

RETZIUS-SPARING ROBOT-ASSISTED RADICAL PROSTATECTOMY: INITIAL EXPERIENCE AND SURGICAL TECHNIQUE

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⊗ To present own initial experience of Retzius-sparing robot-assisted radical prostatectomy (RS-RARP) and surgical technique. In October–November 2019 on the basis of the Urological Department and the Center for Robotic Surgery of City Mariinsky Hospital (Saint Petersburg, Russia) five patients with localized prostate cancer were treated with RS-RARP. The operation time was from 140 to 205 min. The blood loss volume was from 50 to 250 ml. No conversions and intra-operative complications were recorded. Nervous-saving RS-RARP was performed in three patients. No blood transfusions were performed. Two patients faced Clavien Grade I postoperative complications. Immediate continence after removal of the urethral catheter was noted in 3 out of 5 patients. All the patients became continent for 2 weeks. One extraprostatic positive surgical margin was recorded. RS-RARP is an accessible technique for treating patients with localized prostate cancer, which allows achieving high early results. It is necessary to accumulate more experience of such surgeries to assess the distant outcomes and compare them with the data of the robot-assisted radical prostatectomies performed by other approaches.

⊗ **Keywords:** Retzius-sparing robot-assisted radical prostatectomy; da Vinci robot; Retzius space.

РЕТЦИУС-СБЕРЕГАЮЩАЯ РОБОТ-АССИСТИРОВАННАЯ РАДИКАЛЬНАЯ ПРОСТАТЭКТОМИЯ: ПЕРВЫЙ ОПЫТ И ТЕХНИКА ВЫПОЛНЕНИЯ

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⊗ Представлен собственный первоначальный опыт выполнения ретциус-сберегающей (задней) робот-ассистированной радикальной простатэктомии (РС-РАРП) и техники этого вмешательства. В октябре–ноябре 2019 г. на базе урологического отделения и Центра роботической хирургии СПбГБУЗ «Городская Мариинская больница» пяти пациентам, страдающим раком предстательной железы клинической стадии T1c-T2bN0M0, была выполнена РС-РАРП. Время операции составило от 140 до 205 мин. Объем кровопотери — от 50 до 250 мл. Конверсий и интраоперационных осложнений зафиксировано не было. Нервосберегающая РС-РАРП была выполнена трем пациентам. Гемотрансфузий не проводилось. У двух больных после операции отмечались осложнения класса I по Clavien. Немедленное удержание мочи после удаления уретрального катетера отметили 3 из 5 пациентов. В течение двух недель мочу удерживали все пациенты. При гистологическом исследовании препаратов экстрапростатический положительный хирургический край был зафиксирован у одного больного. По результатам было установлено, что РС-РАРП является доступным для освоения способом выполнения минимально-травматического вмешательства при локали-

зованном раке предстательной железы, позволяющим добиться высоких ранних результатов лечения. Необходимо накопление большего опыта таких операций для оценки отдаленных исходов и сравнения их с данными РАРП, выполненных другими доступами.

🔑 **Ключевые слова:** ретциус-сберегающая робот-ассистированная радикальная простатэктомия; робот-хирург «Да Винчи»; ретциево пространство.

INTRODUCTION

Dissection of the parietal peritoneum in the projection of the bladder apex and dissection of the Retzius space are two common approaches to the prostate gland during transperitoneal robot-assisted radical prostatectomy (RARP) [1–3]. A lateral approach was first described by R. Gaston in 2007. With this approach, the Retzius space is opened limitedly along the right flange of the bladder, and further stages of the surgery are performed through the lateral channel formed [4]. In 2012, A. Galfano et al. presented for the first time the results of a Retzius-sparing (posterior) RARP (RS-RARP), during which access to the prostate was made through an incision in the peritoneum in the bladder neck projection from the vesicorectal (Douglas) space [5]. The main trend in prostate cancer surgery is the improvement in the surgical technique to improve the functional results of treatment. Given its anatomical character, RS-RARP is considered one of the promising ways to achieve this objective.

This paper presents our own initial experience with RS-RARP and the technique for this intervention.

PATIENTS AND METHODS

From October to November 2019, in the Urological Department and the Center for Robotic Surgery of the City Mariinsky Hospital (Saint Petersburg, Russia), five patients with clinical stage T1c-T2b-N0M0 prostate cancer underwent RS-RARP at the DaVinci Si robotic surgical complex. The age of patients ranged from 61 years to 65 years. The volume of the prostate gland ranged from 31 cm³ to 65 cm³, the range of the total prostate-specific antigen level was 7.5–10.9 ng/mL, and the total score on the Gleason scale was from 6 (3 + 3) to 7 (4 + 3). The clinical stage of the disease was determined based on multiparametric MRI, osteoscintigraphy or positron emis-

sion (PET) and computed tomography (CT) scans, and radiography or multispiral computed tomography (MSCT) of the chest organs.

Radical prostatectomy through the Douglas space is significantly different from the standard approach of performing RARP. The latter repeats the technique of open retropubic radical prostatectomy described by P. Walsh in 1983 through a sequence of basic steps [6]. The fundamental difference between radical prostatectomy through the Douglas space and RS-RARP is the absence of a stage of Retzius space dissection, mobilization of the bladder, and dissection of the ligamentous–fascial complex of the small pelvis.

STAGES OF SURGERY

Dissection of the parietal peritoneum in projection of the bladder neck. Surgery is performed transperitoneally; the location of the robotic trocars follows that with the traditional approach. Assistant 12 or 5 mm ports are also installed in a standard way, namely, para-rectally on the right 2–3 cm above the optical port and 6–8 cm laterally from the right robot port, respectively. At stage 1, the parietal peritoneum is opened. Unlike the traditional approach, an incision is made in the projection of the bladder neck but not its apex. For improved visualization, traction of the posterior wall of the bladder upwards is performed using the third robotic instrument. **Isolation of the spermatic ducts and seminal vesicles** (Fig. 1). This stage of the surgery is performed immediately after opening the parietal peritoneum. The dissection of the spermatic ducts and seminal vesicles does not differ from the standard technique. The main factor ensuring the technical complexity of this stage is the small volume of the surgical field and the inability to perform wide tractions of the seminal vesicles and the prostate gland itself, which remains isolated

on a small surface of its base at this stage. **Isolation of the posterior surface of the prostate and neurovascular bundles** (Fig. 2), similar to the traditional approach, is conducted after the isolation of seminal vesicles. The level of nerve sparing is determined based on the stage of the tumor process. Partial lateral dissection of the vesicular-prostatic muscle fibers is performed to obtain the posterolateral sections of the prostate gland. **Dissection of the bladder neck** (Fig. 3) is performed in the direction from the bottom upwards, and it is one of the most complicated steps in this surgery. At this stage, the advantage of the robotic tools to freely bend at the ends is most evident. For improved visualization, an optical instrument turned upwards (30°) is used. The neck of the bladder is opened along the rear surface, the urethral catheter is removed, and the bladder's anterior surface is dissected. **Dissection of the dorsal vascular complex** is performed with a blunt and sharp method without prior suturing and dressing. After isolation of the prostate apex, the gland is cut off from the urethra. At this stage, if necessary, the elements of the dorsal complex are sutured. Fig. 4 presents the bed of the removed prostate gland. **Forming of the vesico-urethral anastomosis** (Fig. 5) begins at its front wall at the 12 o'clock position. Anastomosis is performed using self-tightening threads. The complexity of this stage is due to unusual visualization. Given that bladder mobilization is not performed, the mucous membrane of the urethra and the bladder is put together without visible tension. Therefore, strengthening the anastomosis with the use of additional reconstruction is not required. If necessary, rear plastic surgery of the bladder neck is performed. The last step is the installation of drainage to the anastomotic zone and **suturing of the parietal peritoneum**.

RESULTS

The surgery lasted 140–205 min. The blood loss was from 50 mL to 250 mL. There were no conversions, including in the traditional approach through the Retzius space. Moreover, intraoperative complications were not recorded. Nerve-sparing RS-RARP was performed in three patients. Blood transfusions

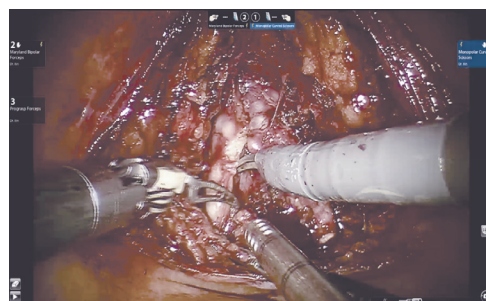


Fig. 1. Isolation of the vas deferens and seminal vesicles
Рис. 1. Выделение семявыносящих протоков и семенных пузырьков

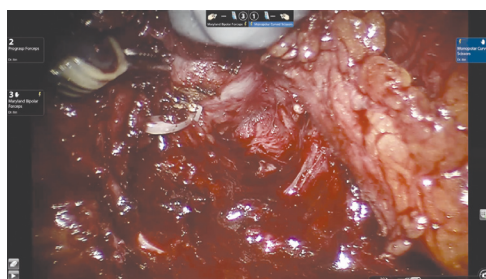


Fig. 2. Isolation of the posterior surface of the prostate gland and neurovascular bundles
Рис. 2. Выделение задней поверхности предстательной железы и сосудисто-нервных пучков

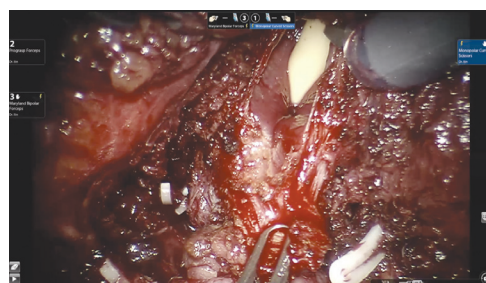


Fig. 3. Dissection of the neck of the bladder
Рис. 3. Диссекция шейки мочевого пузыря

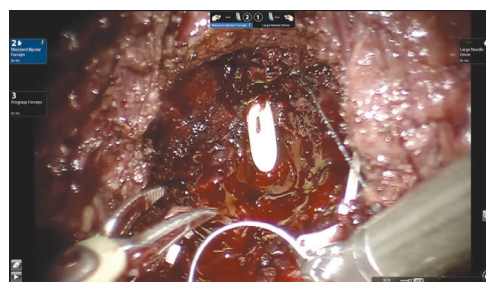


Fig. 4. The bed of the removed prostate gland
Рис. 4. Ложе удаленной предстательной железы

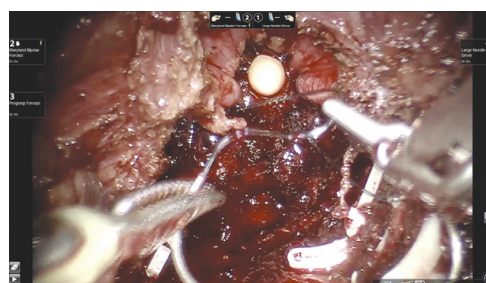


Fig. 5. The imposition of a vesico-urethral anastomosis
Рис. 5. Наложение пузырно-уретрального анастомоза

were not performed. All patients were monitored in the intensive care unit for the first 12–24 h after the surgery. Drainage tube was removed at postoperative days 1 and 2. Clavien class I complications were reported in two patients. The urethral catheter was used for 6–7 days. Prior to removal of the urethral catheter, all patients underwent cystography. Immediately after removal of the urethral catheter, complete continence (lack of necessity to use a safety pad) was noted by three out of five patients. One patient required a safety pad for 6 days, and another patient needed it for 2 weeks.

After nerve-sparing interventions upon removal of the urethral catheter, patients underwent penile rehabilitation with type 5 phosphodiesterase inhibitors. No repeated interventions or repeated hospitalization were performed. The total duration of hospital stay was 4–8 bed days. Histological examination of prostate preparations revealed an extraprostatic positive surgical margin in one patient. In the same patient, the stage of disease migration from cT2b to pT3a was noted.

DISCUSSION

The improvement in functional outcomes of radical prostatectomy has been the subject of many studies in Russia and abroad. The authors propose different methods for enhancing vesicourethral anastomosis, as well as preserving and reconstructing the connective tissue framework of the pelvic floor during RARP with the traditional approach through the Retzius space [1, 7–9]. For the first time in our country, Prof. M.S. Mosoyan et al. began to perform RARP with the retropubic approach and maximum preservation of the anatomical structures surrounding the prostate gland and reconstruction of the pelvic fascia and puboprostatic ligaments; this technique led to a significant increase in the frequency of early continence in this group of patients compared with the control, in which wide dissection of the prostate was performed and reconstruction was not performed [1].

A.D. Asimakopoulos et al. [10] presented a standardized technique for performing RARP with the

lateral approach, in which bladder mobilization occurs laterally and partially along the anterolateral side, thereby reducing the volume of the Retzius space dissection compared with the traditional approach. Their technique preserves the bladder neck as much as possible to significantly increase the likelihood of early recovery of continence.

The perineal approach is also used to perform RARP. The first stage in such surgeries is an open dissection of the pelvic diaphragm, followed by the robotic stage starts, during which the prostate gland is removed and an anastomosis is applied. In a comparative study of traditional and perineal approaches, V. Tugcu et al. demonstrated the advantage of the second method in the surgical duration and the frequency of restoration of normal continence [11].

An increasing number of publications in the literature demonstrated the results of the initial series of RS-RARP. These results confirmed the prospectivity of such a minimally traumatic approach to the prostate gland. A. Galfano et al. [12], who first proposed this approach for radical prostatectomy, analyzed a series of 200 cases; they reported a positive surgical margin frequency of 10.1% and relapse-free survival rate for 1 year of 92%. Immediate continence was noted in 90% of patients, and 40% of patients with preserved neurovascular bundles performed sexual intercourse 1 month after the surgery. In the Russian scientific literature, we have not found a previously described experience of RARP through the Douglas space. By the time the first interventions were carried out with the new approach, we performed 102 RARP surgeries using the traditional transperitoneal method.

In the first results of RS-RARP, a significant variation in the time of intervention was noted, which was due to the location of the surgical team on the training curve for the approach indicated. A large volume of blood loss was not recorded in any patient. In general, we obtained satisfactory intraoperative and early postoperative treatment results. Within a week, four out of five patients ceased using a safety urological pad. Despite the technical aspects of the approach, which complicate the visualization of

prostate gland margins in the early stages of isolation, the results of a histological examination of the removed gland preparations showed that the intraprostatic positive surgical margin was not recorded in any patient. A patient with an extraprostatic positive surgical margin revealed in the course of clinically undetectable extracapsular tumor spread is currently receiving adjuvant treatment in an oncology hospital. Three patients who underwent nerve-sparing RS-RARP are receiving penile rehabilitative care. Evaluation of erectile function recovery is planned at a later stage of follow up.

Currently, several methods are available to achieve early recovery of continence in patients after radical surgical treatment of prostate cancer. The main advantages of the RARP technique with preservation of the retropubic space include minimal trauma of the tissues surrounding the prostate and bladder during the surgical procedure, leading to high early functional results without compromising oncological outcomes.

CONCLUSIONS

RARP with preservation of the retropubic space is an accessible method for performing minimally traumatic intervention in case of localized prostate cancer. This technique achieves good early functional results of treatment. Further experience in such surgeries is necessary to assess long-term outcomes and compare them with RARP data that were obtained with other approaches.

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