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Pelvic Ring Fracture as Aa Potential Risk of Death in Politraumatic Patients

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Abstract

Background: Pelvic injuries can cause from trivial injuries to others that can cause hemodynamic repercussions that compromise the life of the patient. Among pelvic trauma, we must highlight the fractures of the pelvic ring, acetabular fractures or avulsion injuries, among others, the majority being the consequence of a high-energy blunt trauma Polytrauma patients are considered to be those with intentional or unintentional bodily injury resulting from acute exposure to amounts of energy that exceed the physiological tolerance threshold.

Methodology: A narrative review was carried out through various databases from January 2014 to May 2021; the search and selection of articles was carried out in journals indexed in English. The following keywords were used: pelvic ring, pelvic ring fracture, hemodynamic instability in polytraumatized patients, risk of death associated with pelvic fracture

Results: Pelvic trauma is one of the injuries that most frequently endangers the life of the polytraumatized patient, the mortality of patients with pelvic fractures can reach large figures if it is not suspected at the site, with imminent risk of These hemorrhage can become exsanguinating, causing hemodynamic compromise of the patient and its fatal outcome. In most cases (up to 80-90%) they are of venous origin, resulting in a non-negligible percentage that requires blood transfusion.

Conclusions: The present review offers to associate the fracture of the pelvic ring as a factor of hemodynamic instability secondary to abundant intra and extra abdominal blood losses in polytraumatized patients. Keywords: pelvic ring, pelvic ring fracture, hemodynamic instability in polytraumatized patients, risk of death associated with pelvic fracture

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1 | INTRODUCTION

Pelvic trauma can cause from trivial injuries to others that can cause hemodynamic repercussions that compromise the life of the patient (1).

The bony pelvis is made up of the sacrum, coccyx, and three innominate bones: ilium, ischium, and pubis. These last three will form the acetabulum, while the pelvic ring is formed by the iliac bones that articulate behind with the sacrum through amphiarthrosis, strongly united by the anterior and posterior sacroiliac ligaments, ileolumbar, sacrotuberous and sacrospinous ligaments. Towards the front, they form the pubic branches that join at the symphysis pubis by means of a fibrous disc, constituting an amphiarthrosis to which the inferior ligament of the symphysis pubis gives stability (2). The ischium forms a tuberosity in which the obturator foramen is located and it continues with the ilium through the ilioischial branch and with the pubis through the ischiopubic branch (3).

The arterial and venous vascular network is very important since, if the pelvic ring breaks, there is an anatomical variant called the crown mortis, it rests on the posterior face of the pubis. It is an arterio-venous anastomosis between the internal iliac and the external iliac, specifically the junction between the obturator artery and / or vein (branch of the internal iliac artery) with the epigastric branches (branches of the external iliac artery) (4). Its importance lies in the fact that sometimes its breakage goes unnoticed and causes death (5).

Regarding incidence, pelvic fractures represent approximately 3% of skeletal injuries, the mortality rate associated with them being between 10-16%. However, pelvic fractures considered open are rare, representing only 2-4% of all of them. The latter are usually present in conjunction with multiple injuries in young adults from direct or traffic-borne trauma.

Most of the deaths are due to internal injuries associated with them, while those deaths attributed exclusively to pelvic fractures range between 0.4-0.8%. Among the risk factors that increase the predisposition to suffer this type of fracture, we found a low mass bone loss, smoking, hysterectomy, advanced

age and its consequent risk of falls (5,6) (6) (7)

Motor vehicle collisions and motorcycle accidents stand out, these being between 43-58%, pedestrians hit by a motor vehicle, between 20 and 22%, and falls, ranging between 5 and 30% in compared to 0.3% of all blunt trauma patients (7).

We must perform a physical examination, this is a very valuable diagnostic element, with high sensitivity (> 90%), but low specificity. There may be perineal edema, sacral deformity, peri-pelvic, genitourinary (GU) and gastrointestinal (GI) soft tissue lesions (8). Among the clinical manifestations we find: pain, hypovolemic shock, hematuria, rectal bleeding, absence of femoral pulses, perineal hematoma, scrotal and penile hematoma. When a pelvic injury is suspected in a hemodynamically unstable patient, we must try to stabilize it, with the aim of reducing the volume of the pelvis and stabilize the fracture fragments, thereby reducing the risk of major bleeding (9). Likewise, we could unite the lower limbs to stabilize these limbs in internal rotation, which also reduces the volume of the pelvis (9). However, care must be taken not to bind the pelvis too tightly (10).

If the fast echo is positive, we will proceed to emergent laparotomy, stabilization of the pelvis and preperitoneal packing, while those patients who present a negative diagnostic peritoneal aspirate will be treated by stabilization of the pelvis and preperitoneal packing and in those cases necessary, Pelvic angiography will also be used (11). Regardless of the above, in all patients who present hemodynamic stability and large pelvic fractures are suspected, they will be evaluated with multislice computed tomography; in patients with uncontrollable bleeding secondary to severe pelvic trauma, there are centers that resort to source occlusion. intra-aortic balloon bleeding as a temporary measure in order to control bleeding (12).

Supplementary information The online version of this article (<https://doi.org/10.52845/JMRHS/2021-4-9-2>) contains supplementary material, which is available to authorized users.

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2 | MATERIALS AND METHODS

A narrative review was carried out, in which the PubMed, Scielo and ScienceDirect databases, among others, were searched. The collection and selection of articles was carried out in journals indexed in English from the years 2014 to 2021. As keywords, the following terms were used in the databases according to the DeCS and MeSH methodology: pelvic ring, pelvic ring fracture, hemodynamic instability in polytraumatized patients, risk of death associated with pelvic fracture. In this review, 70 original and review publications related to the subject studied were identified, of which 20 articles met the specified inclusion requirements, such as articles that were in a range not less than the year 2014, that were articles of full text and to report on the association of pelvic ring fracture with risk of death in polytraumatized patients. As exclusion criteria, it was taken into account that the articles did not have sufficient information and that they did not present the full text at the time of their review.

3 | RESULTS

HOW PELVIC RING FRACTURE CAN BE A POTENTIAL RISK OF DEATH

Pelvic ring injuries are usually associated with high-energy trauma (especially traffic accidents) and carry a high risk to the life of the patient. Pelvic fractures with hemodynamic instability present a high mortality, between 10 and 42% (13), (14). Mortality is due to uncontrolled pelvic bleeding in 40% of cases. The origin of the bleeding can be arterial, venous or from the fractured bone itself. Venous bleeding is the most frequent, and arterial bleeding occurs in 10-20% of cases. In any case, in patients with hemodynamic instability, the frequency of arterial bleeding increases up to 73%. Patients with hypotension and pelvic fractures have a high mortality, so appropriate decision-making is crucial (15). Pelvic fractures associated with bleeding frequently present rupture of the posterior bony ligament complex (sacroiliac, sacrospinous, sacrotuberous, and fibromuscular pelvic floor) due to complex sacroiliac fractures and / or dislocations or from a sacral fracture. The rupture

of the pelvic ring compromises the pelvic venous plexus and sometimes involves the internal iliac artery (anteroposterior compression injury), there is also the possibility of an involvement of intra-abdominal organs, this occurs in 16.5% of patients who suffer pelvic trauma, being able to present hepatic, splenic or even intestinal involvement, bladder and urethral involvement, the existing percentage of genitourinary involvement is not negligible as well as significant complications secondary to pelvic trauma, neurological involvement not less important are the nerve deficits associated with certain pelvic fractures, reaching a percentage of around 10-15% of cases that present with interruptions of the pelvic ring and there are higher rates (up to 50% of cases) in those fractures that present damage to the sacral level. This incidence increases with the degree of instability (1.5% in stable fractures versus 14.4% in unstable ones) (16). The nerve roots most frequently affected are L5 and S1, as well as isolated peripheral nerves whose clinical translation would be a possible bladder involvement, at the intestinal level or even sexual dysfunction, despite not arising from the aforementioned lumbosacral plexus, the femoral and obturator nerves also are located within the pelvis, so they can be injured in pelvic trauma, involvement of ruptured thoracic aorta, Dissection of the thoracic aorta occurs in 1.4% of patients who suffer blunt trauma with pelvic fracture as a consequence (17), (18).

4 | DISCUSSION

The fracture of the pelvic ring in polytraumatized patients has a great repercussion against the health of the patient due to all the consequences associated with them, among which the pelvic instability that goes hand in hand with intra and extra-abdominal hemorrhage is of a venous nature in higher proportion, even so, potentiating the risk of death if it is not acted on in a timely manner, it is also accompanied by injury at the organic, nervous and vascular level (19). Despite having a low percentage of presentation, it has a potential risk of death in patients who suffer multiple trauma, so it is required in the shortest possible time from the beginning of the

event until therapeutic management is carried out in order to reduce the risk death of the patient (20), (21) This issue should be approached by evaluating a large number of cases with involvement of the pelvic ring, thus establishing a study that demonstrates both the typical and atypical characteristics of clinical presentation in the hospital setting as well as the imaging presentation, in order to have a timely and timely diagnosis. treatment, which would lead us to considerably reduce mortality and improve the future prognosis of patients with a pelvic ring fracture in polytraumatized patients (22), (23).

5 | CONCLUSIONS

The pelvic ring fracture is currently one of the traumas with a high percentage of death in hemodynamically unstable patients due to the kinetics of the trauma and if it is a high-energy one, leading to a greater involvement of the pelvic, organic structure, among which we must act quickly enough to reduce the imminent risk of death in this type of situation (24), (25) .

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