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ORIGINAL ARTICLE / ОРИГИНАЛНИ РАД

Postoperative complications following open and laparoscopic radical prostatectomy – a retrospective analysis using the Clavien–Dindo classification

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SUMMARY

Introduction/Objective Prostate cancer is the most commonly diagnosed malignancy in men in more than half of the world's countries and a leading cause of cancer death. Radical prostatectomy is the standard surgical treatment but carries a risk of postoperative complications. The aim of this study was to analyze postoperative complications after open and laparoscopic radical prostatectomy using the Clavien–Dindo classification.

Methods A retrospective study included 304 patients with prostate cancer treated at the University Clinical Center of Vojvodina, Clinic of Urology, from 2020 to 2024. Complications occurring within 60 days of surgery were graded using the Clavien–Dindo classification and analyzed in relation to sociodemographic, preoperative, intraoperative, and postoperative factors.

Results The mean age was 67.4 ± 5.7 years. Most complications were mild (Grade I, 47%; Grade II, 35.2%); the most frequent were blood transfusion (18.7%) and elevated serum creatinine (10.9%). Complication severity correlated significantly with body mass index ($\rho = 0.169$, $p < 0.01$), preoperative prostate-specific antigen ($\rho = 0.167$, $p < 0.01$), operative duration ($\rho = 0.719$, $p < 0.001$), and intraoperative blood loss ($\rho = 0.552$, $p < 0.001$). Sociodemographic factors showed no significant association. The difference between the open and laparoscopic approaches was not statistically significant ($p = 0.295$).

Conclusion Postoperative complications after radical prostatectomy were predominantly mild. Body mass index, prostate-specific antigen, operative duration, intraoperative blood loss, and the postoperative course were associated with greater complication severity, whereas the surgical approach was not.

Keywords: prostate cancer; prostatectomy; laparoscopy; postoperative complications; risk factors; treatment outcome

INTRODUCTION

The prostate is an encapsulated fibromuscular gland in the male pelvis whose main function is to produce seminal fluid [1]. Malignant prostate neoplasms are predominantly adenocarcinoma (90–95%), with rare mucinous, ductal, squamous, neuroendocrine, and sarcomatoid types [2].

Prostate cancer is the most commonly diagnosed cancer in men in more than half of the world's countries and the leading cause of cancer death in men in a quarter of them [3]. In 2022, an estimated 1,466,680 new cases were diagnosed globally [4]. According to the Global Cancer Observatory, in 2020 the Republic of Serbia ranked third in mortality and fourth in incidence [5]. The main non-modifiable risk factors are older age, race, and a positive family history; the prevalence of disease with a positive family history is approximately 20%, while the hereditary form ranges between 5% and 15% [6].

Current treatment modalities include active surveillance, surgery, and radiotherapy, with the choice depending on tumor characteristics, prostate-specific antigen (PSA) level, disease stage, and recurrence. Androgen deprivation therapy is used for localized, locally advanced, and metastatic disease [7]. Radical prostatectomy is the gold standard for localized prostate cancer and has been performed for more than a century [8]. There are three techniques – open, laparoscopic, and robot-assisted laparoscopic prostatectomy – and minimally invasive procedures have increasingly replaced open surgery [9]. Robot-assisted radical prostatectomy is associated with better perioperative outcomes than open and conventional laparoscopic surgery, owing to lower blood loss, lower transfusion rates, and shorter hospital stay [9]. However, a recent network meta-analysis found no significant difference between the robot-assisted, laparoscopic, and open approaches in estimated blood loss or in overall and major complication rates [10].

Despite these advances, patients remain at risk of adverse outcomes, which may depend on the surgeon's experience, technical difficulties, and individual patient characteristics [11]. Surgical site infection is among the most common complications after radical prostatectomy, and a prolonged operative time has been identified as an independent predictor of its occurrence [12]. A structured system for identifying

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the number and severity of complications is necessary to compare procedures, outcomes, and surgical quality across institutions and surgeons [13]. The Clavien–Dindo classification is increasingly used to evaluate postoperative complications but is not yet routinely applied in clinical practice.

The aim of this study was to determine the types and frequency of postoperative complications after open and laparoscopic radical prostatectomy using the Clavien–Dindo classification, and to assess the association of sociodemographic, preoperative, intraoperative, and postoperative factors with complication severity, as well as to compare the two surgical approaches.

METHODS

Study design and sample

A retrospective study included 304 patients with prostate cancer treated at the University Clinical Center of Vojvodina, Clinic of Urology, between January 1, 2020, and December 31, 2024. The following data were analyzed: sociodemographic characteristics (age, place of residence); body mass index (BMI), preoperative PSA, prostate volume, American Society of Anesthesiologists (ASA) physical status, Gleason score, and International Society of Urological Pathology (ISUP) Grade Group; type of surgery (open or laparoscopic radical prostatectomy, with or without lymphadenectomy, including conversion from laparoscopic to open); operative duration (min); intraoperative blood loss (mL); length of postoperative stay (days); time in the intensive care unit (ICU, hours); and duration of ventilatory support (hours). Postoperative events and complications were assessed within 60 days of surgery and graded using the Clavien–Dindo classification. A 60-day window was chosen because it corresponds to the institutional follow-up schedule, in which the first postoperative outpatient visit with clinical and laboratory reassessment is performed within two months of surgery; this interval captures the early complications covered by the conventional 30-day window together with events presenting somewhat later, while remaining within the period for which complete documentation was available for all patients. Data were collected from the Clinical Information System and patient medical records.

Inclusion criteria were a histopathologically confirmed diagnosis of prostate cancer, radical prostatectomy performed within the study period, and complete data permitting evaluation of complications according to the Clavien–Dindo classification. Patients without a confirmed diagnosis, those operated on outside the study period, and those with incomplete clinical or sociodemographic data were excluded.

Clavien–Dindo classification

Each complication was graded from I to V: Grade I – any deviation from the normal postoperative course not requiring pharmacological, surgical, endoscopic, or radiological treatment; Grade II – complications requiring pharmacological treatment; Grade III – complications requiring surgical, endoscopic, or radiological intervention (IIIa without and IIIb under general anesthesia); Grade IV – life-threatening complications requiring intensive care (IVa, single-organ; IVb, multiorgan dysfunction); and Grade V – death [14]. The main advantage of the classification is its simplicity; its limitations include grading according to the intervention required rather than the true severity, assessment of postoperative (not intraoperative) complications, and the inability to distinguish early from late complications [13, 15]. The classification was adapted to the most common complications after radical prostatectomy as previously described [16]; the complications assigned to each grade are presented in Table 4.

Statistical analysis

Statistical analysis was performed using IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp. Armonk, NY, USA). Continuous variables are presented as mean ± standard deviation and categorical variables as frequencies and percentages. Associations between continuous and ordinal variables were assessed using Spearman's correlation coefficient (ρ), and associations between categorical variables using the χ^2 test. Independent predictors of complication severity were identified by multivariate logistic regression (BMI, PSA, prostate volume, ASA status, Gleason score, and ISUP Grade Group). The open and laparoscopic approaches were compared using the χ^2 test and the Mann–Whitney U test. A p-value < 0.05 was considered statistically significant.

RESULTS

General characteristics of patients and surgery

Patient and surgical characteristics are summarized in Table 1. The mean age was 67.4 ± 5.7 years, and patients came from rural and urban areas in similar proportions. The mean BMI was 27.2, mean preoperative PSA 11.5 ng/mL, and mean prostate volume 47 mL. Most patients were ASA status 3 (68.8%); by ISUP Grade Group, Group 2 was most common (32.2%), followed by Group 3 (28.9%), and Group 1 was least common (3.3%).

Surgical approaches, operative duration, and blood loss are shown in Table 2 and Figures 1–3. Open radical prostatectomy with lymphadenectomy was most common, and laparoscopic radical prostatectomy with lymphadenectomy least common (5.9%). In one patient converted from laparoscopic to open surgery, an intraoperative rectal laceration occurred and was sutured. The mean operative duration was 178.6 ± 27.4 min and the mean blood loss 628.3 ± 401.5 mL. The mean hospital stay was significantly longer after open than after laparoscopic radical prostatectomy (8 ± 4 *vs.* 6.4 ± 3.4 days; t = 3.49; p < 0.001).

Almost half of the patients had Grade I complications (47%; Table 3). The most common individual

Table 1. Patient characteristics

Variable	Value
Number of patients	304
Age, years, mean (SD)	67.4 (5.7)
Place of residence, n (%)	
Rural	142 (46.7)
Urban	162 (53.3)
BMI, mean (SD)	27.2 (3.3)
PSA, ng/mL, mean (SD)	11.5 (6.3)
Prostate volume, mL, mean (SD)	47 (31.1)
ASA status, n (%)	
2	94 (30.9)
3	209 (68.8)
4	1 (0.3)
Gleason score, n (%)	
3+3	11 (3.6)
3+4	100 (32.9)
4+3	85 (28)
4+4	52 (17.1)
4+5	45 (14.8)
5+4	9 (3)
5+5	2 (0.7)
ISUP Grade Group, n (%)	
1	10 (3.3)
2	98 (32.2)
3	88 (28.9)
4	52 (17.1)
5	56 (18.4)

SD – standard deviation; BMI – body mass index; PSA – prostate-specific antigen; ASA – American Society of Anesthesiologists; ISUP – International Society of Urological Pathology

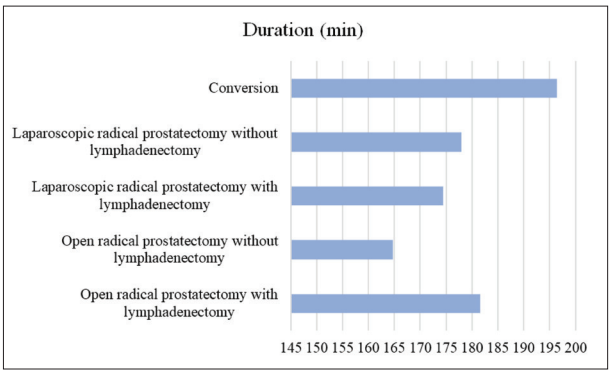


Figure 1. Mean operative duration (minutes) according to the type of radical prostatectomy; bars represent arithmetic means for five surgical subgroups: open radical prostatectomy with lymphadenectomy (n = 161), open radical prostatectomy without lymphadenectomy (n = 41), laparoscopic radical prostatectomy with lymphadenectomy (n = 18), laparoscopic radical prostatectomy without lymphadenectomy (n = 73), and procedures converted from laparoscopic to open surgery (n = 11); measures of dispersion are not displayed; the standard deviation for the whole cohort is reported in Table 2 (178.6 ± 27.4 minutes)

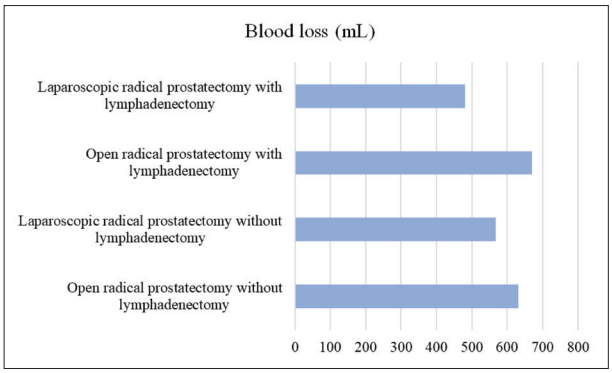


Figure 2. Mean intraoperative blood loss (mL) according to the type of radical prostatectomy; bars represent arithmetic means for four surgical subgroups: open radical prostatectomy with lymphadenectomy (n = 161), open radical prostatectomy without lymphadenectomy (n = 41), laparoscopic radical prostatectomy with lymphadenectomy (n = 18), and laparoscopic radical prostatectomy without lymphadenectomy (n = 73); measures of dispersion are not displayed; the standard deviation for the whole cohort is reported in Table 2 (628.3 ± 401.5 mL)

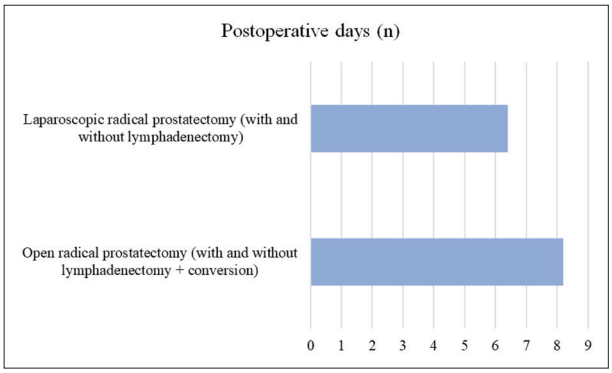


Figure 3. Mean length of postoperative hospital stay (days) according to the surgical approach; bars represent arithmetic means for open radical prostatectomy (with and without lymphadenectomy, including conversions from laparoscopic to open surgery) and for laparoscopic radical prostatectomy (with and without lymphadenectomy); measures of dispersion are not displayed; the corresponding values were 8 ± 4 days after the open and 6.4 ± 3.4 days after the laparoscopic approach (mean ± standard deviation; t = 3.49; p < 0.001)

Table 2. Surgery details

Variable	Value
Type of surgery, n (%)	
Radical prostatectomy with lymphadenectomy (open)	161 (53)
Radical prostatectomy without lymphadenectomy (laparoscopic)	73 (24)
Radical prostatectomy without lymphadenectomy (open)	41 (13.5)
Radical prostatectomy with lymphadenectomy (laparoscopic)	18 (5.9)
Conversion from laparoscopic to open (total)	11 (3.5)
Operative duration, min, mean (SD)	178.6 (27.4)
Blood loss, mL, mean (SD)	628.3 (401.5)
Postoperative stay, days, mean (SD)	7.7 (4.4)
Ventilatory support, hours, mean (SD) *	9.2 (7.2)
ICU stay, hours, mean (SD) **	19.4 (7.6)

SD – standard deviation; ICU – intensive care unit;
*refers to the five patients on ventilatory support;
**refers to the five patients treated in the ICU

Table 3. Patient distribution according to the Clavien–Dindo classification

Clavien–Dindo grade	n (%)
Grade I	143 (47)
Grade II	107 (35.2)
Grade IIIa	22 (7.3)
Grade IIIb	23 (7.6)
Grade IV	8 (2.6)
Grade V	1 (0.3)

complications were blood transfusion (Grade II, 18.7%) and elevated serum creatinine (Grade I, 10.9%); the full distribution is presented in Table 4.

Table 4. Complications according to the Clavien–Dindo classification

Complication	n (%)
Grade I	
Lymphocele / prolonged lymph secretion	14 (4.6)
Acute urinary retention (re-catheterization)	15 (4.9)
Superficial dehiscence / wound infection	10 (3.3)
Extravasation of urine	2 (0.7)
Peripheral neuropathy (obturator nerve)	2 (0.7)
Elevated serum creatinine	33 (10.9)
Glaucoma	1 (0.3)
Ileus	1 (0.3)
Lymphedema (scrotum, leg)	5 (1.6)
Transurethral catheter dislocation	1 (0.3)
Hernia (no treatment)	1 (0.3)
Allergic exanthema	1 (0.3)
Mild anemia	7 (2.3)
Nausea	20 (6.6)
Herpes zoster	1 (0.3)
Thrombophlebitis	1 (0.3)
Transient ischemic attack	1 (0.3)
Orthostatic hypotension	6 (2)
Malaise	5 (1.6)
Low-intensity pain	4 (1.3)
Sleep disturbance	6 (2)
Diarrhea	5 (1.6)
Grade II	
Blood transfusion	57 (18.7)
Urological infections (cystitis, epididymitis, etc.)	27 (8.9)
Clostridioides difficile infection	1 (0.3)
Arrhythmia requiring treatment	4 (1.3)
Phlebothrombosis	3 (1)
Pneumonia	3 (1)
Bladder tamponade	2 (0.7)
Hypertensive crisis	8 (2.6)
Exacerbation of chronic obstructive pulmonary disease	1 (0.3)
Enteritis	1 (0.3)
Wound infection (antibiotics)	1 (0.3)
Grade IIIa	
Percutaneous drainage (lymphocele, abscess, hematoma)	12 (3.9)
Endoscopic bleeding arrest (gastrointestinal)	1 (0.3)
Percutaneous nephrostomy (hydronephrosis)	3 (1)
Suprapubic catheterization (acute urinary retention)	2 (0.7)
Repeated cystoscopic catheterization	2 (0.7)
Grade IIIb	
Laparoscopic marsupialization of lymphocele	3 (1)
Laparoscopic revision (hematoma, bleeding, drain dislocation)	12 (3.9)
Early urethral stricture / bladder neck contracture	4 (1.3)
Migration of stapler into anastomosis	1 (0.3)
Hernia or fistula surgery	1 (0.3)
Surgical treatment of ileus	2 (0.7)
Complete wound dehiscence	2 (0.7)
Grade IV	
Myocardial infarction / severe arrhythmias	1 (0.3)
Stroke	1 (0.3)
Acute respiratory failure	4 (1.3)
Urosepsis	1 (0.3)
Other intensive care unit treatment (unspecified)	1 (0.3)
Grade V	
Fatal outcome	1 (0.3)

Sociodemographic factors and postoperative complications

Age was not significantly correlated with complication severity ($\rho = 0.025$, $p > 0.05$). The association between place of residence and severity was not statistically significant ($\chi^2 = 5.105$, $p = 0.403$; Table 5).

Table 5. Distribution of patients by place of residence in relation to postoperative complications

Clavien–Dindo grade	Rural, n (%)	Urban, n (%)
Grade I	60 (42.3)	83 (51.2)
Grade II	53 (37.3)	54 (33.3)
Grade IIIa	13 (9.2)	8 (4.9)
Grade IIIb	12 (8.5)	12 (7.4)
Grade IV	3 (2.1)	5 (3.1)
Grade V	1 (0.7)	0 (0)

$\chi^2 = 5.105$; $p = 0.403$

Preoperative factors

On multivariate logistic regression (Table 6), BMI and preoperative PSA contributed significantly to Grade I complications (BMI: OR 0.903, 95% CI 0.836–0.974, $p = 0.009$; PSA: OR 0.951, 95% CI 0.912–0.991, $p = 0.017$), whereas Grades II–IV could not be significantly predicted by the studied variables. Spearman correlation confirmed significant, low positive associations between complication severity and BMI ($\rho = 0.169$, $p < 0.01$) and preoperative PSA ($\rho = 0.167$, $p < 0.01$). A significant association was found with Gleason score ($\chi^2 = 64.781$, $p < 0.01$), whereas ASA status and ISUP Grade Group were not significant (Table 7).

Intraoperative factors

Operative duration ($\rho = 0.719$, $p < 0.001$) and intraoperative blood loss ($\rho = 0.552$, $p < 0.001$) showed strong, statistically significant positive correlations with complication severity.

Table 6. Multivariate logistic regression for postoperative complications by Clavien–Dindo grade

Grade	Variable	OR (95% CI)	Wald	p
I	BMI	0.903 (0.836–0.974)		0.009 *
	PSA (ng/mL)	0.951 (0.912–0.991)		0.017 *
	Prostate volume (mL)	1.001 (0.993–1.009)		0.872
	ASA status		1.188	0.552
	Gleason score		3.328	0.767
	ISUP Grade Group		0.776	0.678
II	BMI	1.069 (0.992–1.153)		0.080
	PSA (ng/mL)	1.036 (0.996–1.078)		0.081
	Prostate volume (mL)	0.998 (0.989–1.006)		0.597
	ASA status		0.230	0.891
	Gleason score		3.943	0.684
	ISUP Grade Group		0.066	0.968
IIIa	BMI	1.051 (0.918–1.204)		0.471
	PSA (ng/mL)	0.987 (0.912–1.068)		0.744
	Prostate volume (mL)	1.001 (0.985–1.018)		0.903
	ASA status		0.654	0.721
	Gleason score		4.200	0.650
	ISUP Grade Group		0.0	1.000
IIIb	BMI	1.009 (0.886–1.149)		0.894
	PSA (ng/mL)	1.026 (0.962–1.094)		0.441
	Prostate volume (mL)	1.000 (0.985–1.015)		0.978
	ASA status		0.137	0.934
	Gleason score		2.970	0.813
	ISUP Grade Group		0.0	1.000
IV	BMI	1.142 (0.918–1.421)		0.233
	PSA (ng/mL)	1.050 (0.953–1.158)		0.322
	Prostate volume (mL)	1.012 (0.992–1.033)		0.252
	ASA status		0.073	0.964
	Gleason score		5.781	0.448
	ISUP Grade Group		0.0	1.000

OR – odds ratio; CI – confidence interval; BMI – body mass index; PSA – prostate–specific antigen; ASA – American Society of Anesthesiologists; ISUP – International Society of Urological Pathology; Grade V was not analyzed (single patient);
*statistically significant

Table 7. Distribution of patients by Gleason score and Clavien–Dindo grade

Grade	3 + 3	3 + 4	4 + 3	4 + 4	4 + 5	5 + 4	5 + 5
I	8 (72.7)	50 (50)	45 (52.9)	20 (43.5)	16 (35.6)	4 (44.4)	0 (0)
II	0 (0)	35 (35)	28 (32.9)	16 (34.8)	22 (48.9)	1 (11.1)	1 (50)
IIIa	2 (18.2)	7 (7)	3 (3.5)	5 (10.9)	3 (6.7)	1 (11.1)	0 (0)
IIIb	1 (9.1)	5 (5)	7 (8.2)	4 (8.7)	3 (6.7)	2 (22.2)	0 (0)
IV	0 (0)	3 (3)	1 (1.2)	1 (2.2)	1 (2.2)	1 (11.1)	1 (50)
V	0 (0)	0 (0)	1 (1.2)	0 (0)	0 (0)	0 (0)	0 (0)

Values are n (%);
$\chi^2 = 64.781$;
$p < 0.01$

Postoperative factors

Length of stay, ICU hours, and duration of ventilatory support correlated significantly and positively with complication severity (Table 8).

Comparison by surgical approach

Patients undergoing open radical prostatectomy tended to have more frequent and more severe complications than those undergoing laparoscopic surgery, except for Grade II, which was more frequent after laparoscopic surgery; however, none of the differences reached statistical significance (overall $\chi^2 = 6.120$, $p = 0.295$; Mann–Whitney U = 9525.5, Z = -0.256, $p = 0.798$; Table 9).

Table 8. Correlation between postoperative factors and complication severity (Clavien–Dindo)

Factor	Spearman's ρ	p
Postoperative days	0.323	< 0.001
Ventilatory support (hours)	0.235	< 0.001
Intensive care unit (hours)	0.235	< 0.001

Correlation significant at the 0.01 level (two-tailed)

Table 9. Comparison of complication severity between open and laparoscopic radical prostatectomy

Grade	Open, n (%)	Laparoscopic, n (%)	χ^2 (p)
I	102 (47.9)	41 (45.1)	0.205 (0.650)
II	68 (31.9)	39 (42.9)	3.34 (0.068)
IIIa	17 (8)	4 (4.4)	1.28 (0.259)
IIIb	20 (9.4)	4 (4.4)	1.19 (0.139)
IV	5 (2.3)	3 (3.3)	0.22 (0.636)
V	1 (0.5)	0 (0)	0.43 (0.513)

Overall $\chi^2 = 6.120$;
$p = 0.295$;
Mann–Whitney U = 9525.5;
Z = -0.256;
$p = 0.798$

DISCUSSION

Millions of men are diagnosed with prostate cancer each year, and prognosis varies with age, ethnicity, genetic background, and disease stage [17]. The number of men with localized disease undergoing radical prostatectomy is rising, yet mortality from metastatic disease has remained relatively unchanged [18]. Radical prostatectomy may be performed as open or minimally invasive surgery; oncological and functional outcomes depend largely on the experience of the surgeon and the center rather than on the approach alone, and the only consistent advantage of minimally invasive surgery is reduced intraoperative blood loss [19]. Beyond general surgical risks, patients should be counseled about stress urinary incontinence (5–15%) and erectile dysfunction (30–80%), the latter depending on age, nerve-sparing, and baseline function [19]. Overall outcomes also depend on baseline patient and tumor characteristics and functional status [20]. The Clavien–Dindo classification is widely used and valued for its simplicity and reproducibility, allowing comparison of surgical techniques [21].

In our study, most patients had Grade I (47%) or Grade II (35.2%) complications. Patient age was not associated with complication severity ($\rho = 0.025$), suggesting that comorbidity, physical status, and physiological reserve may be more relevant predictors [22]. BMI and preoperative PSA showed significant, low positive correlations with severity ($\rho = 0.169$ and 0.167, respectively). A significant association was found with Gleason score ($\chi^2 = 64.781$, $p < 0.01$), whereas ISUP Grade Group and ASA status were

not significant; tumor aggressiveness (ISUP Grade Group 4–5) reflects more adverse tumor biology [2], but its influence on the postoperative course requires further study. Operative duration ($\rho = 0.719$) and intraoperative blood loss ($\rho = 0.552$) correlated strongly with severity, consistent with greater physiological stress and with the literature [12, 22, 23]. Postoperative factors – length of stay, ICU time, and ventilatory support – were also significantly associated with severity, as expected. The open and laparoscopic approaches did not differ significantly, although Grade II complications were more frequent after laparoscopic surgery; this may reflect the influence of surgeon experience and individual patient factors.

Martínez-Holguín et al. [24], in a series of 518 patients, reported a shorter mean hospital stay (4 *vs*. 7.7 days) and a lower mean PSA (7 *vs*. 11.5 ng/mL) than in our cohort, with fewer transfusions (4.8%); as in our study, severe complications (≥ Grade III) were uncommon.

Dinić et al. [25] analyzed 254 patients undergoing open retropubic prostatectomy, with a similar operative duration (170 min) but greater blood loss (867 *vs*. 628.3 mL) and longer hospitalization (10.5 *vs*. 7.7 days); low-grade complications predominated, consistent with our findings.

Shabani et al. [26], in 244 patients, found no significant differences in age, BMI, or PSA between approaches – contrary to our finding of a significant association of BMI and PSA with complications – and reported significantly less blood loss and shorter hospitalization with laparoscopic surgery; in our cohort, hospital stay was likewise significantly shorter after laparoscopic surgery (6.4 *vs*. 8 days; $p < 0.001$), and Grade II complications were more frequent after the laparoscopic approach.

In a network meta-analysis of 80 studies, Kim et al. [10] found no significant difference between the robot-assisted, laparoscopic, and open approaches in estimated blood loss or in overall and major complication rates, with the longest operative time for the laparoscopic approach; this is consistent with the lack of a significant difference between the open and laparoscopic approaches in our cohort. The robot-assisted approach is not yet available at our center.

In a large cohort, Pompe et al. [16] (13,924 patients) observed predominantly mild complications after the introduction of standardized reporting (Grade I, 10.6%; Grade II, 7.9%), with severe complications (Grades IV–V) in less than 1%, consistent with our results.

Our study has limitations. Complications were recorded within 60 days of surgery, whereas most published series apply a 30-day or a 90-day window; besides limiting the assessment of long-term outcomes, this makes direct comparison with other series more difficult, as a 60-day window may capture more events than 30-day reports and fewer than 90-day reports. The absence of significant differences between approaches may partly reflect patient selection during the COVID-19 pandemic, when patients with better general health and fewer comorbidities were preferentially selected for surgery. Interobserver variability in Clavien–Dindo grading [15] and unexamined factors such as physiological reserve and surgeon experience may also have influenced the frequency and severity of complications.

CONCLUSION

Postoperative complications following open and laparoscopic radical prostatectomy were predominantly mild, with most patients classified within Clavien–Dindo Grades I and II. No statistically significant association was observed between sociodemographic factors (age and place of residence) and complication severity. In contrast, preoperative factors (BMI and PSA), intraoperative factors (operative duration and intraoperative blood loss), and postoperative factors (length of hospitalization, ICU stay, and ventilatory support) were significantly associated with greater complication severity. Although laparoscopic radical prostatectomy showed a tendency toward fewer severe complications than the open approach, this difference did not reach statistical significance.

Ethics: The study was approved by the Ethics Committee of the University Clinical Center of Vojvodina (Decision No. 00-382 of December 1, 2024). The study was conducted in accordance with the Declaration of Helsinki and conforms to applicable legal standards.

Conflict of interests: None declared.

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Постоперативне компликације након отворене и лапароскопске радикалне простатектомије – ретроспективна анализа применом Клавијен–Диндо класификације

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САЖЕТАК

Увод/Циљ Карцином простате је најчешће дијагностикован малигнитет код мушкараца у више од половине земаља света и један од водећих узрока смрти од рака. Радикална простатектомија је стандардни вид хируршког лечења, али носи ризик од постоперативних компликација. Циљ рада био је да се анализирају постоперативне компликације након отворене и лапароскопске радикалне простатектомије применом Клавијен–Диндо класификације.

Методе Ретроспективном студијом обухваћено је 304 болесника са карциномом простате лечених у Универзитетском клиничком центру Војводине, на Клиници за урологију, у периоду од 2020. до 2024. године. Компликације настале унутар 60 дана од операције градиране су према Клавијен–Диндо класификацији и анализиране у односу на социодемографске, преоперативне, интраоперативне и постоперативне факторе.

Резултати Просечна старост износила је 67,4 ± 5,7 година. Већина компликација била је блага (градус *I* – 47%; градус *II* – 35,2%); најчешће су биле трансфузија крви (18,7%) и повишене вредности серумског креатинина (10,9%). Тежина компликација значајно је корелирала са индексом телесне масе ($\rho = 0{,}169$, $p < 0{,}01$), преоперативном вредношћу антигена специфичног за простату ($\rho = 0{,}167$, $p < 0{,}01$), трајањем операције ($\rho = 0{,}719$, $p < 0{,}001$) и интраоперативним губитком крви ($\rho = 0{,}552$, $p < 0{,}001$). Социодемографски фактори нису показали значајну повезаност. Разлика између отвореног и лапароскопског приступа није била статистички значајна ($p = 0{,}295$).

Закључак Постоперативне компликације након радикалне простатектомије биле су претежно благе. Индекс телесне масе, вредност антигена специфичног за простату, трајање операције, интраоперативни губитак крви и постоперативни ток били су повезани са већом тежином компликација, док хируршки приступ није.

Кључне речи: карцином простате; простатектомија; лапароскопија; постоперативне компликације; фактори ризика; исход лечења