MODERN VIEWS ON DIAGNOSIS AND TREATMENT OF SWELLY SCRUM AND TESTLES SYNDROME IN CHILDREN

Nazarov N.N.
Tashkent Pediatric Medical Institute

https://doi.org/10.5281/zenodo.11091345

Abstract*. The article presents the results of diagnosis and treatment of swollen scrotum and testicle syndrome in 357 patients aged from 1 to 18 years. The results of an ultrasound study on the causes of swollen scrotum and testicle syndrome, features of clinical manifestations, types and severity were analyzed. It was recommended to use a differential approach in choosing the tactics and method of surgical treatment depending on the condition. During conservative treatment, the importance of ultrasound in assessing the dynamics of testicular blood circulation and the types of lesions is emphasized.*

Keywords*: syndrome of swollen scrotum, testicle, clinic, diagnosis, treatment, children.*

Relevance. Acute diseases of the scrotum rank first among diseases of the external genital organs in men. Patients with this pathology make up 4-8.1% of all patients hospitalized in urological hospitals [6-7,12,14].

In the structure of injuries to the genitourinary system, injuries to the scrotal organs occupy about 25%. Closed injuries to the scrotum and testicle in peacetime are more common (up to 80%) than open ones (19.4%), among victims are adolescents and middle-aged children. Considering the high prevalence of scrotal injuries among men of reproductive age, issues of providing quality medical care are of great medical and social importance [1,5,8,11].

Emergency operations performed for these diseases are the second most common in children after appendectomies. The lack of clear differential diagnostic criteria for diseases included in the concept of “edematous scrotum” syndrome in children leads to unfavorable outcomes of surgical treatment [2,10,14].

Meanwhile, the issues of early diagnosis, recognition of types of damage, the cause - testicular atrophy, methods of conservative therapy, especially for testicular bruises, after organ-preserving operations, have not been sufficiently developed, and some of them have not been studied at all [5].

The role of ultrasound in the diagnosis of scrotal and testicular injuries has been assessed differently; Some authors emphasize the high accuracy of the method, others believe that it does not allow distinguishing a rupture of the tunica albuginea and testicular parenchyma from an intratesticular hematoma, while others believe that the value of the method is completely questionable [3].

Despite the obvious successes of modern urology and surgery achieved in the treatment of patients with trauma, many questions remain unresolved. When providing care to victims with trauma to the external genitalia, expectant surgical tactics prevail. This is partly due to the fact that an incorrect assessment of the clinical picture can lead to adverse consequences, including testicular atrophy. The use of precision technologies remains insignificant [4,9-11].

Unfortunately, the wide dissemination of modern methods of surgical treatment is hampered by the low technical equipment of urological hospitals, and therefore, the majority of

victims continue to be treated conservatively. All of the above determines the relevance of searching for new methods of treatment for damage to the external genitalia [13-14].

Currently, there is no unified tactical approach to the management of patients with injuries to the scrotal organs, and indications for the use of one or another method of surgical treatment have not been developed. In this regard, it seems relevant to develop a diagnostic and treatment algorithm for the management of patients with injuries to the scrotal organs using modern gentle methods of diagnosis and surgical treatment [6-7,13].

Aim. To improve outcomes of scrotal and testicular injuries in children by optimizing early diagnosis and treatment.

Material and research methods. This work is based on an analysis of the diagnostic results of treatment of 357 children with acute diseases of the scrotal organs aged from 1 to 18 years, who were undergoing inpatient treatment at the clinical bases of the Department of Hospital Pediatric Surgery of the Tashkent Pediatric Medical Institute from 2018 to 2023. Of these, 309 (86.6%) were subjected to surgical treatment, 48 (13.4%) patients - conservative treatment. The patients were aged: up to 1 year – 7 (2.0%); from 1 year to 3 years – 19 (5.3%); from 4 to 6 years – 51 (14.3%); from 7 to 11 years – 83 (23.2%); from 12 to 18 years old – 197 (55.2%).

The admission of sick children with edematous scrotum syndrome (OSS) over the years was quite uneven, however, this indicates the predominance of acute lesions of hydatid in 163 (45.7%) and testicular torsion in 98 (27.4%). Damage and inflammatory diseases of the testicle occurred in 79 (22.1%) and 17 (4.8%) patients, respectively.

Diagnosis of traumatic injuries to the scrotum and its organs (bruises, testicular rupture) is based on anamnestic data and identification of reliable signs of injury: hematoma, abrasion in the scrotum area. All children with traumatic injuries to the scrotum were hospitalized in the emergency surgery department, where monitoring of the circulatory systems, ultrasound examination and Dopplerography of the testicle was carried out.

Results and discussion. There is a certain pattern in the distribution of patients by age and nature of the pathology. POM is more often observed in adolescent children, and decreases among children from 1 to 3 years of age (4-5.0%). Starting from 4-6 years (11-14.0%), an increase in incidence is again observed. At 7-11 years old (17-21.5%), the maximum differs among children 12-18 years old (47-59.5%).

The main causes of closed injuries to the scrotum were: direct blow to the perineum - in 5 (6.3%); cycling – 11 (14.0%); playground injuries – in 23 (29.1%); accidents in sports sections – in 36 (45.6%); the reasons are unknown – in 4 (5.0%) patients.

Patients were admitted on day 1 - 43 (54.4%); second day - 29 (36.7%); third or more days - 7 (8.9%) after injury. In 23 (29.1%) cases, an increase in local manifestations was noted: an increase in the entire or corresponding half of the scrotum and/or testicle, an increase in pain. To verify the nature of the damage, ultrasound and Dopplerography of the testicle were performed.

The main complaints presented upon admission were: pain, swelling, scrotal asymmetry, hyperemia.

The following types of damage were verified: scrotal hematoma –9 (11.4%); testicular bruises – 13 (16.5%); subcapsular testicular hematoma – 25 (31.6%); testicular parenchyma rupture – 32 (40.5%). One testicle was affected in 68 (86.1%) patients, and both testicles were affected in 11 (13.9%) patients.

Injuries to the soft tissues of the scrotum (9 patients) are characterized by hemorrhage in its wall and/or the formation of a hematoma in the lumen of the organ. In this case, the patients experienced pain in the scrotum, but the testicle and epididymis were unchanged, their size did not increase. In 6 patients there was hemorrhage on the affected side, giving a dark purple color to the skin of the scrotum. In 3 children, hemorrhage was noted on both sides, which did not extend beyond the scrotum.

In 6 (7.6%) patients there was an isolated injury in the form of a scrotal hematoma, in which the shape, consistency and size of the testicle remained unchanged. In 3 children, hemorrhage into soft tissues was significant. Its size tended to increase, imbibition covered the entire scrotum and spread to nearby areas of the perineum and groin area. In such cases, only a clinical examination of the child is not sufficient to determine the type and nature of damage to the testicle, scrotum, or their combination. More convincing evidence can be obtained by interpreting clinical and ancillary test data.

In case of isolated testicular bruises with minor injuries to the scrotal organs, there were no bruises in the skin or in the scrotal cavity. However, obvious clinical signs of traumatic orchitis were noted in the form of increasing pain, increasing size and tenderness on palpation of the affected testicle, which served as the basis for establishing a diagnosis of testicular contusion.

Subcapsular and intraparenchymal testicular hematomas (25-31.6% of patients) are accompanied by significant enlargement and severe pain in the affected testicle. With continued bleeding, the size of the testicle increases over time. This damage is differentiated from gonadal contusion by ultrasound diagnostic data.

When the tunica albuginea and testicular parenchyma rupture (32-40.5% of patients), severe pain occurs at the time of injury and the hematoma grows. Due to significant accumulation of blood in the membranes of the testicle, a tense hematocele is formed. Hematocele and the absence of clear boundaries of the spread of the hematoma beyond the scrotum indicate a rupture of the tunica albuginea of the testicle, in which it is not possible to clearly palpate the testicle and its epididymis, which is a reliable sign of rupture of the testicular parenchyma. When blood and lymph circulation is impaired, favorable conditions are created for infection and suppuration of the hematocele.

For trauma to the scrotum and testicle, a physical examination is essential. However, palpation of the injured testicle is often difficult due to intense pain. Diaphanoscopy can also be useful in the differential diagnosis of hydro- and hematocele.

Echography in case of scrotal trauma is indicated to confirm or exclude testicular rupture, differentiate soft tissue hematoma from hematocele, or to develop indications for conservative therapy, dynamic monitoring of the patient after surgery, and determine the prognosis. Ultrasound examinations (ultrasound) performed in 79 patients with injuries to the scrotal organs revealed the following data: the presence of a scrotal hematoma without changes in the testicles - in 9 patients, testicular contusion - in 13, scrotal hematoma and intrathecal collection of blood in the testicle - in 25, scrotal hematoma and violation of the integrity of the testicular membrane - in 32 patients.

In case of closed injuries to the scrotum and its organs, indications for surgical interventions were determined individually, both according to the nature of the injury and the complication. In 13 (16.5%) patients, conservative local treatment was performed, of which: testicular bruises - 5 (6.3%); scrotal hematoma - 9 (11.4%), which brought good results without any complications.

Watchful waiting with conservative therapy is indicated for incipient serous orchiepididymitis, mild injuries to the scrotum and/or its organs. The complex of treatment included bed rest, elevated position of the pelvis, suspension, ointment compresses, and anti-inflammatory therapy. Antibiotic therapy of the cephalosporin group of 2-3 generations was carried out. Non-steroidal anti-inflammatory drugs and desensitizing therapy (calcium chloride solution and pipolfen, diphenhydramine), enteral painkillers (analgin, baralgin), physiotherapy and suspensions were also used. In case of damage to the scrotum and/or its organs, along with ensuring rest, cold compresses and hemostatic agents (calcium chloride solution, dicinone) were prescribed. Additionally, 0.3–0.5 ml of 1% Vikasol was prescribed. 9 children with severe pain syndrome underwent novocaine blockade of the spermatic cord according to Lauren-Epstein, 2 of them - once, 1 - twice. Starting from 3–4 days, cold compresses were replaced by thermal procedures and UHF on the scrotal area. Prospective studies of bruises, hematomas, and bruises of the scrotum in patients showed that non-operative treatment was 100% successful. Follow-up studies were performed from 2 weeks to 3 months, including mandatory ultrasound of the scrotum and its organs. Complete resorption of hematomas and bruises from the walls of the scrotum was observed within a period of seven days to one month.

In case of closed injuries to the scrotum and its organs, indications for surgical interventions were determined individually, both according to the nature of the injury and the complication.

Of the 79 patients we observed, 65 (82.3%) underwent surgical intervention. Among these patients, 2 patients initially received conservative treatment, but were subsequently operated on due to the progression of signs of swollen scrotum syndrome, or the development of various complications.

Our clinical observations and literature data convincingly show that most acute diseases of the scrotal organs in children require urgent surgical intervention. In case of swollen scrotum syndrome, the success of the operation depends, first of all, on the timeliness, thoroughness and minimal trauma of performing all stages: adequate access with elimination of the pathological process, assessment of the condition of the testicle and the method of completing the intervention. The final diagnosis and choice of tactics are determined during surgery. Let us consider the features of surgical treatment of each of the listed diseases separately.

The establishment of indications for surgical intervention in 65 patients during conservative therapy was due to the following circumstances: aggravation of inflammatory changes and circulatory disorders and the development of destructive processes in the testicular parenchyma with the erroneous choice of conservative tactics in the presence of an increasing scrotal hemotoma. Surgical interventions during dynamic observation in these cases were carried out within a period of up to 2 hours in 51 patients; up to 6 hours - 7 patients; up to 12 hours - 5 patients; until 18:00 - 2 patients. Among these patients, an extensive hematoma under the tunica albuginea and accumulation of blood in the scrotal cavity were detected in 7, a violation of the integrity of the tunica propria in 4, a massive scrotal hematoma without damage to the testicle in 5, a subcapsular hematoma in 25, and an intratesticular hematoma in 32.

The inspection was carried out using a scrotal approach 2-3 cm long, depending on the age of the children, in the corresponding half of the scrotum, opening its membranes layer by layer. The appearance of blood in the scrotal cavity and vaginal lining indicates a severe rupture. By widening the incision, the testicle was brought out into the wound, and the spermatic cord was

blocked with 3–5 ml of 0.25% novocaine solution. During the subsequent examination of the testicle, the nature of the damage was finally determined and the necessary surgical procedures were performed depending on its severity.

During the audit, in 15 children, along with a huge hematoma, blood imbibition of the lining of the scrotum and testicle was revealed, but the source of the bleeding could not be determined; violation of the integrity of its own membrane - in 7; massive scrotal hematoma without testicular damage - in 5; subcapsular hematoma - in 25; intratesticular hematoma - in 21, in 11 - a rupture of the testicular parenchyma 0.5–1.5 cm long, in 5 of them - with partial prolapse of the testicular parenchyma.

Analysis of the immediate results of conservative treatment and postoperative course in operated patients. The tactics for continuing conservative therapy or the nature of postoperative treatment were as follows. Patients were prescribed bed rest, pelvic elevation, suspension, painkillers (analgin, baralgin), antihistamines (pipolfen, suprastin) in age-specific dosages.

The dynamics of changes in POM at the initial stage of conservative therapy and in the early postoperative period were determined by the initial state, the degree of morphofunctional disorders in the scrotal organs, as well as the volume and nature of the conservative or surgical intervention performed. A decrease in edema and hyperemia of the scrotum, the size of the affected testicle, a decrease in the intensity of pain and other subjective sensations of patients, as well as an improvement in the well-being of patients indicate upcoming positive changes during the therapy. Evaluation of the effectiveness of treatment in patients was carried out on the basis of the above objective data and the subjective feelings of the patients. In patients, along with clinical data - the dynamics of changes in the organs of the scrotum during ultrasound. The tendency to decrease in size and restore the echo-homogeneity of the testicle and improve vascular perfusion over time indicate upcoming positive changes.

In 72 (91.1%) of the 79 operated children, the postoperative period proceeded smoothly, in 7 (8.9%) various complications were observed.

Swelling of the scrotum and ruptures of the damaged testicle in these patients, starting from 3-4 days, began to gradually decrease and were closer to the size of the undamaged testicle. In 3 patients, continued increase in size and pain on the affected side were noted. Postoperative wounds healed by primary intention. In 2 patients there was suppuration of the surgical wound.

In 2 children, an increase in body temperature to subfebrile levels was noted. This course of the postoperative period was observed mainly among patients with ruptures of the testicular parenchyma, with simultaneous damage to both testicles. The symptoms of acute scrotum in these cases subside by 5-6 days and disappear by 10-12 days of the postoperative period, that is, they are extended by 7-8 days. The genesis of this course can be associated with vascular-circulatory disorders and the ongoing inflammatory process in the affected testicle.

The latter circumstance dictates the expediency of preoperative identification of the type of POM in children as fully as possible, because with erroneous conservative tactics, in cases requiring surgical intervention, there is a high risk of developing early and late complications.

Although conservative treatment is fully consistent with the generally accepted principles of treatment of initial post-traumatic orchitis and mild injuries of the scrotum in children.

Untimely or inadequate treatment of POM can lead to impaired growth, development and testicular function in children, subsequently causing in some cases the development of hypogonadism and male infertility.

Conclusions. It was established that edematous scrotum syndrome (77.9%) with damage to the scrotal organs (22.1%), among them: children under 7 years old - 19.0%; older age groups – 81.0%.

The following types of damage were verified: scrotal hematoma 11.4%; testicular bruises 16.5%; subcapsular testicular hematoma 31.6%; testicular parenchyma rupture 40.5%. Damage to one testicle occurred in 86.1% of patients, 13.9% of patients had damage to both testicles.

The nature of the lesions, the tendency to progression of local and general manifestations in acute diseases and injuries of the scrotal organs in children confirm the advisability of expanding the indications for early surgical intervention.

A therapeutic and diagnostic algorithm for the management of damage to the scrotal organs in childhood, which allows you to choose adequate tactics for the management and treatment of patients and ensures the preservation of reproductive health.

REFERENCES

1. Bolotov A.D., Khairli G.Z., Zhienbaev E.R., Ainaev E.I., Akhmetov D.E., Balpukov U.Zh. Blunt trauma to the scrotum leading to unilateral testicular rupture//Clinical Medicine, 2017;(2):44.
2. Grigorieva M.V., Sarukhanyan O.O., Gasanova E.N., Teleshov N.V., Batunina I.V. Traumatic injuries of the scrotal organs in children // Urological Gazette, 2019;1:(9). 36-37.
3. Delyagin V.M., Tarusin D.I., Urazbagambetov A. Ultrasound examinations for pathology of the scrotal organs // Reproductive health of children and adolescents, 2014;(3):61-69.
4. Okulov A.B., Lavrova T.R., Pykov M.I. and others. Acute diseases of the scrotum in children / Textbook for interns, residents, doctors. M.: RMAPO, 2009; 24.
5. Salopenkova A.B., Proshchenko Ya.N. Diagnosis of testicular ischemia in children // Pediatric surgery, 2015;(6): 141-143.
6. Soliev A., Sattarov Zh.B. Tactics of treatment of sick children with damage to the organs of the scrotum and testicles // Scientific works of gifted youth and medicine of the 21st century, Tashkent - 2023. 1(1), P.188.
7. Ergashev N.Sh., Sattarov Zh.B., Khakimov T.P., Solieva A.T. Swollen scrotum syndrome in children and adolescents / Materials of the annual XXIV scientific and practical conference of the Institute of Postgraduate Education in Health Care of the Republic of Tajikistan “Modern trends in science and practice in pediatric surgery”, 2018; 253-253.
8. Bertolotto M. Multiparametric US for scrotal diseases// Abdom Radiol (NY) 2018;43(4):899-917.
9. Dalton DM, Davis NF, O'Neill DC, Brady CM, Kiely EA, O'Brien MF. Aetiology, epidemiology and management strategies for blunt scrotal trauma. Surgeon 2016;14(1):18-21. doi: 10.1016/j.surge.2014.06.006.
10. Johnson D, Sandlow J I, Vasectomy: tips and tricks. Transl Androl Urol 2017;6(4):704-709. doi: 10.21037/tau.2017.07.08.
11. Lee SH, Lee DG, Choi SK, Choi T, Yoo KH. Trends in testicular injury in Korea. 1986–2015. J Korean Med Sci 2017;32(10):1669-1673. doi: 10.3346/jkms.2017.32.10.1669.
12. Parenti GC, Feletti F, Carnevale A, Uccelli L, Giganti M. Imaging of the scrotum: beyond sonography. Insights Imaging. 2018;9(2):137-148. doi: 10.1007/s13244-017-0592-z.

13. Sallami S. Blunt scrotal trauma in adults: a multi-institution study evaluating the American Association for the surgery of trauma organ injury grading scale about 107 cases. Tunis Med 2017;95(5):331-335.
14. Wang A, Stormont I, Siddiqui MM. A review of imaging modalities used in the diagnosis and management of scrotal trauma. Curr Urol Rep 2017;18(12):98. doi:10.1007/s11934-017-0744-1.