

UDC 616.65-006.6-089.87-089.166

Y.A. Nakonechnyi

A combined approach to neurovascular tissue preservation in extraperitoneoscopic radical prostatectomy

PNPI «Danylo Halytskyi Lviv National Medical University», Ukraine

Paediatric Surgery (Ukraine). 2026. 2(91): 99-106. doi: 10.15574/PS.2026.2(91).99106

For citation: Nakonechnyi YA. (2026). A combined approach to neurovascular tissue preservation in extraperitoneoscopic radical prostatectomy. Paediatric Surgery (Ukraine). 2(91): 99-106. doi: 10.15574/PS.2026.2(91).99106.

Optimizing functional outcomes after radical prostatectomy remains a relevant problem, particularly in patients with increased oncological risk and technically challenging surgical conditions. Although numerous techniques for neurovascular tissue release and dissection have been described, consensus on the optimal approach is absent.

Aim – to describe and evaluate the safety and feasibility of a combined neurovascular tissue preservation approach (CA-NVT) in extraperitoneoscopic radical prostatectomy (ERP).

Materials and methods. This prospective study included 30 patients with non-metastatic prostate cancer who underwent ERP. In all cases, a combined approach to neurovascular tissue release and dissection was applied. Functional outcomes and biochemical recurrence were evaluated during a 12-month follow-up period.

Results. Postoperative complications were limited to Clavien–Dindo grade I–II and occurred in 17% of patients. No vesicourethral anastomotic strictures were observed during the follow-up period. At 12 months postoperatively, urinary continence and erectile function were preserved in 97% and 60% of patients, respectively. Positive surgical margins were present in 27% of cases, and biochemical recurrence occurred in 13% of patients within 12 months.

Conclusions. The combined neurovascular tissue preservation approach in ERP is a safe and feasible technique, yielding encouraging functional outcomes while maintaining an oncologically tailored surgical dissection.

The study was performed in accordance with the principles of the Declaration of Helsinki. Written informed consent was obtained from all patients.

The authors declare no conflict of interest.

Keywords: radical prostatectomy, neurovascular tissue, combined approach, prostate cancer.

Комбінований підхід до збереження нейроваскулярної тканини при екстраперитонеоскопічній радикальній простатектомії

Й.А. Наконечний

ДНТ «Львівський національний медичний університет імені Данила Галицького», Україна

Оптимізація функціональних результатів після радикальної простатектомії залишається актуальною проблемою, особливо у випадках підвищеного онкологічного ризику та складних оперативних умовах. Попри те, що було описано безліч технік вивільнення та дисекції нейроваскулярної тканини, консенсусу щодо оптимального підходу не існує.

Мета – описати та оцінити безпеку і доцільність комбінованого підходу до збереження нейроваскулярної тканини (CA-NVT) при екстраперитонеоскопічній радикальній простатектомії (ЕРП).

Матеріали та методи. Проспективне дослідження охопило 30 пацієнтів із неметастатичним раком простати, яким виконували ЕРП. В усіх випадках застосовано комбінований підхід до збереження нейроваскулярної тканини. Функціональні результати та біохімічний рецидив оцінювали впродовж 12 місяців.

Результати. Післяопераційні ускладнення обмежувалися I–II ступенем тяжкості за класифікацією Clavien–Dindo та спостерігались у 17%. За час спостереження стриктур везикоуретрального анастомозу не зареєстровано. Через 12 місяців після операції утримання сечі та еректильна функція згідно з установленими критеріями збереглися у 97% та 60% пацієнтів відповідно. Позитивні хірургічні краї присутні у 27% випадків, а біохімічний рецидив виник у 13% пацієнтів протягом 12 місяців.

Original articles. Urology and gynecology

Висновки. Комбінований підхід до збереження нейроваскулярної тканини при ЕРП є безпечною та технічно придатною до застосування методикою, що забезпечує обнадійливі функціональні результати при збереженні онкологічно адаптованої хірургічної дисекції.

Дослідження виконано відповідно до принципів Гельсінської декларації. Письмову інформовану згоду на участь у дослідженні отримано від усіх пацієнтів.

Автори заявляють про відсутність конфлікту інтересів.

Ключові слова: радикальна простатектомія, нейроваскулярна тканина, комбінований підхід, рак простати.

Introduction

Optimizing functional outcomes after radical prostatectomy remains a relevant problem, particularly in patients with increased oncological risk and technically challenging surgical conditions. Although numerous techniques for neurovascular tissue (NVT) release and dissection have been described, consensus on the optimal approach is absent [10,14,23]. Therefore, the development of safe and feasible surgical strategies aimed at preserving NVT while maintaining oncological control remains an important area of investigation.

Aim – to describe and evaluate the safety and feasibility of a combined NVT preservation approach (CA-NVT) in extraperitoneoscopic radical prostatectomy (ERP).

Material and methods of the study

This prospective study included 30 patients with non-metastatic intermediate- to high-risk prostate cancer (PCa) who underwent ERP between 2022 and 2024 at the University Clinic of Danylo Halytskyi Lviv National Medical University. A personalized preservation approach with precise magnetic resonance imaging (MRI) based surgical planning, as described previously, was applied in all cases, as well as a combined NVT preservation approach (CA-NVT) [18,19]. Preservation of the posterior wall of the bladder neck outlet, arcus tendineus, puboprostatic ligaments, distal portion of the dorsal vascular complex, and maximal functional urethral length was performed in all cases. In addition, vesi-

courethral anastomosis (VUA) with single-layer anatomical reconstruction (SLAR), preservation of the anterior smooth muscle urethral sphincter, and modified posterior support were consistently applied [11,12].

Exclusion criteria consisted of metastatic PCa, finasteride use, and neoadjuvant or adjuvant androgen-deprivation therapy.

Urinary continence (UC) and erectile function (EF) outcomes were evaluated at 1, 3, 6, 9, and 12 months after the surgery. UC was considered achieved if the patient had a voided volume ≥ 250 mL with no urine leakage during a cough stress test and adequate bladder emptying confirmed by ultrasonography and uroflowmetry. EF was defined as the ability to achieve erections sufficient for successful sexual intercourse, with or without the use of phosphodiesterase type 5 inhibitors. UC and EF according to these criteria were preserved in all cases before surgery. Biochemical recurrence (BCR) was defined as two consecutive serum prostate-specific antigen (PSA) values ≥ 0.2 ng/mL. Statistical analyses were performed using MedCalc (free calculators) and STATISTICA version 10 (64-bit). Numerical data are presented as median and interquartile range (Q1; Q3). ChatGPT (OpenAI, USA) was used exclusively for language editing and stylistic refinement.

The study was conducted in accordance with the principles of the Declaration of Helsinki. The study protocol was approved by the Local Ethics Committee for all participants. Written informed consent was obtained from all patients.

Surgical technique. A five-trocar extraperitoneoscopic anterior approach was used in all cases, as previously described [19]. The present article provides a more detailed description of the NVT approach, release, and dissection. Posterior bladder neck outlet preservation was performed using a latero-posterior approach in all patients (Fig. 1).

Full bladder neck preservation was carried out whenever feasible and oncologically safe. The extent of dissection, the degree of NVT and paraprostatic anatomy preservation, as well as the extent of pelvic lymph node dissection, were determined during preoperative planning and discussed with the patient prior to surgery. Following transection of the anterior Denonvilliers' fascia



Fig. 1. Posterior bladder neck outlet preservation left side view

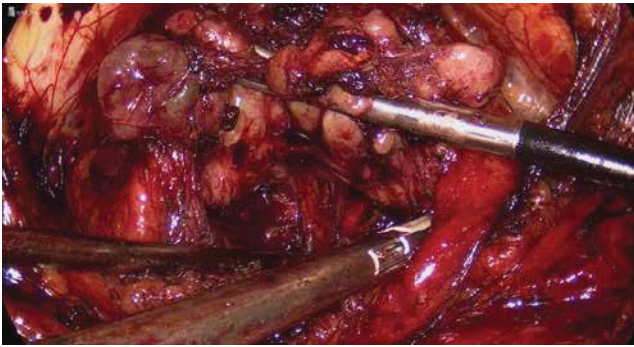


Fig. 2. Finalized posterior avascular plane development before mobilization of the lateral surfaces and tips of the seminal vesicles



Fig. 3. Partial posterior retrograde release of the right predominant neurovascular bundle following its partial antegrade dissection

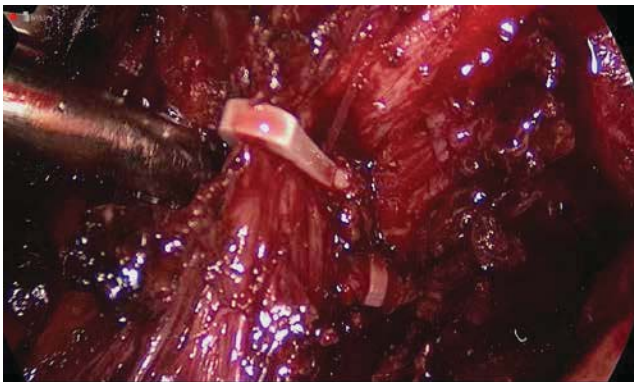


Fig. 4. Antegrade clip control of the anteromedial portion of the neurovascular tissue



Fig. 5. Anterolateral avascular plane development on the left side

(DF) and the seminal ducts, the seminal vesicles (SV) were mobilized up to their tips and lateral surfaces, with careful consideration of their proximity to the NVT. In favorable cases, the tips and lateral surfaces of the SV were mobilized after partial posterior retrograde release of the predominant neurovascular bundle (pNVB), during blunt development of the posterior avascular plane under surgeon-controlled countertraction (Fig. 2).

In complex surgical settings, such as high prostate volume (PV), restricted operative space, advanced tumour stage, inflammatory changes, or a history of prior prostate interventions, a gradual combination of antegrade dissection with posterior release was employed to minimize the risk of neuropraxia (Fig. 3).

Antegrade dissection was then continued from the lateral surfaces and tips of the SV toward the prostate base, preserving them whenever oncologically safe. At this stage, the anterior prostatic artery and its branches, the pNVB, and the approximate course of accessory neural pathways (ANP) were identified in accordance with the tri-zonal concept described by A. Takenaka et al. (Fig. 4).

Antegrade NVT dissection was continued from the medial side toward the most convex region of the prostate base, where the endopelvic fascia was bluntly sepa-

rated, and the anterolateral avascular plane was developed (Fig. 5).

During the anterolateral release, the assistant gently stabilized the prostate without applying excessive force to ensure adequate exposure, while countertraction was provided solely by the operator. The NVT was gently displaced away from the prostate surface in a lateral caudal direction, delineating the trajectory of the pNVB while preserving the ANP (Fig. 6).

When oncological risks were present, the endopelvic fascia was incised over the suspicious area, beneath the puboprostatic ligaments, in order to preserve the latter as well as the distal portion of the dorsal vascular complex. In favorable cases, blunt development of the anterolateral avascular plane was extended up to the prostate-urethral junction, finalizing the retrograde pNVB release, which was partially initiated during posterior plane development (Fig. 7).

To minimize the risk of neuropraxia in cases with complicated surgical settings, this maneuver was performed by combining gradual antegrade and retrograde dissection of the pNVB with progressive blunt development of the anterolateral avascular plane (Fig. 8).

In selected cases, hydrodissection was used for development of the anterolateral avascular plane as well as



Fig. 6. Surgeon-controlled countertraction during left-sided anterolateral release, delineating the pNVB trajectory



Fig. 7. Blunt development of the anterolateral avascular plane to the prostate-urethral junction with retrograde release of the left predominant neurovascular bundle.



Fig. 8. Gradual antegrade dissection of the left predominant neurovascular bundle at the level of the prostate base



Fig. 9. Antegrade dissection of the anterolateral portion of the neurovascular tissue

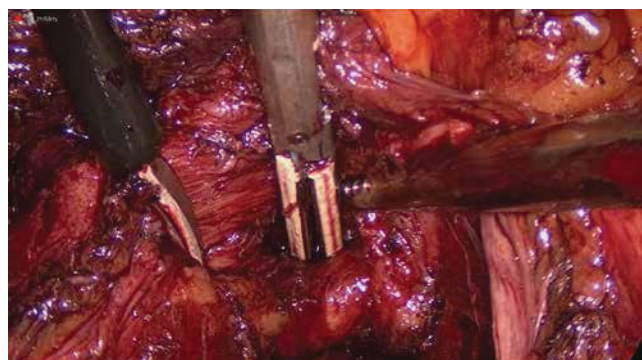


Fig. 10. Preservation of the distal part of the dorsal vascular complex with blunt dissection, right-sided view

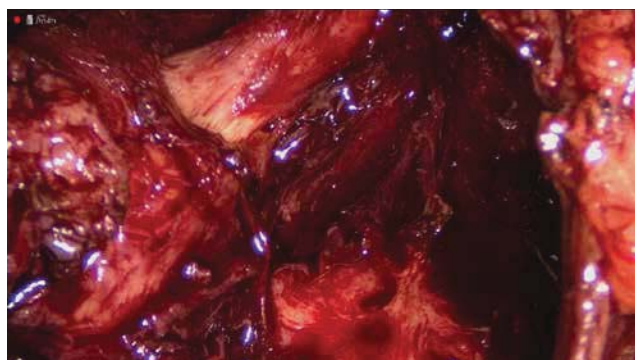


Fig. 11. Finalized circumferential apical dissection, right-sided view

during posterior NVT release. The anterior prostatic blood supply was generally controlled with Hem-o-lok® clips, while posterior branches in the mid-apical regions were typically managed using a LigaSure™ low-cautery technique, which was additionally applied more extensively in areas with higher oncological risk (Fig. 9).

After completion of NVT detachment, blunt preservation of the distal portion of the dorsal vascular complex was performed (Fig. 10), followed by division of the dorsal venous complex (DVC) and the anterior fibromuscular stroma.

This approach improved circumferential apical dissection, allowing preservation of maximal functional urethral length, with urethral transection performed ≤ 5 mm distal to the verumontanum (Fig. 11).

Cold saline irrigation was applied throughout the procedure to improve tissue visualization and optimize hemostasis, which was finally achieved by selective superficial sutures when required. Most venous bleeding did not require additional hemostatic measures, given the subsequent vesicourethral anastomosis with SLAR, anterior urethral sphincter preserva-

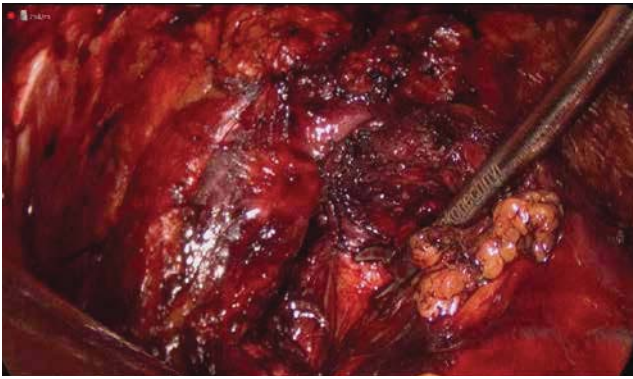
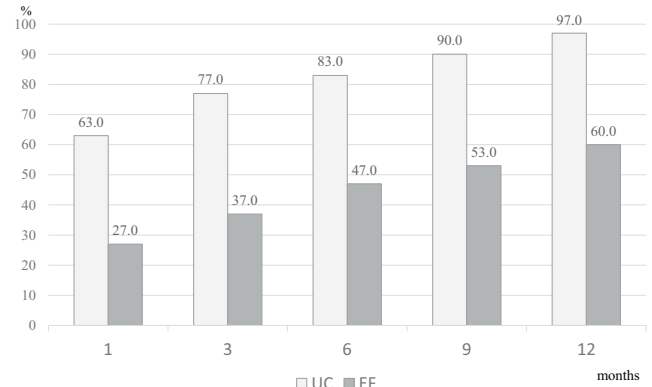


Fig. 12. Finalized vesicourethral anastomosis with SLAR, anterior urethral sphincter preservation, and modified posterior support, left-sided view with the bladder led out medially



Notes: UC – urinary continence; EF – erectile function.

Fig. 13. Functional outcomes of the Study group

Table 1

Baseline clinical and perioperative characteristics of the study group (N=30)

Characteristics	Median (Q1; Q3)
Age, years	64 (60; 69)
BMI, kg/m ²	29.2 (26.9; 34.8)
PSA, ng/ml	11.1 (8.5; 18.9)
PV, ml	48.2 (36.4; 62.5)
PIRADS	4 (4; 5)
T-stage	2c (2a; 2c)
pT-stage	3a (2c; 3a)
ISUP	2 (1; 3)
pISUP	2 (2; 3)
OT, min	140.5 (119; 151)
EBL, ml	320 (250; 390)
HS, days	8 (7; 9)
UC-R, days	7 (7; 8)

Notes: T-stage – clinical stage; pT-stage – pathological stage. Other abbreviations are defined at first mention in the text.

tion, and modified posterior support, as previously described (Fig. 12) [15–17].

This approach was inspired by, adapted from, and based on previously reported techniques by leading experts in the field [11–13,25,27].

Results of the study

Baseline demographic, clinical, and perioperative characteristics of the cohort (n=30) are shown in Table 1. Median age was 64 (60; 69) years, and median body mass index (BMI) was 29.2 (26.8; 34.8) kg/m². The median PSA level was 11.1 (8.5; 18.9) ng/mL, and median PV was 48.2 (36.4; 62.5) mL. The median Prostate Imaging Reporting and Data System (PI-RADS) score was 4 (4; 5). Median clinical stage was cT2c (cT2a; cT2c), and median pathological stage was pT3a (pT2c; pT3a). Median

biopsy and pathological International Society of Urological Pathology (ISUP) grades were 2 (1; 3) and 2 (2; 3), respectively. Median operative time (OT), estimated blood loss (EBL), length of hospital stay (HS), and time to urethral catheter removal (UC-R) were 140.5 (119; 151) minutes, 320 (250; 390) mL, 8 (7; 9) days, and 7 (7; 8) days, respectively. Postoperative complications were limited to Clavien-Dindo grade I–II and occurred in 17% (n=5) of patients. No vesicourethral anastomotic strictures were observed during follow-up.

Preservation volume and oncologic outcomes are summarized in Table 2. Full bladder neck preservation was achieved in 40% (n=12) of cases. No nerve-sparing (NS) was performed in 3% (n=1), partial preservation on one side with no preservation contralaterally in 30% (n=9), bilateral partial preservation in 17% (n=5), par-

Original articles. Urology and gynecology

Table 2

Preservation characteristics and oncologic outcomes of the Study group (N=30)

Characteristics	% (n)
BN-P	40 (12)
NS-none / NS-partial-none	3 (1) / 30 (9)
NS-partial	17 (5)
NS-partial-full	43 (13)
NS-full	7 (2)
ISUP upgrade	37 (11)
PSM	27 (8)
pN1	9 (2/23)
BCR	13 (4)

Notes: BN-P refers to full bladder neck preservation; pN1 is reported for patients with available nodal status (n=23); BCR refers to biochemical recurrence within 12 months. Other abbreviations are defined at first mention in the text.

Table 3

Functional outcomes of the Study group

Time period after surgery	UC, % (n)	EF, % (n)
1 month	63 (19)	27 (8)
3 months	77 (23)	37 (11)
6 months	83 (25)	47 (14)
9 months	90 (27)	53 (16)
12 months	97 (29)	60 (18)

tial-to-full preservation in 43% (n=13), and bilateral full preservation in 7% (n=2). Positive surgical margins (PSM) were observed in 27% (n=8) of patients, and ISUP grade upgrading occurred in 37% (n=11). Lymph node involvement (pN1) was identified in 2 of 23 patients with available nodal status (8.7%), while BCR within 12 months occurred in 13% (n=4). UC and EF demonstrated progressive recovery over the 12-month follow-up period, as summarized in Table 3 and Figure 13. At 12 months, UC and EF rates were 97% (n=29) and 60% (n=18), respectively.

Discussion

Over the past decades, the number of radical prostatectomies has increased, along with a growing proportion of patients with more advanced stages of PCa choosing this treatment option [3,9]. These challenges, together with the rapid evolution of robotic surgical platforms, have led to broader adoption of nerve-sparing techniques and increased emphasis on preservation of paraprostatic anatomical structures [2]. Previous studies have demonstrated that the adaptation and integration of these techniques into the extraperitoneal approach may improve functional outcomes with acceptable on-

cological control [19]. However, extended preservation of paraprostatic tissues may be technically challenging or restricted in certain surgical settings. Accurate pre-operative MRI-based surgical planning, combined with tailored preservation and reconstructive strategies, may contribute to improved functional outcomes, as suggested by prior reports [7,10,18,19]. In this series, the combined approach to NVT preservation demonstrated its safety and feasibility. Postoperative complications were observed in 5 patients, all of which were limited to Clavien-Dindo grade I–II. No postoperative vesicourethral anastomotic leakages were observed that affected catheter removal time (UC-R) or contributed to stricture development during the 12-month follow-up. No bleeding events necessitating additional hemostatic interventions or associated procedures were observed, which may support the safety profile of the modified VUA technique despite the absence of routine DVC suture control. These findings are consistent with previous reports [15–18]. EF and UC were preserved in 60% and 97% of patients, respectively, at 12 months of follow-up. These findings, as well as the 12-month BCR rate, may be regarded as satisfactory in light of the baseline characteristics and risk profile of the cohort. The integration of posterior and anterolateral NVT release, along with gradual pNVB dissection, was intended to minimize traction on the NVT while improving intraoperative visualization.

Recent studies employing hybrid and combined approaches for nerve-sparing procedures have reported improved functional outcomes [23,26]. The combined NVT release may facilitate tissue recognition and identification of the NVT trajectory, which can be particularly useful during the extraperitoneal approach. The use of surgeon-controlled countertraction during posterior and anterolateral NVT release may reduce the risk of neuropraxia, in line with previous reports [8,11]. Gradual antegrade and retrograde NVT dissection further enhances prostate mobility and may be particularly beneficial in challenging surgical settings characterized by limited operative space due to pelvic anatomy, increased PV, advanced tumour stage, and/or severe inflammatory changes. Hydrodissection may be especially helpful in facilitating the development of the posterior and anterolateral avascular planes, particularly in the presence of granulomatous inflammation, consistent with previously reported data [10]. In complex cases, these approaches can be combined and applied gradually. In addition, combining clip application with a LigaSure low-cautery technique, sharp dissection, and selective superficial suturing for vessel control may also help minimize tissue injury. The anterolateral portion of the NVT is more ac-

cessible for clip application, whereas in the mid- and apical regions a low-cautery technique combined with sharp dissection may represent an alternative to clip placement, which can require excessive traction in complex surgical settings. Most venous bleeding did not require additional hemostatic measures, as the SLAR technique during VUA effectively achieved hemostasis through partial integration of the DVC and DF into the sutures, followed by modified posterior support. In selected cases, larger venous or arterial vessels were controlled with selective superficial sutures when necessary. Small arterial branches could be controlled using a low-cautery approach.

The extended use of LigaSure with a low-cautery approach may also facilitate safer dissection on oncologically advanced sides. Previous comparative data suggest that LigaSure-based pNVB control may provide acceptable oncological and functional outcomes [6]. In addition, it provides sufficient haptic feedback for improved tissue handling and structural recognition. Combining judicious thermal energy use with simultaneous cold saline irrigation may further reduce tissue damage. These considerations are consistent with recently published data [20,21]. Still, consensus on the optimal approach for NVT release and dissection is absent [1,2,5,6,14,23]. Overall, the results align with strategies designed to maximize preservation while maintaining oncological safety, assuming accurate MRI-based preoperative planning [4,24]. These techniques may also be adapted from robotic platforms to the extraperitoneal approach to enhance functional outcomes [19,22]. The present study has several limitations, including a limited sample size, a single-surgeon design, and reliance on specific objective criteria for the assessment of functional outcomes. Future studies with larger cohorts and more robust designs are warranted to confirm these findings and refine patient selection criteria.

Conclusions

The combined NVT preservation approach in ERP is a safe and feasible technique, yielding encouraging functional outcomes while maintaining oncologically tailored surgical dissection.

No conflict of interests was declared by the authors.

References/Література

- Basourakos SP, Zhu A, Lewicki PJ, Ramaswamy A, Cheng E, Dudley V et al. (2022, Sep). Clipless robotic-assisted radical prostatectomy and impact on outcomes. *Eur Urol Focus*. 8(5): 1176-1185. doi: 10.1016/j.euf.2021.06.010.
- Beyatlı M, Güngör HS, Haberal HB, İnkaya A, Sobay R, Tahra A et al. (2025, Oct 15). Comparison of ultrapreservation and Retzius-sparing techniques in robotic radical prostatectomy: single-center experience. *Medicina*. 61(10): 1851. doi: 10.3390/medicina61101851.
- Freitas PFS, Blachman-Braun R, Soodana-Prakash N, Williams AD, Ritch CR, Punnen S et al. (2024, Sep 30). Changing times: trends in risk classification, tumor upstaging, and positive surgical margins after radical prostatectomy – results from a contemporary National Cancer Database study. *World J Urol*. 42(1): 551. doi: 10.1007/s00345-024-05262-0.
- Furrer MA, Sathianathan N, Gahl B, Wuethrich PY, Giannarini G, Corcoran NM et al. (2023, Dec 14). Functional impact of neurovascular bundle preservation in high risk prostate cancer without compromising oncological outcomes: a propensity-modelled analysis. *Cancers*. 15(24): 5839. doi: 10.3390/cancers15245839.
- Fuschi A, Sequi MB, Al Salhi Y, Suraci PP, Valenzi FM, Rera OA et al. (2025, May 30). Comparative analysis of cold versus thermal dissection in nerve-sparing robot-assisted radical prostatectomy. *Cancers*. 17(11): 1831. doi: 10.3390/cancers17111831.
- Hamamoto S, AbdelRazek M, Naiki T, Taguchi K, Etani T, Iwatsuki S et al. (2021, Dec). LigaSure versus the standard technique (Hem-o-lok clips) for robot-assisted radical prostatectomy: a propensity score-matched study. *J Robot Surg*. 15(6): 869-875. doi: 10.1007/s11701-020-01180-6.
- Jaber AR, Moschovas MC, Saikali S, Gamal A, Perera R, Rogers T et al. (2024). Impact of prostate size on the functional and oncological outcomes of robot-assisted radical prostatectomy. *Eur Urol Focus*. 10(2): 263-270.
- Kowalczyk KJ, Huang AC, Hevelone ND, Lipsitz SR, Yu HY, Ulmer WD et al. (2011, Sep). Stepwise approach for nerve sparing without countertraction during robot-assisted radical prostatectomy: technique and outcomes. *Eur Urol*. 60(3): 536-547. doi: 10.1016/j.eururo.2011.05.001.
- Kratzer TB, Mazzitelli N, Star J, Dahut WL, Jemal A, Siegel RL. (2025, Dec). Prostate cancer statistics, 2025. *CA Cancer J Clin*. 75(6): 485-497. doi: 10.3322/caac.70028.
- Mandel A, Choudhary M, Tillu N, Maheshwari A, Kolanukuduru K, Wagaskar V et al. (2025, Mar 1). Hood technique for radical prostatectomy. *J Endourol*. 39(S1): S35-S38. doi: 10.1089/end.2024.0303.
- Mattei A, Naspro R, Annino F, Burke D, Guida R, Gaston R. (2007, Sep). Tension and energy-free robotic-assisted laparoscopic radical prostatectomy with interfascial dissection of the neurovascular bundles. *Eur Urol*. 52(3): 687-695. doi: 10.1016/j.eururo.2007.05.029.
- Menon M, Shrivastava A, Bhandari M, Satyanarayana R, Siva S, Agarwal PK. (2009, Jul). Vattikuti Institute prostatectomy: technical modifications in 2009. *Eur Urol*. 56(1): 89-96. doi: 10.1016/j.eururo.2009.04.032.
- Moschovas MC, Bhat S, Onol FF, Rogers T, Roof S, Mazzone E et al. (2020, Dec). Modified apical dissection and lateral prostatic fascia preservation improves early postoperative functional recovery in robotic-assisted laparoscopic radical prostatectomy: results from a propensity score-matched analysis. *Eur Urol*. 78(6): 875-884. doi: 10.1016/j.eururo.2020.05.041.
- Moschovas MC, Patel V. (2022, Apr). Neurovascular bundle preservation in robotic-assisted radical prostatectomy: how I do it after 15,000 cases. *Int Braz J Urol*. 48(2): 212-219. doi: 10.1590/s1677-5538.ibju.2022.99.04.
- Nakonechnyi YA. (2025). Intracorporeal square-to-slip knot technique for vesicourethral anastomosis with single-layer anatomical reconstruction and anterior urethral sphincter preservation. *Paediatric Surgery (Ukraine)*. 1(86): 73-78. doi: 10.15574/PS.2025.1(86).7378.
- Nakonechnyi YA. (2025). Vesicourethral anastomosis modified posterior support efficiency in extraperitoneoscopic radical prostatectomy. *Paediatric Surgery (Ukraine)*. 4(89): 76-82. doi: 10.15574/PS.2025.4(89).7682.

Original articles. Urology and gynecology

17. Nakonechnyi YA, Borzhievskiy OA, Borzhievskiy ATs. (2026). Vesicourethral anastomosis modified posterior support in extraperitoneoscopic radical prostatectomy. *Paediatric Surgery (Ukraine)*. 1(90): 94-100. doi: 10.15574/PS.2026.1(90).94100.
18. Nakonechnyi YA, Mytsyk YuO, Borzhievskiy ATs. (2024). PCA3 score prognostic value for identifying postoperative ISUP grades 4–5 in localized peripheral zone prostate cancer with a posterior tumor growth dominant pattern. *Paediatric Surgery (Ukraine)*. 4(85): 65-70. doi: 10.15574/PS.2024.4(85).6570.
19. Nakonechnyi YA, Mytsyk YuO, Nakonechnyi AY, Borzhievskiy ATs. (2025). Personalized preservation extraperitoneoscopic radical prostatectomy in high-risk prostate cancer patients. *Paediatric Surgery (Ukraine)*. 3(88): 87-94. doi: 10.15574/PS.2025.3(88).8794.
20. Ohyama S, Takahashi S, Tamai K, Hori Y, Hirakawa Y, Hoshino M et al. (2019, Mar 15). Prevention of nerve root thermal injury caused by bipolar cauterization near the nerve roots. *Spine*. 44(6): E321-328. doi: 10.1097/BRS.0000000000002846.
21. Oyama S, Nonaka T, Matsumoto K, Taniguchi D, Hashimoto Y, Obata T et al. (2021, Mar). A new method using a vessel-sealing system provides coagulation effects to various types of bleeding with less thermal damage. *Surg Endosc*. 35(3): 1453-464. doi: 10.1007/s00464-020-08043-z.
22. Rebouças RB, Da Costa Souto M, Luiza Jácome Franca Campos A, Monteiro RC et al. (2026, Mar). The pubovesical complex sparing laparoscopic radical prostatectomy improves early urinary continence without compromising oncologic safety: a prospective, randomized, double-blinded clinical trial. *Prostate*. 86(4): 475-480. doi: 10.1002/pros.70106.
23. Sood A, Grauer R, Jeong W, Butaney M, Mukkamala A, Borcherch A et al. (2022, Sep). Evaluating post radical prostatectomy mechanisms of early continence. *Prostate*. 82(12): 1186-1195. doi: 10.1002/pros.24371.
24. Spirito L, Sciorio C, Romano L, Di Girolamo A, Ruffo A, Romeo G et al. (2025, Apr 13). Impact of nerve-sparing techniques on prostate-specific antigen persistence following robot-assisted radical prostatectomy: a multivariable analysis. *Diagnostics*. 15(8): 987. doi: 10.3390/diagnostics15080987.
25. Takenaka A, Leung RA, Fujisawa M, Tewari AK. (2006, Jun). Anatomy of autonomic nerve component in the male pelvis: the new concept from a perspective for robotic nerve sparing radical prostatectomy. *World J Urol*. 24(2): 136-143. doi: 10.1007/s00345-006-0102-2.
26. Vargo EH, Vetter JM, Figenshau RS, Kim EH. (2024, Oct). A hybrid approach to hood-sparing robotic prostatectomy to maximize functional outcomes and maintain early oncologic efficacy. *J Endourol*. 38(10): 997-1003. doi: 10.1089/end.2024.0203.
27. Wagaskar VG, Mittal A, Sobotka S, Ratnani P, Lantz A, Falagario UG et al. (2021, Aug). Hood technique for robotic radical prostatectomy – preserving periurethral anatomical structures in the space of Retzius and sparing the pouch of Douglas, enabling early return of continence without compromising surgical margin rates. *Eur Urol*. 80(2): 213-221. doi: 10.1016/j.eururo.2020.09.044.

Відомості про автора:

Наконечний Йосиф Андрійович – PhD, доц. каф. урології ФПДО ДНТ «ЛНМУ ім. Д. Галицького». Адреса: м. Львів, вул. Пекарська, 69; тел.: +38 (032) 275-76-32. <https://orcid.org/0000-0002-6872-1889>.

Стаття надійшла до редакції 02.02.2026 р., прийнята до друку 15.06.2026 р.