Acta Scientific Orthopaedics (ISSN: 2581-8635)

Volume 5 Issue 6 June 2022

Case Review

Myths, Problems and prospects in the Diagnostics and Treatment of Complex Pelvic Injuries

GV Lobanov*

Department of Traumatology, Orthopedics and HES, GOO VPO Donetsk NMU Named After M. Gorky, Donetsk, Ukraine

***Corresponding Author:** GV Lobanov, Department of Traumatology, Orthopedics and HES, GOO VPO Donetsk NMU Named After M. Gorky, Donetsk, Ukraine.

DOI: 10.31080/ASOR.2022.05.0472

Received: January 27, 2022

Published: May 05, 2022

Pelvic injury in the structure of damage to the musculoskeletal system, of course, is the most disruptive to the patient's quality of life. At the same time, according to the data of various authors and according to our research, a third of polytrauma is accompanied by unstable multi fragmentary destruction of the pelvis (up to 38%), with access to permanent disability in 19.1% of the victims.

An analysis of current publications on various problems of pelvic injuries does not give the impression of assessing their adequacy or "simplicity" of the topic to which these studies are devoted, and the authors freely interpret the complex issues of diagnosis and treatment of these complex injuries.

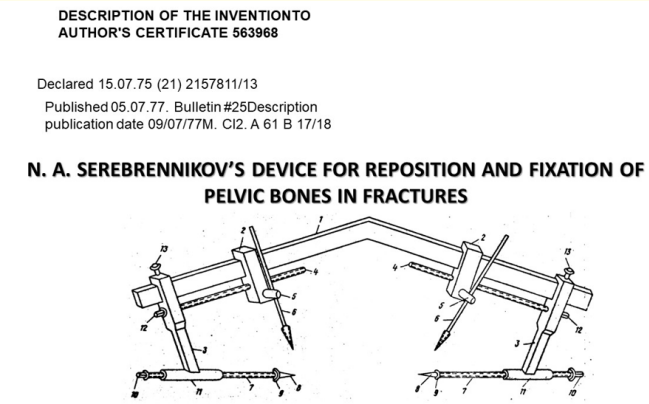
The widespread development of the Internet, with an avalanche of information falling, has led to the fact that experts began to read less. Today, a new relationship is being formed between scientific publishing and the Internet community. Internet content forces people to search for information in various sections, including narrowly specialized problems, which are often interpreted in an accessible language for all. This is faced by a practitioner in the case when the patient explains that "he read everything on the Internet, and now do as it was before - before the illness ...". And the same doctor searches the Internet for "how to properly treat a patient's illness." The reliability of this information is questionable in terms of its objectivity and scientific validity, since the world medical community knows the facts of a commercial approach to the development of grants (Cochrane's control). In such cases, there is a chance that scientifically significant results go away as an error in the study.

Innovations in medicine are expensive, and pelvic surgery is extremely expensive, since saving life in a hemodynamically unstable pelvic injury is not only a costly event, but also prognostically - a problem of difficult choice. And for a long time, there are no countries that at the state level would fully support scientific research in medicine, in particular in the field of critical conditions. Medical universities and laboratories are struggling to obtain quotas and grants from various customers, which ensure not only stable work, but also salaries for employees and their scientific trips with a presentation of the results on the forums. At the same time, various scientometric bases are being developed (Citation Index, Hirsch Index (h-index), Impact Factor (IF or IF)) as a way to assess the quality of work and the effectiveness of scientific activity. But citation itself is subjective, since the author selects for citation the works that most fully reflect his thoughts and show the sequence of development of the idea. In pelvic surgery, this also becomes an element of politics and an element of influencing the scientific audience.

So, for example, I will give one of the most common quotes that form a certain priority and thus emphasize the scientific reliability of solving problems (Figure 1).

But there are inaccuracies in the quote - the first with the priority date, the second with the priority itself. The priority is actually from 1975, not from 1974, as shown in figure 2. copyright certificate (No. 563668).

Figure 1: Quote from the collection of works of the Ural Research Institute of Traumatology Orthopedics.



DESCRIPTION OF THE INVENTIONTO
AUTHOR'S CERTIFICATE 563968

Declared 15.07.75 (21) 2157811/13

Published 05.07.77. Bulletin #25Description
publication date 09/07/77M. Cl2. A 61 B 17/18

N. A. SEREBRENNIKOV'S DEVICE FOR REPOSITION AND FIXATION OF PELVIC BONES IN FRACTURES

Figure 2: Scanned copy of copyright certificate No. 563668.

Therefore, the priority from 1975 of the candidate of sciences N.A. Serebrennikov, later than the filed application of Professor P.S. Drachuk in 1966, and in 1968 a positive decision was received with the issuance of a copyright certificate for the "Apparatus for repositioning and fixing the anterior pelvis in case of its fractures and ruptures of the symphysis" (No. 214020) (Figure 3).

Figure 3: photo by professor Drachuk P.S. and a scanned copy of copyright certificate No. 214020.

And, it would seem that these data are not fundamental in terms of how long and how successfully an individual clinic has been working on a problem, but a ten-year difference is significant for the results obtained.

All of the above was one of the reasons for the opening in 1954 of the Regional Traumatology Hospital in Donetsk, and then in 1956 - the Institute of Traumatology and Orthopedics, where an emergency service was organized, which took over the functions of emergency traumatology, surgery and resuscitation with intensive care. This combination made it possible to create a highly qualified center for the treatment of victims with severe, including multiple organ damage.

The Donetsk School of Pelvic Surgery arose not spontaneously, but as a regional necessity. Initially, daily and numerous mine injuries (with the mechanism of formation of the latter: scrolling the victim between the trolley and the wall of the drift, hitting the drive head of the conveyor or combine, hitting the conveyor fenders - when moving on the latter, and then rock falls, compression by metal structures, etc.). The total number of road injuries in the city of one million has naturally increased. And now the mechanisms associated with a local military conflict have been added.

Therefore, priorities that were incorrect for 10-15 years in the 50-60s of the last century are no longer relevant for the development of school settings and the formation of positions, but the end result of "knowing and being able" is fundamental and determines approaches to the treatment of pathology, in particular, which is a regional.

Historically, stereotypes have developed - "myths" in practical healthcare that have no scientific explanation, are of the same type in different clinical schools and migrate from one textbook to another, becoming the basis of methodological recommendations. At the same time, each practicing physician, relying on "myths" in the diagnosis and care of victims with pelvic trauma, considers them unshakable "truths in the last instance." At the same time, increasing mortality, initially not "terminal patients". In this connection, there is an urgent need to consider "MYTHS" logically and impartially, in accordance with the current situation in medical practice. In our opinion, we should start with the transportation of the victims [1-3].

Myth 1

All victims with a pelvic injury should be delivered on a rigid shield in the position according to N.M. Volkovich (Figure 4). This suggestion was appropriate for low-energy pelvic trauma. At present, with hemodynamically unstable and multifragmentary pelvic injury, such styling leads to continued or even increased bleeding from damaged pelvic bones, exacerbated manifestations of shock, secondary displacements of fragments that are dystopic by changing the attachment points of the muscles and the frame of the pelvis. Thus, the position according to N.M. Volkovich is erroneous and outdated. We consider it expedient to use common anti-shock vacuum mattress stretchers for immobilization in case of polytrauma with dominating destruction of the pelvic bones. In case of isolated destructions, patients should be placed in the position according to Pasternak V.N. (Figure 5) or immobilize with improvised (Figure 6) or regular stabilizing belts.

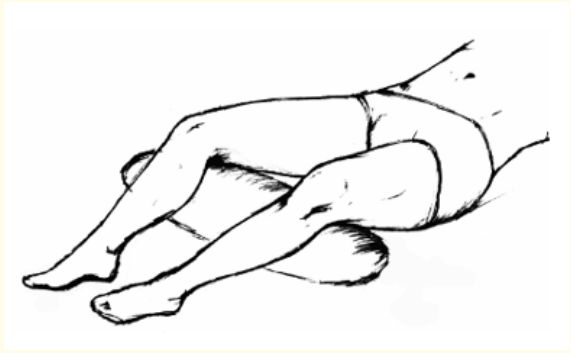


Figure 4: Laying according to N.M. Volkovich (1928).

Figure 5: Laying according to V.N. Pasternak (1980).

Figure 6: Improvised pelvic girdle.

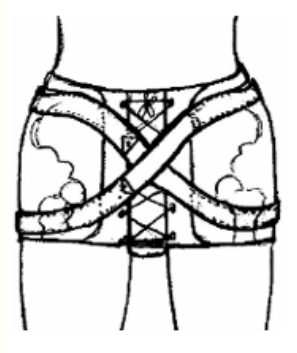


Figure 7: Pelvic girdle of the Donetsk school.

Stabilizing laying (Figure 5) provides for two longitudinally located along the pelvis at the level of large skewers and wings of the iliac bones of the ridge (size 30 x 10 x 5 cm). This creates a uniform load on the region of the greater trochanters, the wings of the ilium and the region of the sacrum, which ensures the stable position of both halves of the pelvis and the unloading of the sacrum, which is extremely important in case of comminuted damage.

Myth 2

When in the emergency room, Hans forceps (G. Ganz) are used for stabilization, which should stabilize the patient's condition by creating stability in the posterior sections of the pelvic ring (Figure 8). In almost all manuals, this tool becomes the first and necessary operational technique for stabilizing the condition. In a literary review of his doctoral dissertation, [4] notes the disadvantages associated with stabilization with Hans forceps, while stating the significant prevalence of this method. An alternative to forceps, in terms of the time of application and the impossibility of destroying and displacing pelvic fragments, we consider an external fixation device (which will be discussed later). And G. Ganz's pelvic C-frame, without diagnosis, turns an uncomplicated comminuted injury of the sacrum into a complicated neurological deficit.

Figure 8: Pelvic forceps G.Ganz (C-frame) scheme and clinical application.

Myth 3

In the emergency room, the doctor assesses the violation of the stability of the pelvic ring with stereotypical Verneuil or Larrey techniques, which in turn aggravates the victim's condition due to additional pain impulses. Loading techniques, especially in case of multifragmental injuries, by using force effects on fragments of the damaged pelvis, add additional aspects to the fracture mechanics. An experienced physician assesses the presence of an unstable pelvic injury by visual changes in bone landmarks, the presence of hematomas, and by gentle palpation. Such an examination focuses on the need to use the capabilities of modern diagnostic equipment to objectify the severity of the destruction [5,6].

Myth 4

Description on radiographs of pelvic injuries "with displacement in width" or "with displacement in height". The biomechanics of muscle tension in combination with traumatic changes in the points of attachment of muscle masses, pain settings, individual preserved elements of the pelvic floor and ligament connections form displacements that can only be analyzed as torsion around the standard body axes (horizontal, sagittal, axial). At the same time, the reposition of the displaced fragments is carried out by the reverse restoration of the pelvic frame, with: "the sooner - the more successful it is", which is associated with cicatricial changes in the muscles, the formation of new points of support for the ligamentous apparatus, respectively, the body adapts to injury and begins to function in new biomechanical conditions.

Myth 5

The use of external fixation is cumbersome, uncomfortable and ineffective in providing assistance. Based on the experience of more than 2,000 surgical interventions over the past 20 years, we have formed the following vision of these problems: we consider external stabilization of the pelvis as a resuscitation measure indicated in the first hours after injury, which makes it possible to achieve stabilization of hemodynamics and ensure easier reduction of complex injuries, using the concept of "separately controlled rod. This allows complex multi-comminuted injuries to be made simpler due to stabilization and to perform a dosed reposition of already more prepared bone destruction for the restoration of the pelvic frame. At the same time, patients note a sharp decrease in pain syndrome and, as a result, an improvement in the quality of life.

As a rule, the period of fixation of pelvic injuries coincides with the time of restoration of homeostasis of the main functions of the body after a severe injury, so it does not matter to the patient which method of treatment is chosen. In addition, the patient's perception of the bulkiness and instability of the hardware structure is associated with instability of fixation, which is usually due to a small insertion of the nail into the bone, loosening of the structure, especially in conflicts with the bed, external objects (Figure 9). We worked out in experimental conditions and calculated, together with the staff of the Department of Strength of Materials of the Technical University, the relationship between the fixator and the damaged bone fragment. The study of the controllability and elasticity of various types of rods for bending and planar loading, taking into account the necessary anatomy of insertion, showed that the minimum bending at the maximum possible load on the rod is provided with a ratio of the immersed part of the rod to the end part as 1 to 2, which ensures compression of the loaded part of the rod with a force of 80.4 ± 8.8 H (Figure 10). At the same time, it is important that the rod and the damaged bone fragment be fixed at 2 points, then this allows you to manipulate both bone fragments and the external structure and achieve calculated, experimentally verified indicators.

The rigidity of the nail insertion for extraction from the ilium, inserted to the depth of the threaded part, was 747.3 ± 10.8 N. The fracture strength when creating a repositioning force on the

Figure 9: Distribution of forces of interaction "rod - bone".

Figure 10: Diagrams of stress stiffness of rods at one and two fixation points.

Figure 11: Distribution of the load on the support with the possibility of controlled reposition.

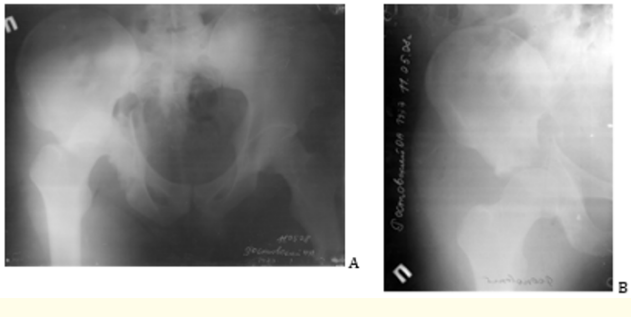
nail at an angle of 10° in the plane of operation of the device to its longitudinal axis was 2500.7 ± 12.7 H. This is associated with a larger area of support on the cortical layer and allows us to offer reposition and management of fragments (Figure 11). External devices were used in the clinic in the form of repositioning devices (AS SU 1804316, RF patent 2015688, Ukrainian patent 6574, 9033, 29309).

Myth 6

no matter how you treat the victim with a pelvic injury, you still won't get a good result. As an example, we present a clinical observation of polytrauma, where a priori it was impossible to obtain a good result.

Patient R. born in 1977 (I.B. No. 62021) was admitted with a diagnosis of brain concussion, closed comminuted transverse juxtectal fracture of the right acetabulum and posterior wall with postero-superior dislocation of the right hip, closed rupture of the right sacroiliac joint, closed fracture of the third diaphysis of the left ulna with displacement, closed fracture of the distal metaepiphysis of the right radius without displacement, traumatic dislocation of the IY-Y fingers of the left foot, contusion of the chest, blunt abdominal trauma, contusion of the kidneys, multiple bruised wounds of the face, extremities, abrasions of the chest, anterior abdominal wall. Traumatic shock 3 degrees.

Trauma road, delivered to the emergency department of the district hospital. Upon admission, he was clinically and radiologically examined, a complex of anti-shock measures was performed, primary wound care was performed, the dislocation was eliminated under intravenous anesthesia (Figure 12. A. B.), a system of permanent skeletal traction was applied. After a telemedicine consultation, the patient was operated on: AVF of the pelvic bones with "pelvis-femur" (Figure 12 C. D.). MOS of the left ulna with an extraosseous plate, closed reduction of the toes.



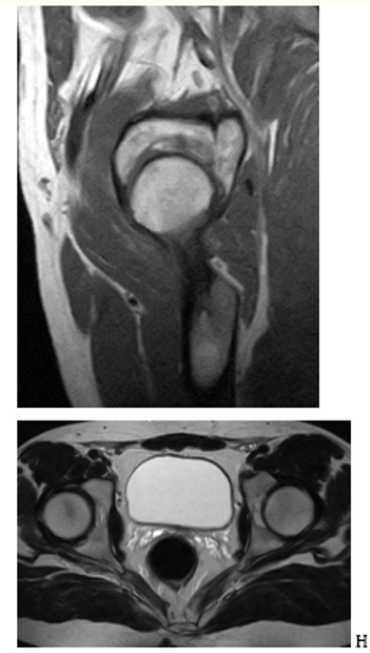


Figure 12: A-H. Clinical observation of patient R., born in 1977 (I.B. No. 62021) radiographs, computed and magnetic tomograms (description in the text).

The patient is observed in dynamics. According to the state, subsequent reduction of the secondary displacement and osteosynthesis with pins of the right wrist joint were performed. Later, regarding the false joint of the left forearm, resection and bilocal replacement of the bone defect with a device, followed by fusion. The fracture of the bones of the acetabulum healed with a satisfactory functional result. The patient was examined at 1 year (Figure 12 E. F.), functional result (Figure 12. G) and magnetic tomography of the pelvic bones at 3 years after injury (Figure 12. H.) excellent function 100 points according to Harris, magnetic resonance imaging showed cartilage repair in the acetabulum.

The introduction of the developed devices and technologies for external osteosynthesis made it possible to reduce mortality by 14%; achieve stable reposition, and, accordingly, good and excellent anatomical and functional outcomes in 86.71% of cases, reduce hypostatic complications by 16% and the number of post-traumatic contractures of the lower extremities by 19%; to reduce the average duration of bed rest to 8 ± 0.5 days and to halve the duration of inpatient treatment, to 41.8 ± 3 days, this made it possible to reduce the disability of 1gr. - by 7.28%, 2gr. - by 13.81%, 3gr. - by 18.5%.

There are a lot of myths around the treatment of complex injuries, and we have not considered all of them (there are stereotypes associated with the diagnosis of emergency trauma, the fight against pelvic bleeding, intrapelvic anesthesia, pelvic tamponade and X-ray endovascular occlusion). Thus, it is necessary to logically assess the stereotypes and "myths" that have developed in medicine and correctly try to eliminate them without creating "revolutionary situations", but without stagnation for a long time.

Funding Information and Conflicts of Interest

The study was not sponsored. The authors declare no obvious and potential conflicts of interest related to the publication of this article

Bibliography

1. Grandma WA., *et al.* "Pelvic injury". *Clinic, diagnostics and treatment. Donetsk* (2001): 176.

2. Lobanov GV. "Extrafocal osteosynthesis of unstable pelvic injuries (anatomical, biomechanical and clinical substantiation)". *Doctor of Medical Sciences. Donetsk* (2000): 229.

3. Stelmakh KK. "Treatment of unstable pelvic injuries Traumatology and orthopedics of Russia" 4.38 (2005): 31-38.

4. Fine AM. "Diagnosis and treatment of severe fractures of the pelvic bones in victims with combined and multiple trauma)". *Doctor of Medical Sciences Moscow* (2017): 238.

5. Cherkes-Zade DI. "Treatment of pelvic injuries and their consequences: A guide for doctors. M.: OAO". Izdatelstvo Meditsina (2006): 192.

6. Shapovalov VM., *et al*. "Surgical stabilization of the pelvis in the wounded and injured". St. Petersburg (2000): 239.