992; Mayo, 1994; Bellabarba et al., 2001). There is no uniform opinion about
adaptation of the hip joint to mild incongruence (Lipscomb, 1979; Gettys et al., 2011); some authors showed that the change of loading of forces effecting on the hip joint resulted in destruction of the articular cartilage of the acetabulum and femoral head (Matta et al., 1986).

The not removal posttraumatic deformation of the pelvic ring and ununited acetabulum may be the factor promoting development of the hip joint arthrosis. They complicate the subsequent reconstructive operations and are accompanied by functional inferiority of the lumbo-sacral and sacroiliac associations (Zorya, 2001). The prognosis is considered to be more favourable in the fractures of the anterior wall or column without injury of the acetabular vault than in the fractures of the posterior wall. They are treated more often by conservative method (Heeg et al., 1990; Liu et al., 2006; Reagan, Moed, 2011). The trauma of a posterior wall and posterior column predicts poor prognosis of treatment with propability to 90% in comparison with a trauma of the anterior departments (Pritchett, Bortel, 1991; Triantaphilopoulos et al., 2007). The negative results of operative treatment of the posterior wall were observed in 30 % of the patients (Aho et al., 1986; Saterbak et al., 2000; Moed et al., 2002).

The open reposition and internal fixing of the bone fragments at the articular fractures contributed to reduction of the risk of posttraumatic arthrosis, restoration of its basic bone mass, decrease in the pelvic deformation degree (Paprosky, 1994 decreases; Wright et al., 1994; Ranawat et al., 2009). The positive results of operative treatment of the articular fractures achieved in 40-91%, satisfactory in 8-16%, unsatisfactory in 9-30% of cases (Matta, 1983; Mayo, 1994; Saterbak et al., 2000; Lomita, 2002; Moed et al., 2002; Rommens, 2002).

At the consequences of the acetabular fractures it is important to avoid mechanical traumatization of the articular cartilage, subchondral bone tissue, articular capsule as well as blood circulation disorders leading to deterioration of the tissue trophic of the hip joint. At the fractures with dislocation of the femoral head there were found frequently damaged vessels surrounding articular cavity and owing to this the displaced fragments may damage vessels of the articular cavity (Edzov, 1996; Henle et al., 2007).

Early loading on the operated extremity may promote development of posttraumatic arthrosis. It resulted in the aseptic necrosis of the femoral head and development of the posttraumatic coxarthrosis in 60-80 of % of cases (Krijanovsky, Furmanets, 1992; Giannoudis et al., 2009).

Thus, the analysis of literature data indicates that the problems of etiopathogenesis and treatment of the acetabular fractures and their consequences have not studied well, in this connection this problem remains to be an object for steadfast attention from traumatologists-orthopedists and requires deeper investigation.

References


