

Treatment Tactics for Bladder Exstrophy with Total Epispadias in Newborn and Infants

Egamnazarov N. K., Ergashev B. B., Kamolov SH. B.

Tashkent Pediatric Medical Institute, Republican Educational, Treatment and Methodological Center for Neonatal Surgery
at the Russian Orthodox Church, Uzbekistan, Tashkent

Abstract The results of a comprehensive study of 43 children with bladder exstrophy aged from 1 day to 1 year are presented. The proposed scheme of surgical correction includes such indications as early correction of this defect in surgical practice, i.e., up to 1 month, one-stage radical cystosphincterourethroplasty with rapprochement of the symphysis. The proposed method of surgical treatment of bladder exstrophy reduces the frequency of relapses of exstrophy and epispadias.

Keywords Bladder exstrophy, Bladder plastic surgery, Cystosphinctroplasty, Urethroplasty

1. Relevance

The tactics of management and surgical treatment of newborns with bladder exstrophy are one of the pressing and unresolved problems of modern pediatric surgery and urology [2,3,5]. In particular, there is no consensus on the choice of timing and method of phasing the operation [1,4,5]. Some scientists propose simultaneous cystosphincterourethroplasty, and a number of scientists are inclined towards staged corrections of bladder exstrophy.

Purpose of the study: selection of optimal treatment tactics by determining the most effective method of surgical correction of bladder exstrophy with total epispadias in newborns and infants.

2. Material and Methods

This study was based on the results of a comprehensive examination and treatment of 43 patients with bladder exstrophy aged from 1 day to 1 year for the period from 2015 to 2023. The children were treated at the Republican Training, Treatment and Methodological Center for Neonatal Surgery at the Republican Perinatal Center. There were 36 boys (83.7%), 7 girls (16.3%). Full-term – 42(97.7%), premature – 1 (2.3%). Number of boys were five times more than girls. 12(27.9%) children were born at the Republican Perinatal Center, 31(72.1%) children were admitted from other institutions. All patients had the classic form of bladder exstrophy with total epispadias.

The examination of children with bladder exstrophy included: clinical examination, assessment of the

exstrophied area, laboratory tests (complete blood count, complete urine test, biochemical blood test, blood group and Rh factor, stool analysis), ultrasound and dopplerography with color mapping of the internal organs of the abdominal cavity, retroperitoneal space, genitourinary system, heart. Neurosonography of the brain was performed. Also were determined the distance between the pubic bones of the pelvis, assessed the hip joints and x-rayed the pelvic bones. In addition, if combined malformations were suspected, X-rays of the chest, skull and extremities were performed, as well as excretory urography.

3. Results and Discussions

Establishing a diagnosis of newborns was not difficult due to the severity of symptoms. The size of the exstrophied area ranged from 6.0 ± 3.5 cm in diameter. 6 children had inguinal hernia, and in 2 of them the hernia was bilateral.

To carry out an objective assessment of the results of surgical treatment of bladder exstrophy, all patients were conditionally divided into two groups. The main group (since 2017) included 21(48.8%) children who underwent simultaneous plastic surgery of the bladder, neck and urethra, i.e., cystosphincterourethroplasty.

The comparison group (until 2017) consisted of 22 (51.2%) patients with bladder exstrophy who underwent staged correction, i.e., first cystosphincteroplasty and in the next stage after 2 or 3 months - urethroplasty.

In the main group, the first surgical intervention was performed at the age of 10 days to 1 month, in the comparison group at the age of 2-3 months and older. The gender composition in both groups was practically the same. So, in the main group there were 17 boys, 4 girls, and in the comparison group there were 19 boys, 3 girls. Inguinal hernia as a concomitant in the main and comparison groups

was noted in 3 patients, respectively, and in the main group in 2 children it was bilateral.

In the treatment of patients in the comparison group, we adhered to the tactics of staged treatment of bladder exstrophy. Previously, we considered the age of 2-3 months of life to be the optimal time for performing primary plastic surgery of the bladder using local tissues without osteotomy and comparison of the pubic bones. We motivated this by the fact that during this period the child gains weight, the anesthetic risk decreases (it becomes possible to perform the operation under spinal anesthesia without intubation) and, most importantly, the skin adapts, and the severity of contact dermatitis, caused by urine entering the surrounding tissues, sharply decreases.

In addition, during this period we corrected concomitant defects (bilateral inguinal and inguinal-scrotal hernias). In this group, we adhered to the tactics of bladder plastic surgery without reduction of the bones of the symphysis pubis. Almost all children, regardless of the size of the bladder area, underwent bladder plastic surgery using local tissues as the first stage of correction of the defect, even when the size of the exstrophied area was 1.5-2.0 cm. At the same time, we slightly modified the bladder drainage technique. Thus, catheters were not installed at the mouths of both ureters, as in the classical version, we left it in the cavity of the newly created bladder, the end of which was brought out through the apex of the bladder through a contraperture and fixed. The bladder was sutured with double-row interrupted sutures (Vicryl 4/0 and 5/0). Bladder neck plastic surgery has also been improved, the essence of which is as follows: after crossing the muscles of the urogenital diaphragm and isolating tissue, a zone in the form of a narrow longitudinal strip 1.5-2 cm long and wide was created in the area of the bladder neck. Next, the bladder neck was formed and this area was covered from above with a layer of muscles using two U-shaped sutures. In the second stage, after 2-3 months, urethroplasty was performed using interrupted sutures (Vicryl 6/0) over the urinary catheter and thereby eliminated total epispadias. The aponeurosis and skin were sutured transversely, since during cystosphincteroplasty without approximation of the pubic bones, in which it is not possible to suture the wound (aponeurosis and skin) longitudinally.

In 3 of our patients with bladder exstrophy in the comparison group, an inguinal hernia was diagnosed. At the same time, we treated unilateral inguinal hernias (2 patients) during bladder repair, i.e., the first stage of exstrophy correction (cystosphincteroplasty). If the inguinal hernia was bilateral (1 child), then in such cases the hernia was first sectioned on both sides, and then bladder plastic surgery was performed 1 month after the first operation. Plastic surgery of the urethra, clitoris and labia in girls (3 patients) with bladder exstrophy was performed simultaneously with plastic surgery of the bladder.

Thus, until 2017, we performed staged correction for all patients with bladder exstrophy and total epispadias: 1st stage - cystosphincteroplasty at the age of 2-3

months after the first operation, 2nd stage – urethroplasty (22 patients), The only exception was girls with bladder exstrophy (2 patients), in whom, due to the anatomical features of the urethra, a one-stage cystosphincterourethroplasty was performed. In this group, in the early postoperative period, relapse of exstrophy and epispadias, that is, complete divergence of the sutures on the anterior abdominal wall, bladder wall and urethra, was noted in 5 children (22.7%), partial divergence in 6 (27.3%) children. Recurrence of epispadias in these patients was noted in almost 13 (59.0%) patients. In this group, all operations were performed without approximation of the pubic bones.

Considering the high percentage of postoperative complications during staged correction of bladder exstrophy without approximation of the symphysis pubis, since 2017 we have switched to single-stage correction of bladder exstrophy in newborns and infants. To bring the pubic bones together, non-absorbable sutures were used (ethibond 2/0), and for plastic surgery of the bladder and urethra, absorbable suture material (Vicryl 4/0, 5/0 and 6/0) was used. All children of the main group (21 patients) underwent simultaneous plastic surgery of the bladder, neck and urethra (simultaneous cystosphincterourethroplasty). So, if the diastasis between the pubic bones was up to 3.5 cm, we brought them together without osteotomy. All this made possible at the end of the operation to suture the aponeurosis and skin longitudinally without tension. Thus, in 17 children we brought the pubic symphysis closer together during the operation. In this case, 2 sutures of 2/0 ethibond were placed on the pubic cartilage, the pubic bones were brought together and tied. In 4 cases, due to a large diastasis of more than 4 cm, a posterior osteotomy was performed on both sides before plastic surgery. The technique of this operation (operation - cortical osteotomy of the iliac bones, cystourethroplasty, epicystostomy, external drainage of both ureters, connection of the pelvic bones, umblicoplasty, abdominoplasty) was as follows: first, under general intubating anesthesia, the patient was placed on his stomach, after treating the surgical field with betadine, a parallel skin incision about 3.0 cm long was made on both sides along the gluteal-pelvic junction and the wound was opened layer by layer, approximately 2.5-3.0 cm long from glutopelvic junction and exposed the ileum. With the help of Delato, a corticotomy was performed in the classical way, the movement of the pelvic bone was checked and the symphyses were tentatively brought closer to each other, and then the wound was closed with sutures.

After this, the patient was placed on his back, and after processing the surgical field and determining the location of the future new navel, a bordering incision was made at the border of the skin and mucosa of the exstrophied bladder. Next, the bladder was mobilized using sharp and blunt methods. The ureters were drained externally. Then cystoplasty and urethroplasty were performed. In this case, the bladder was first formed, the integrity of the wall of which was restored with double sutures. After this, neo urethroplasty by Duple was performed. Careful hemostasis during the operation. Next, the symphysis was brought together, with a

diastasis of up to 1.5 cm. The anterior abdominal wall - muscles and aponeurosis were sutured along the midline. The muscles were brought together with absorbable threads, and the aponeurosis with non-absorbable threads. A navel was formed. The integrity of the skin and subcutaneous tissue was restored with interrupted sutures. Aseptic dressing with betadine.

In all patients of the main group, surgery was performed at the age of 10 days to 1 month, i.e., during the neonatal period.

Analyzing of the early postoperative period showed that the results of primary plastic surgery of the bladder, neck and urethra were significantly better compared to the results of staged correction of bladder exstrophy. Thus, in the main group of children there was no complete dehiscence of the sutures on the bladder wall; recurrence of total epispadias in the early postoperative period was noted in only 2 (9.5%) patients. In addition, the total duration of the operation did not lengthen significantly compared to staged cystosphinctero- and urethroplasty.

Thus, one-stage cystosphincterourethroplasty with rapprochement of the pubic bones during primary plastic surgery of the bladder and urethra with local tissues is the method of choice, which can significantly improve functional results and reduce the number of relapses of both bladder exstrophy and total epispadias.

REFERENCES

[1] Surgical restoration of the pelvic ring for congenital

malformation - exstrophy of the bladder / Khabibyanov R.Ya., Andreev P.S., Akramov N.R., et al. // *Practical Medicine*. 2017. No. 8 (109). pp. 154-156.

- [2] Scope of surgery for primary closure of the bladder in children with bladder exstrophy / Rudin Yu.E., Sokolov Yu.Yu., Rudin A.Yu., Kirsanov A.S., Medvedeva N.V., Kartseva E. V.- *Pediatric surgery*. 2020. T. 24. № 1. C. 21-28.
- [3] Complex staged treatment of penile defects in boys with epispadias and exstrophy of the bladder/Rudin Yu.E., Marukhnenko D.V., Aliev D.K., et al. // *Experimental and clinical urology*. 2016. № 4. C. 128-135.
- [4] Bladder exstrophy: current state of the problem (literature review)/ Averin V.I., Kandratyeva O.V., Zabarovsky A.V., etc. // *Childhood Surgery*. 2018. № 3 (60). P. 100-104.
- [5] Delayed primary closure of the bladder in children with exstrophy and microcystis /Rudin Yu.E., Sokolov Yu.Yu., Rudin A.Yu., Marukhnenko D.V., Runenko V.I., Kirsanov A.S., Kartseva E.V., Medvedeva N.V. *Experimental and clinical urology*. 2020. № 4. C. 146-154.
- [6] Endoscopic interventions for bladder exstrophy in children / Lebedev D.A., Osipov I.B., Burkhanov V.V., et al. // In the book: Vorontsov readings. St. Petersburg - 2017 Materials of the X Anniversary Scientific and Practical Conference. 2017. C. 57-58.
- [7] Method of surgical correction of the pelvic ring for the treatment of bladder exstrophy in children / Kruglov I.Yu., Baskov V.E., Kagantsov I.M., Pervunina T.M. Patent for invention RU 2802430 C1, 08.28.2023. Application № 2022128262 from 28.10.2022.
- [8] Achieving urinary continence in cloacal exstrophy: The surgical cost. / Maruf M, Kasprenski M, Jayman J, et al. // *J Pediatr Surg*. 2018 Oct; 53(10): 1937-1941. doi: 10.1016/j.jpedsurg.2018.02.055. Epub 2018 Feb 24.