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Immediate results of orthotopic intracorporal ileoneocystoplasty

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SUMMARY

Since 1960, the gold standard for the treatment of MIRS is radical cystectomy (RCE) with pelvic lymph dissection. The formation of an artificial orthotopic bladder (provided that the patient has the appropriate indications) is optimal for the subsequent successful psycho-social and labor readaptation of the patient after RCE. The currently used a large number of different technologies of urine derivation in the course of radical cystectomy testifies to the lack of a single generally accepted, and therefore the most optimal method, which objectifies further scientific research in this area.

INTRODUCTION

Вступ

Bladder cancer (BC) is a pressing problem both in developed countries (USA, Germany, China) and among developing countries to which Ukraine belongs. Among cancers, BC ranks 6th in prevalence

in the United States, 5th in Germany, 13th in China, and 9th in Ukraine. According to world statistics, in 2020, 573 thousand new cases of BC were recorded and more than 212 thousand BC was the cause of death [1]. Most of the newly diagnosed neoplasms of the bladder are muscular-non-invasive BC (MNIBC) and are 70-80% of the total. This form

of the disease is usually treated with transurethral resection. The prognosis for patients with MNIBC is favorable if the disease has not progressed to muscular-invasive BC (MIBC). This scenario develops in about 30% of patients with BC. Since 1960, the gold standard for the treatment of MIBC is radical cystectomy (RCE) with pelvic lymph dissection. This type of treatment is also indicated for patients with recurrent and BCG-resistant MNIBC. RCE is a simultaneous operation on the urinary system, intestines, and lymph nodes, and, despite advances in surgery, chemotherapy, and radiotherapy [3], the prognosis for patients remains unfavorable. Regardless of the surgical method, open or robot-assisted [7, 8], as well as the age of patients [10], multicenter studies have shown that the mortality rate in the first 90 days after BC is 1.8-4%, and complications develop approximately in every second patient [4, 5, 6]. Postoperative complications increase the length of the patient's stay in the hospital, increase the material costs of treatment and rehabilitation, and significantly affect the quality of life of patients after surgery.

The optimal implementation of the reconstructive stage of RCE at the current level of development of scientific knowledge and surgical technologies remains a relevant multifaceted and sometimes controversial problem given the further functional outcome of various modifications of this operation, the latter largely determines the quality of life of operated patients, specific postoperative complications and adverse effects, as well as mortality.

Currently, several basic fundamentally different approaches to urine derivation after radical cystectomy have been developed and widely used, including: formation of ureterocutaneostom (there is also a modification in the form of transureterocutaneostomy); diversion of urine to the continuous intestine by applying direct ureteral anastomoses (most often it is ureterosigmoanastomosis); creation of ileal (hereinafter: ileal) conduit with removal of "wet stoma" (a well-known example is Bricker surgery); formation from detubularized parts of the gastrointestinal tract of reservoirs holding urine with the removal of "dry stoma" (typical examples are Hautmann surgery or "Indiana pouch"); derivation of urine to the artificial orthotopic bladder, technologically the most common option is ilioecocystoplasty (examples of which are the surgeries Studer, "Hemi-kock", "Camey I", in addition, there are technologies of orthotopic cecocystoplasty and sigmoneocystoplasty, the possibility of using a continuous ileocecal or gastroduodenal segments.

The formation of an artificial orthotopic bladder (provided that the patient has the appropriate indications) is optimal for the subsequent successful

psycho-social and occupational readaptation of the patient after RCE. This is due to the lack of excretion of urine on the surface of the skin (ie urostomy), as well as, provided the anatomical integrity and functional capacity of the external sphincter of the bladder, there is a potential for the patient to develop an independently controlled act of urination. The latter, along with the unconditional achievement of radical surgical treatment of bladder cancer, determines a good onco-functional result of the operation, especially in combination with nerve-preserving techniques of cystoprostatectomy in men (subject to appropriate indications) - making it potentially possible to preserve erectile function the patient.

The aim of the study. Evaluate the immediate results of improving the reconstructive stage of radical cystectomy by applying a modified configuration of the newly formed ureteral-bladder-urethral segment and a new technology of its step-by-step intraoperative modeling.

MATERIALS AND METHODS

Матеріали і методи дослідження

Clinical data of case histories in nine patients with muscular-invasive bladder cancer in the clinical stage T2aN0M0 – T3bN0M0, who were treated at the Institute of Urology of the National Academy of Medical Sciences of Ukraine during 2019-2020, were retrospectively evaluated. All male patients aged 45 to 85 years (average age - 54.3 ± 1.8 years). Patients were examined in accordance with the accepted standards of urological care ("Decree of the Ministry of HealthCare of Ukraine № 330"). All patients underwent preoperative transurethral resection (TUR) or transurethral biopsy (TUR biopsy) of the tumor, which histopathologically confirmed the malignancy with high sensitivity and specificity. The final histopathological diagnosis, classification, and assessment of prognostic factors were based on the removed tissue.

In the preoperative period, the duration of the disease was estimated (from the onset of symptoms to hospitalization): in two patients this period was up to 1 year, from 1 to 2 years - four patients, from 2 to 4 years - three patients. Previously, open resection of the bladder with the tumor was performed in three patients in other medical institutions. Cystectomy and lymphadenectomy stages in all patients were performed laparoscopically. Six patients underwent reconstructive surgery by converting access from midline laparotomy (where the removal of the gross specimen was performed), and two patients continued ileal reservoir formation intracorporeally.

The prototype used a known method of orthotopic artificial ilonecystoplasty by Studer U. E. et al. [9]. All operations were performed in the typical Trendelenburg position 20-30 ° on the back under combined epidural and total intravenous anesthesia with endotracheal intubation. After removal of the bladder, prostate with seminal vesicles and regional lymph nodes, isolated and reduced to the pelvic cavity segment of the ileum length of 50 cm, then restored the integrity of the gastrointestinal tract, then proceeded to the stage of iloneocystoplasty itself. By the way, one of the disadvantages of the prototype is the resection of a sufficiently long ileal segment (up to 65 cm) [9], which can be a prerequisite for a number of metabolic disorders, and subsequently lead to chronic renal failure. Thus, it is important to reduce the length of the intestinal segment removed from the patient in order to reduce the likelihood of metabolic acidosis in the remote postoperative period.

The method is explained by illustrative materials..

Initially, two inflection points are plotted at a distance of 15 cm from both ends of the intestinal graft using a weak solution of betadine (Fig. 1 - 4, 5), and then ligature holders (suture material Vicryl 4/0) are applied there, and verticalize right and left undetubularized intestinal segments (Fig. 1 - 1, 2). Then find and plot the sagging point in the projection of the middle intestinal segment (Fig. 1 - 6) with a weak solution of betadine.

Then detubularize the right and left intestinal segments along the counter-mesenteric edge, and the central segment - asymmetrically, with its average 5 cm dissected at a distance of 0.7-0.8 cm from the intestinal mesentery, and then again smoothly move to the counter-mesenteric edge, due to which get a single intestinal plate (Fig. 2) with a cervical shred (Fig. 3 - 1).

In the next step, the medial edges of the right and left intestinal segments are fixed to the upper edge of the middle segment (intestinal stapler Hendo-60-3,0A or continuous suture V-Lock 2/0) (Fig. 3 - 3) and sharply form a hole in an oval shape with a diameter of 0.6-0.8 cm in the projection of the point of sagging (Fig. 3 - 2). Afterward, the upper and middle thirds of the lateral edge of the right and left intestinal segments are fixed together resulting in the formation of aboral and oral intestinal openings (intestinal stapler Hendo-60-3,5A or continuous suture V-Lock 2/0). Then, for 12 and 6 hours of the conventional dial, vertical incisions are made in the eye of the reservoir neck in order to bring its diameter to 1.0-1.5 cm, where the Foley urethral catheter is inserted (Ch 26-30), the formed semicircles are everted, then tubularize on the urethral catheter by applying three to five

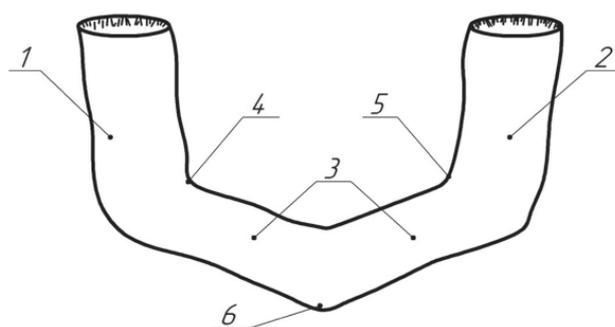


FIGURE 1. Isolation of an intestinal fragment

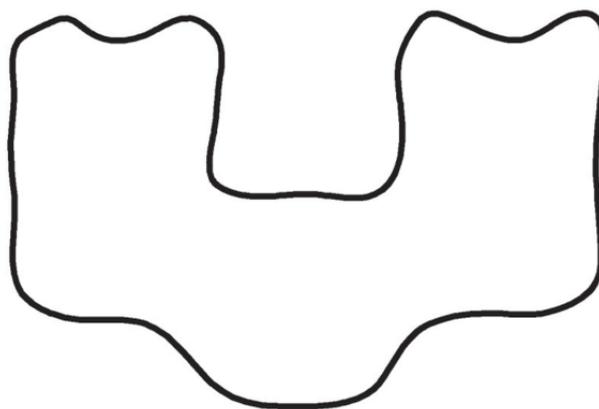


FIGURE 2. Detubularization of the intestinal fragment

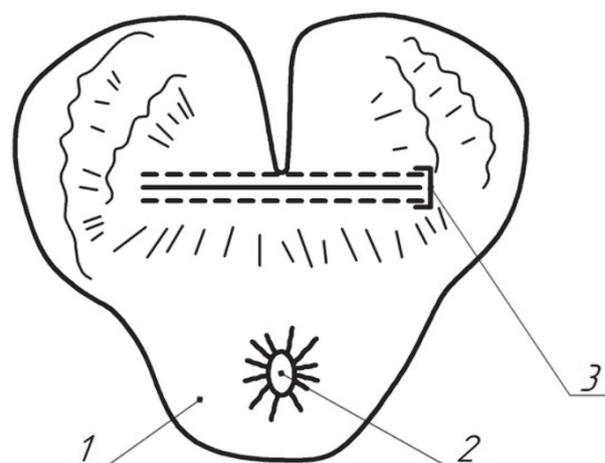


FIGURE 3. Formation of the bladder neck

nodal sutures Vicryl 5/0 (on the anterior and posterior surfaces) (Fig. 4 - 1, footnote 1 - 1.2, 1.3) and perform the maneuver of neck deplication (Fig. 4 - 1, footnote 1 - 1.1) with two nodal gray-muscular sutures Vicryl 3/0, applied in parallel to the axis of the neck one above another, on both sides (permissible step between the places, where the needle goes in and where it goes out of the tissue is from 0.3 to 0.5 cm) (Fig. 4 - 1, footnote 1 - 1.4).

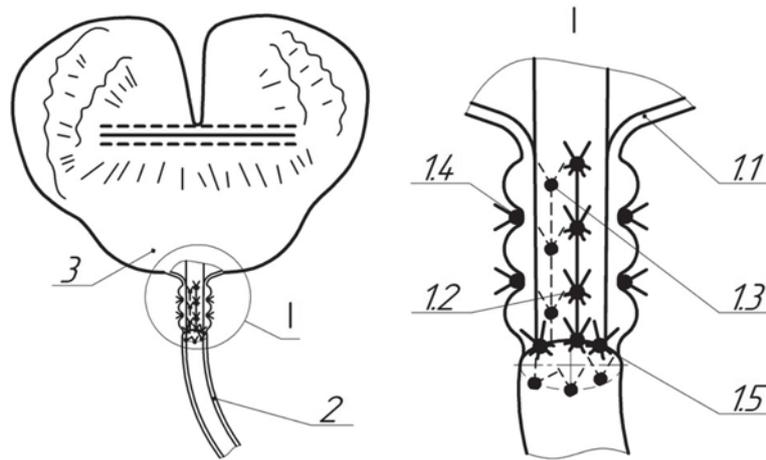


FIGURE 4. Bladder neck duplication maneuver

Subsequently, a vesicourethral anastomosis is performed by suturing the newly formed reservoir neck and membranous urethra (Fig. 4 - 2) with six Vicryl 2/0 sutures, while the anterior edge of the cervical flap (Fig. 4 - 3) is displaced caudoventrally during stitching of the cervix and cranio-dorsal during the imposition of ligatures on the urethra (Fig. 4 - 2 and Fig. 4, footnote 1 - 1.5). Then on the posterolateral surface of the reservoir, we form anastomoses with the ureters (suture material Vicryl 4/0) (Fig. 5 - 1, 2). In the next step, the free edge of the cervical flap with the formed neck of the bladder is compared with the lower thirds of the lateral edge of the right and left intestinal segments, and the oral and aboral intestinal openings are sealed (intestinal stapler Hendo-60-3,5A or continuous suture V-Lock 2/0).), pre-installing through the intestinal opening cystostomic drainage Ch 22-24

(Fig. 5 - 6). Finally, peritonize the anterior wall of the reservoir at the location of the suture of the right and left intestinal segments and install pelvic drainage, which completes the stage of orthotopic ilioneocystoplasty according to the proposed method (Fig. 6).

RESULTS AND DISCUSSION

Результати та їх обговорення

To assess the immediate results after surgery, all patients were divided into two groups: 1 group - patients who underwent reconstructive surgery - 7 (77.7%), 2 group - patients with intracorporeal ilioneocystoplasty - 2 (22.3%). Perioperative results between groups are presented in table 1.

After the reconstructive stage of the operation according to the proposed method intraoperatively

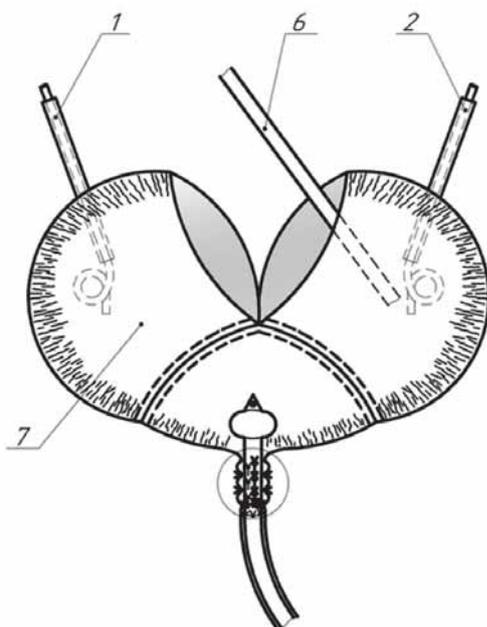


FIGURE 5. Formation of ureteroneovesical anastomoses

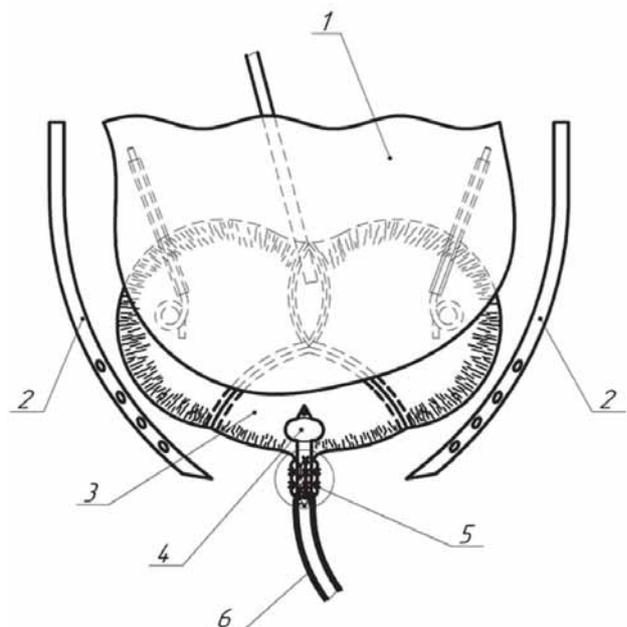


FIGURE 6. Final sealing and peritoneisation

TABLE 1. Comparative evaluation of immediate results after surgery (p <0,05 *)

	Open RCE	Laparoscopic RCE
Reservoir volume, ml		
- intraoperatively	180±23	160±50
- after 6 months	420±68	380±50
P/o amount of days in the hospital	14,2±4,2	7,2±1,5
Urine derivation stage time, h	1,5±0,5	2,5±0,5
Act of urination	Present	Present
Hermetic vesico-urethral anastomosis	Hermetic	Hermetic
Vesico-urethral anastomosis stenosis	Absent	Absent
Stress urinary incontinence	1/7 during daytime and night-time	2/2 during night time

Note: * - the difference between the groups is probable, p/o - postoperative period

determined the volume of the artificial bladder, which in 1 group averaged 180 ml ± 23 ml, in the second 160 ml ± 50 ml. The time of the reconstructive stage of the operation in open access was on average 1.5 ± 0.5 h and 2.5 ± 0.5 h in the group of laparoscopic access (excluding the imposition of intracorporeal intestinal anastomosis). The postoperative bed day was 14.2 ± 4.2 days in group 1 and 7.2 ± 1.5 days in group 2.

During periodic follow-up examinations of patients in both groups, the preservation of an independent act of urination without expansion of collecting systems of both kidneys was noted. No signs of leaking of vesicourethral anastomosis in the early postoperative period or its stenosis in the late. We associate this with the applied modification of the formation of the neck “neovezika”, which reduces the tension of VUA, which is a disadvantage of the prototype, as well as a number of other “traditional” methods of ilioneocystoplasty, there is a potential possibility of tension of the neovesico-urethral anastomosis in the case of such anatomical features of the patient as short mesentery of the small intestine, the presence of intestinal bowel disease (as a result of previous surgery on the abdominal organs), the joint-fibrous process of the pelvis and short membranous urethra. The latter condition can occur due to prostatic hyperplasia, which is removed, as well as the inability to perform intraoperatively maneuver apical dissection of the prostate during the cystoprostatectomy stage of surgery (in men), or initially anatomically short urethra. Thus, the above can lead to leaks of the vesicourethral anastomosis in the early postoperative period, and in the remote - to its stenosis, which in turn, due to the impossibility of the act of independent urination, eliminates the potential benefit of orthotopic ilioneocystoplasty and less traumatic surgeries aimed at creating a heterotopic conduit (such as Bricker surgery, etc.) [9].

After 6 months, the capacity of the formed bladder was 420 ± 68 ml in 1 group, and 380 ± 50

ml in 2 groups, which allowed patients to perform controlled urination 6-8 times a day at will and 2-3 times a night. For comparison with the prototype, the volume of the “neobladder” on average is 285.5 ± 50 ml [9].

Stress incontinence after surgery was in two patients in group 2 at night and in one patient from group 1 during day and night.

In addition, examining the original source, it can be established that during modeling of an illegal bladder relative to a prototype that uses only the apodactyl method of comparison of the edges of the intestine, while an instrumental approach, such as intestine staplers, the authors did not use [see 9, p. 44]. What can not be realized in the process of active implementation of minimally invasive cystectomy, after all, in laparoscopic or robot-assisted versions of this operation, almost all stages of the intervention are performed exclusively instrumentally.

CONCLUSIONS

Висновки

In all clinical cases with the proposed method of ilioneocystoplasty, an acceptable functional result was obtained, no negative impact on the radicality of the operation was found. The application of the proposed method of orthotopic ilioneocystoplasty during RCE will allow: to reduce the total time of the operation in connection with the planned use of modern methods of intestinal suture; to compensate for the possible tension of the vesicourethral anastomosis, which will reduce the frequency of leaks of VUA or its stenosis, as well as urinary incontinence at night; reduce the likelihood of metabolic disorders in the postoperative period due to the reduction of the length of the removed ileal segment from the patients; as well as to unify the technology of orthotopic ilioneocystoplasty in the framework of different approaches to radical

cystectomy, among them: traditional “open”, laparoscopic or robot-assisted. Given the number of observations, the formation of final conclusions requires the accumulation of clinical experience.

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РЕФЕРАТ**Безпосередні результати ортотопічної інтракорпоральної іліонеоцистопластики**

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З 1960 року золотим стандартом лікування МІРСМ є радикальна цистектомія (РЦЕ) з тазової лімфодисекцією. Формування артіфіційного ортотопічного сечового міхура (за умови наявності у хворого відповідних показань) являється оптимальним для наступної успішної психо-соціальної і трудової реадaptaції пацієнта після РЦЕ. Застосовувана нaтепер велика кількість різноманітних технологій деривації сечі в ході радикальної цистектомії засвідчує відсутність єдиної загальноприйнятої, а значить найбільш оптимальної методики, що об'єктивізує подальший науковий пошук в даному напрямку.

Ключові слова: рак сечового міхура, лапароскопічна радикальна цистектомія, операція Штудера, операція Брікера, ортотопічна іліонеоцистопластика, везікоуретральний анастомоз.

РЕФЕРАТ**Непосредственные результаты ортотопической интракорпоральной илеонеоцистопластики**

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А.П. Кондратенко

С 1960 года золотым стандартом лечения МИРСМ является радикальная цистэктомия (РЦЭ) с тазовой лимфодиссекцией. Формирование артіфіціального ортотопического мочевого пузыря (при наличии у больного соответствующих показаний) является оптимальным для последующей успешной психо-социальной и трудовой реадaptaции пациента после РЦЭ. Применяемые на данный момент большое количество различных технологий деривации мочи в ходе радикальной цистэктомии свидетельствуют об отсутствии единой общепринятой, а значит наиболее оптимальной методики, что делает объективным дальнейший научный поиск в данном направлении.

Ключевые слова: рак мочевого пузыря, лапароскопическая радикальная цистэктомия, операция Штудера, операция Брикера, ортотопическая иліонеоцистопластика, везикоуретральний анастомоз.