

Surgical Treatments Damage to the Urinary Organs in Combined Abdominal Injuries

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Combined injury is simultaneous damage to two or more of seven anatomical areas of the body (brain and spinal cord, skeletal bones and soft tissues of the extremities, internal organs of the chest and abdomen, pelvis, spine) in various combinations by one traumatic agent [17, 18, 36] .

All types of combined injuries, when focusing on the leading injury, can be classified into one of seven groups: 1st group - combined traumatic brain injury, 2nd group - combined spinal cord injury, 3rd group - combined chest injury, 4- group 1 - combined injury of the abdomen and retroperitoneal organs, group 5 - combined injury of the musculoskeletal system, group 6 - combined injury of two or more cavities, group 7 - combined injury without a leading injury [1, 9, 27].

The classification of polytrauma into a separate category is important due to certain features of such injuries, which should be taken into account when triaging and providing medical care.

According to N. Tscheme (1998), with polytrauma, injuries to the extremities are observed in 86% of cases, the head - 69%, the chest - 62%, the abdomen - 36%, the pelvis - 28%, the spine - 19%. The frequency of injuries to individual areas of the body with combined gunshot wounds and closed injuries, according to I.A. Eryukhin et al. (1997), respectively: head - 29.4 and 70.6%; neck - 1.3 and 0%; breast - 32.4 and 40.7%; stomach - 58.1 and 27.4%; pelvis 36.8 and 32.2%; spine - 5.9 and 11.3%; limbs - 74.4 and 66.2%). Since multiple areas are simultaneously damaged in a combined injury, the overall result significantly exceeds 100%.

From a practical point of view, for general surgeons, the 4th group is of greatest interest - combined trauma of the abdomen and retroperitoneal organs. The leading ones are injuries to the parenchymal organs of the abdomen, mainly the liver and spleen [1, 3, 4, 31], the vessels of the mesentery, accompanied by bleeding into the abdominal cavity, followed by injury to hollow organs, primarily the large and small intestines [8, 21], urinary bladder with the release of their contents into the

abdominal cavity and the development of peritonitis [5, 7].

Damage to the organs of the retroperitoneal space is much less common - ruptures of the kidney, pancreas, duodenum and extraperitoneal part of the colon [12, 13].

Leading injuries, which are characterized by bleeding into the abdominal cavity, account for more than 85% of all abdominal injuries, injuries of hollow organs - more than 15% [11, 12, 13, 14].

In the first case, the victims have a classic picture of hypovolemic (hemorrhagic) shock, in the second - peritoneal symptoms of varying severity, which depends on the location and extent of intestinal damage. Shock hypotension, compared with trauma to parenchymal organs in the case of damage to hollow organs, is much less pronounced and is relatively easily relieved in the early period of injury [15, 17, 27].

Abdominal injuries account for 1.5 to 18% of all peacetime injuries, but their frequency and severity continue to increase [16].

Closed abdominal injuries are accompanied by a large number of complications and high mortality due to diagnostic difficulties and frequent combination with injuries to other organs and systems [20]. The diagnostic algorithm, from our point of view, should be considered in the direction of maximum use of modern low-traumatic and highly informative diagnostic methods. Mortality for isolated trauma of one organ ranges from 5.1 to 20.4%, for combined injuries - from 18.3 to 64%. As a rule, open injuries are not accompanied by such severe damage to internal organs and organs of the retroperitoneal space as closed ones, and the mortality rate for them is 10-25% [18, 19].

Damage to the bladder in 90% of cases occurs due to closed abdominal injuries. A significant portion of this is due to road traffic accidents, falls from heights, work-related injuries, and impacts from animal hooves. In an unfilled (collapsed) state, the bladder is well protected by the pelvic bones from the direct impact of traumatic force. The frequency and severity of its injuries increase as it fills and stretches. It has been established that intraperitoneal ruptures of the bladder are a consequence of its injuries in the full state [2, 21].

Penetrating injuries of the bladder, such as through perforation of its wall, are usually accompanied by fractures of the branches of the pubic bone. In approximately a third of patients with pelvic injuries, hematuria is recorded without cystographic signs of a violation of the integrity of the bladder. It should be assumed that it is a consequence of a bruise with minimal damage to the bladder wall. Contusion injuries of the bladder do not require special treatment. However, patient monitoring and prolonged catheterization are necessary to completely eliminate wall damage, which fundamentally affects the incidence of complications of traumatic disease [21, 25].

The vast majority of injuries to the bladder and urethra are associated with fractures of the pelvic bones, and extraperitoneal ruptures of the bladder predominate over intraperitoneal ruptures by 2-2.5 times. With extraperitoneal localization, ruptures are usually located on its anterolateral wall and much less often in the area of its neck. The resulting urinary leaks initially spread to the prevesical tissue and into the paravesical space. Subsequently, urine spreads through the fascial spaces to the anterior wall of the abdomen, and through the retroperitoneal space reaches the kidneys. At the same time, through the inguinal canal it descends into the scrotum, and through the obturator foramen it spreads to the gluteal region. Urinary leakage can cause severe phlegmonous inflammation of the tissue [6].

With intraperitoneal ruptures of the bladder, all layers of its wall are damaged, including the peritoneum. When exposed to a very large traumatic force, leading to severe multiple fractures of the pelvis, intra- and extraperitoneal ruptures of the bladder can be simultaneously observed. Since the diagnosis of bladder rupture is very important, it should be established within a short period of time [10].

Diagnosis of kidney and urinary tract damage begins with mandatory catheterization of the bladder in all victims. A positive Zeldovich phenomenon indicates the presence of an intraperitoneal rupture. If there is blood in the urine, it becomes necessary to conduct ultrasound and X-ray contrast studies of the bladder and kidneys, and CT. For bladder ruptures, cystography is the most informative [26].

Videolaparoscopy is of great diagnostic importance. Injury to the intra-abdominal part of the bladder during laparoscopy is determined by the presence of a defect in the organ wall, hemorrhages in the peritoneum in the pelvic area, and leakage of intensely blood-stained urine into the abdominal cavity. The amount of hemorrhagic fluid can reach 2 liters or more, depending on the time period from the moment of injury. The characteristic urine odor of hemorrhagic abdominal contents may not be detected. In the absence of visual signs of bladder damage, this large hemorrhagic uroperitoneum must always be differentiated from manifestations of traumatic pancreatitis. To do this, the aspirated fluid must be examined for the presence of amylase. Injecting a dye into the bladder facilitates diagnosis. Vitreous edema of the paravesical and pelvic tissue and their staining indicate damage to the extraperitoneal part of the bladder [22, 23].

Surgical treatment of intraperitoneal ruptures of the bladder is always urgent. The purpose of the operation is to detect and layer-by-layer suturing of the wall rupture with careful peritonization of the suture line. It is better to complete such an operation by applying an epicycstostomy to the extraperitoneal part of the bladder in the suprapubic region. If there are few victims and they are well monitored, then you can limit yourself to prolonged catheterization (7-10 days) of the bladder. In the case of large extraperitoneal ruptures of the organ with the formation of urinary leaks, it is necessary to suture the defect, apply an epicycstostomy and adequately drain the paravesical space [24, 25].

Wounds with extraperitoneal ruptures of the bladder require not only suturing via extraperitoneal access, but also the application of an epicycstostomy with ventrofixation of the bladder according to Krasulin and mandatory drainage of paravesical tissue in the iliac regions or according to McWhorter-Buyalsky. Ventrofixation of the bladder consists of suturing its bottom with two catgut sutures to the muscles of the anterior abdominal wall above and below the insertion site of the Foley catheter. Suturing wounds located in the neck or bladder triangle is desirable, but not necessary [14, 18].

Wounds on the posterior wall of the bladder cannot be sutured. An attempt to suture from the outside can lead to an increase in the defect, so such tears are sutured from the inside. The operation is completed by applying an epicycstostomy, and the victim is placed on his stomach for several days to create an unimpeded outflow of urine through the fistula (position according to N.N. Elansky). At the same time, drainage of pre- and paravesical tissue is necessary. Injuries to the urethra in the general structure of injuries to the lower urinary tract occur very often, both in isolated form (58.3%) and in combination with bladder rupture (9.4%). They are usually found in men, which is explained by the peculiarities of the anatomical structure, in particular, strong fixation and relative immobility of the urethra.

In case of pelvic fractures, forced compression with the point of application opposite the pubic arch and symphysis leads to either crushing or complete interruption of the urethra in the area of the genitourinary diaphragm. In case of fractures of the pubic arch and ruptures of the arch and symphysis, in 70% of cases the prostatic and bulbomembranous parts of the urethra are damaged. As a rule, the urethra is completely torn off at the apex of the prostate gland, which during rectal examination is easily displaced or cannot be felt at all under the finger. Such fractures are quite often accompanied by damage to the periprostatic venous plexus with the formation of a large hematoma that displaces the prostate gland [22, 24].

In case of damage to the urethra in the acute and early stages of a traumatic disease, the technique

of its recanalization can be used, as it is relatively simple and accessible to a general surgeon. Its successful implementation is possible subject to the following technical conditions: the use of a soft (siliconized) rubber tube with a diameter of no more than 7-8 mm (danger of bedsores and necrosis of the mucous membrane!), a retrograde method of its implementation (from the bladder), direct fixation with a thread removed on the anterior abdominal wall, a sufficient period of catheter stay (at least 3 weeks) [26].

The most modern method of treating urethral ruptures is to pass a Foley catheter through the urethra into the bladder using two metal catheters, one of which is inserted through the external opening of the urethra to its defect, and the second - towards it through the cystostomy from the bladder. Using these rigid catheters, the ends of the ruptured urethra are compared, after which a catheter inserted from the outside is passed into the bladder. Then, with its help, a soft guide catheter is removed retrogradely from the bladder through the urethra. A Foley catheter is attached to it and passed into the bladder.

There is still no unified approach to resolving the issue of the nature and timing of reconstructive operations for injuries to the urethra. The most important criterion in resolving this issue is the ability to avoid such long-term complications as strictures, urinary incontinence, and in men, erectile dysfunction and ejaculation. There are 3 tactical options for surgical restoration of acute urethral injuries: early suture of the urethral wound, insertion of a thin plastic tube for recanalization of the urethra (No. 16-19 according to Charrière), cystostomy in the acute period and recovery after 2-4 months [24].

Early primary suture of urethral injuries (applied only with a favorable prognosis), as well as recanalization in the acute period, lead to the subsequent development of strictures in 32-100% of cases, urinary incontinence in 15-44%, impotence in 20-67% [23].

Plastic surgeries performed 2-4 months after injury have undoubted advantages. During this time, the intrapelvic hematoma resolves, the upwardly displaced prostate gland, together with the prostatic urethra, returns to its original place, greatly facilitating the comparison and suture of the torn ends. With a two-stage restoration of the urethra, the narrowing area usually does not exceed 2 cm, which allows the refreshed ends to be connected without tension.

Renal rupture is characterized by gross hematuria and signs of intense retroperitoneal hematoma during video laparoscopy. Ultrasound and CT are highly reliable for this type of injury. Excretory urography is less sensitive. In most cases, with closed kidney injury, conservative therapy aimed at hemostasis and replenishment of blood loss is effective.

The operation is indicated for ongoing bleeding, ruptures or tears of one of the poles of the kidney, cracks, ruptures of the kidney body and its fibrous capsule, ruptures of the ureter. In case of injury to a single kidney, organ-preserving surgery is indicated. In case of kidney ruptures, vicryl sutures are placed through the entire cortex and most of the medulla. To prevent the cutting of sutures, muscle tissue, fascia or aponeurosis are used. If one of the poles is crushed, a wedge resection is performed. For ruptures penetrating into the pyelocaliceal system, after suturing them, a pyelostomy was applied to prevent the formation of a urinary fistula and urinary infiltration of the retroperitoneal tissue.

For renal ruptures in victims with a poor prognosis, only nephrectomy should always be performed. With doubtful and favorable prognosis, if, taking into account the nature of the damage, there is no need for nephrectomy; partial resection and suturing of wounds of this organ are allowed. The kidney can be removed by laparotomy (transperitoneal) and lumbotomy (extraperitoneal) approaches. Before nephrectomy, it is always necessary to ensure the presence of a second functional kidney.

In patients with combined abdominal trauma accompanied by shock, with an unfavorable and questionable prognosis, nephrectomy, bladder suture and epicycstostomy are performed; with a favorable prognosis, kidney resection, suture of the ureter and urethra are allowed.

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