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**Prostatic Adenocarcinoma: Laparoscopic Radical Prostatectomy
versus Open Radical Prostatectomy**

SUMMARY OF THE DOCTORAL THESIS

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List of Scientific Papers Published within the Scope of the Doctoral Thesis

1. **Cherciu AI**, Persu MC, Bumbea AC, Cherciu MM, Firoiu MC, Vrabie RT, et al. Early postoperative complications after open versus laparoscopic radical prostatectomy: a retrospective cohort analysis using Clavien–Dindo classification. *J Med Life*. 2026;19(3):194–201. DOI : 10.25122/jml-2026-0003

<https://medandlife.org/wp-content/uploads/JML-2026-0003.pdf>

2. **Cherciu AI**, Persu MC, Bumbea AC, Cherciu MM, et al. Comparative analysis of urinary continence recovery after open and laparoscopic radical prostatectomy: a retrospective cohort study. *J Med Life*. 2026 Feb;19(2):120-126. doi: 10.25122/jml-2026-0004.

<https://pmc.ncbi.nlm.nih.gov/articles/PMC13059432/>

3. **Cherciu AI**, Persu MC, Bumbea AC, Cherciu MM, Firoiu MC, et al.. Does the Laparoscopic Approach Reduce the Incidence of Vesicourethral Anastomotic Stricture Compared with the Open Approach After Radical Prostatectomy in Patients with Microangiopathic Risk Factors? *Medicina* (Kaunas). 2026 Feb 22;62(2):417. doi: 10.3390/medicina62020417.

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Introduction

Prostatic adenocarcinoma represents one of the most frequently diagnosed malignancies in men, constituting a major public health issue worldwide. Over recent decades, the introduction of screening based on prostate-specific antigen (PSA) testing, as well as the development of modern imaging techniques, has enabled the diagnosis of an increasing number of cases in localized stages, leading to a significant expansion of curative therapeutic options.

Surgical treatment through radical prostatectomy represents the therapeutic standard for numerous patients diagnosed with localized disease. Consequently, the development of minimally invasive techniques, particularly laparoscopic and robotic approaches, has brought major changes in the surgical management of the disease. Nevertheless, the comparison between the open and laparoscopic approaches continues to represent an important research topic.

The motivation of the present research is based on the need to optimize surgical treatment within the context of clinical practice in Romania and on the necessity of comparatively evaluating the two surgical techniques within a contemporary institutional framework.

The study aims to evaluate the perioperative, functional, and oncological outcomes of radical prostatectomy performed through both open and laparoscopic approaches, thereby contributing to the identification of factors involved in optimizing the surgical management of prostatic adenocarcinoma and improving therapeutic selection and postoperative outcomes. In current urological practice, interest in identifying predictive factors for postoperative evolution is continuously increasing. The integrated analysis of perioperative, clinical, and biological parameters contributes to the development of efficient therapeutic strategies and to the adaptation of surgical management according to the particular characteristics of each patient. At the same time, the obtained results provide

relevant data regarding the applicability and efficiency of modern techniques in current medical practice.

The correlated analysis of clinical and technical factors allows the identification of their direct impact on functional recovery and on the occurrence of complications, supporting the development of a surgical perspective focused not only on oncological disease control, but also on the quality of postoperative recovery.

I. GENERAL PART

1. Prostatic adenocarcinoma – current data regarding epidemiology, diagnosis, and disease management

1.1. Epidemiology and risk factors

Prostatic adenocarcinoma represents one of the most frequently diagnosed malignancies in men and constitutes a major public health issue worldwide. The incidence of the disease has increased significantly in recent decades, mainly due to the development of screening programs based on prostate-specific antigen (PSA) testing, as well as advances in modern imaging techniques. Increased life expectancy and population aging further contribute to the growing prevalence of the disease [1].

The geographic distribution of prostatic adenocarcinoma is heterogeneous, with higher incidences reported in North America and Western Europe. The main risk factors involved in the occurrence and progression of the disease include advanced age, family history, genetic predisposition, androgen-dependent hormonal factors, obesity, metabolic syndrome, smoking, and dietary factors. In recent years, the role of BRCA1 and BRCA2 genetic mutations has become increasingly important in oncological risk stratification and individualized therapeutic management [2].

1.2. Diagnosis and staging of prostate cancer

The modern diagnosis of prostate cancer is based on the integration of clinical examination, biological markers, imaging techniques, and histopathological examination. PSA determination remains the main tool used for screening and early diagnosis, although its specificity is limited by the possibility of elevated values in benign prostatic pathology [3].

Digital rectal examination continues to play an important role in the clinical evaluation of the patient, while multiparametric magnetic resonance imaging has become an essential method for identifying suspicious lesions and selecting patients for biopsy. The use of standardized imaging assessment systems has significantly increased diagnostic accuracy and reduced the overdiagnosis of clinically insignificant disease.

Histopathological examination uses the ISUP classification and Gleason score to evaluate tumor aggressiveness, while TNM staging allows assessment of disease extent and establishment of the optimal therapeutic strategy. The development of modern imaging and molecular biology methods has contributed to more accurate oncological risk stratification and individualized treatment [4].

3. Therapeutic management of prostatic adenocarcinoma

The therapeutic management of localized prostatic adenocarcinoma includes active surveillance, radiotherapy, and surgical treatment through radical prostatectomy. The choice of therapeutic method depends on the oncological risk group, life expectancy, functional status, and patient preferences [5].

Active surveillance is recommended mainly for patients with low-risk disease, while surgical treatment and radiotherapy are predominantly indicated in intermediate- and high-risk cases. The main goal of treatment is to achieve effective oncological control with minimal impact on quality of life and postoperative functionality [6].

The development of personalized medicine and the introduction of molecular markers allow therapeutic strategies to be adapted according to the biological and clinical profile of each patient, contributing to the optimization of therapeutic outcomes and the reduction of treatment-related complications.

2. Open versus laparoscopic radical prostatectomy

2.1. Surgical principles of radical prostatectomy

Radical prostatectomy represents one of the main curative treatment methods for localized prostatic adenocarcinoma. The procedure involves complete excision of the prostate together with the seminal vesicles and the creation of a vesicourethral anastomosis. In certain situations, pelvic lymphadenectomy is also associated for oncological staging purposes.

The main objectives of the intervention are oncological disease control, preservation of urinary continence, and preservation of erectile function whenever possible. Postoperative outcomes are influenced both by patient characteristics and by the surgeon's experience and the operative technique used [7].

2.2. Open radical prostatectomy

The open approach represents the classical surgical technique used in the treatment of localized prostate cancer. The main advantages of this method include direct access to the operative field and the possibility of performing the intervention without the need for complex equipment.

However, open surgery is frequently associated with greater blood loss, longer hospitalization, and slower postoperative recovery. Despite the development of minimally invasive techniques, open radical prostatectomy remains an important therapeutic option, particularly in centers with extensive experience in conventional surgery [8].

2.3. Laparoscopic radical prostatectomy

The introduction of the laparoscopic approach represented a major advancement in minimally invasive urological surgery. Laparoscopic radical prostatectomy is associated with reduced blood loss, faster postoperative recovery, and shorter hospitalization.

Magnified visualization of the operative field allows more precise dissection and may contribute to reduced tissue trauma and improved functional recovery. However, the technique requires advanced surgical experience and involves a significant learning curve [9].

2.4. Oncological and functional outcomes

Comparing the outcomes obtained through open and laparoscopic approaches represents an important topic in the medical literature. Current studies suggest comparable oncological outcomes between the two techniques regarding local disease control and biochemical recurrence-free survival [10].

From a functional perspective, the main aspects evaluated are the recovery of urinary continence and the preservation of erectile function. Postoperative evolution is influenced by numerous factors, including patient age, body mass index, tumor characteristics, and technical particularities of the intervention.

The comparative analysis of the two approaches highlights the importance of individualized treatment and the need for an integrated evaluation of oncological, functional, and perioperative outcomes in the management of patients with localized prostatic adenocarcinoma.

In the present study, oncological outcomes were evaluated through the analysis of postoperative histopathological parameters and postoperative biological evolution. The comparative analysis between the laparoscopic and open approaches demonstrated comparable oncological outcomes regarding local disease control and postoperative pathological profile. The distribution of ISUP grades and pathological stages did not reveal significant differences between the

two groups, suggesting that the laparoscopic approach allows adherence to the oncological principles of radical prostatectomy similarly to open surgery [11].

From a functional point of view, one of the major objectives of radical prostatectomy is the recovery of urinary continence and the maintenance of the best possible postoperative quality of life. In the present study, urinary continence recovery was evaluated at 3, 6, and 12 months postoperatively, with the results demonstrating a progressive improvement in continence over time in both analyzed groups [12].

II. SPECIAL PART

Chapter 3. Working hypothesis and general objectives

The present research originated from the need for a comparative evaluation of the main outcomes obtained through open and laparoscopic radical prostatectomy in the treatment of localized prostatic adenocarcinoma.

The working hypothesis of the present research was that the laparoscopic approach may provide perioperative and functional advantages comparable or superior to open surgery, without compromising oncological outcomes.

The objectives of the research included the analysis of perioperative parameters, evaluation of early postoperative complications, analysis of urinary continence recovery, and evaluation of vesicourethral anastomotic stricture.

Chapter 4. Materials and methods

The conducted study was retrospective, observational, and comparative, and included patients diagnosed with localized prostatic adenocarcinoma and surgically treated through radical prostatectomy between 2022 and 2024.

The analyzed cohort included 149 patients, of whom 51 were treated through the laparoscopic approach and 98 through the open approach.

Clinical, oncological, and perioperative variables were analyzed, including age, body mass index, PSA, prostate volume, ISUP grade, and perioperative parameters.

Chapter 5. Study regarding early postoperative complications

5.1. Introduction

Early postoperative complications represent an important indicator of the safety and effectiveness of surgical treatment in localized prostatic adenocarcinoma. The development of minimally invasive techniques has primarily aimed to reduce perioperative morbidity and accelerate postoperative recovery without compromising oncological outcomes.

In the medical literature, laparoscopic radical prostatectomy is frequently associated with reduced blood loss, shorter hospitalization, and faster functional recovery compared to the open approach.

The objective of this study was the comparative evaluation of perioperative parameters and early postoperative complications between laparoscopic and open radical prostatectomy.

5.2. Materials and methods

The study included patients diagnosed with localized prostatic adenocarcinoma and surgically treated through radical prostatectomy between 2022 and 2024.

Clinical and perioperative variables were evaluated, including age, body mass index, PSA, prostate volume, ISUP grade, clinical staging, duration of surgery, estimated blood loss, and length of hospitalization.

Postoperative complications were classified according to the Clavien–Dindo classification system.

5.3. Results

The analysis of perioperative parameters revealed significant differences between the two surgical techniques. Patients treated through the laparoscopic approach presented reduced blood loss and shorter hospitalization compared to the group treated through open surgery.

Early postoperative complications were predominantly of low severity, and the laparoscopic approach was associated with a more favorable overall postoperative recovery.

5.4. Discussion

The obtained results are consistent with the data reported in the medical literature regarding the perioperative benefits of minimally invasive surgery.

The reduction in blood loss and hospitalization duration observed in the laparoscopic group may be explained by reduced tissue trauma and superior visualization of the operative field.

5.5. Conclusions

Laparoscopic radical prostatectomy was associated with significant perioperative advantages compared to the open approach, including reduced blood loss and shorter hospitalization.

The obtained results support the benefits of minimally invasive surgery in optimizing perioperative recovery.

Chapter 6. Study regarding urinary continence recovery

6.1. Introduction

Recovery of urinary continence represents one of the most important functional indicators of the success of radical prostatectomy and has a major impact on the patient's quality of life.

The objective of this study was the comparative evaluation of urinary continence recovery after laparoscopic and open radical prostatectomy, as well as the identification of predictive factors involved in postoperative functional evolution.

6.2. Materials and methods

The study included patients treated through laparoscopic and open radical prostatectomy, who were evaluated postoperatively from a functional perspective.

Urinary continence was analyzed at 3, 6, and 12 months postoperatively. Clinical and perioperative variables were evaluated, including age, body mass index, PSA, prostate volume, and perioperative parameters.

6.3. Results

The results demonstrated a progressive improvement in urinary continence over time in both analyzed groups.

The analysis of predictive factors demonstrated that advanced age and increased body mass index were associated with slower functional recovery.

6.4. Discussion

Recovery of urinary continence after radical prostatectomy represents a complex multifactorial process.

The obtained results are consistent with the data reported in the medical literature regarding the influence of age and body mass index on functional recovery.

6.5. Conclusions

Recovery of urinary continence showed a progressively favorable evolution in both analyzed groups.

Age and body mass index represented the main predictive factors associated with postoperative functional recovery.

Chapter 7. Study regarding vesicourethral anastomotic stricture and the role of microangiopathic risk factors

7.1. Introduction

Vesicourethral anastomotic stricture represents one of the major late complications following radical prostatectomy, having a significant impact on the patient's quality of life and frequently requiring additional endoscopic treatment.

The mechanisms involved in the development of anastomotic stricture are complex and multifactorial. The medical literature suggests the role of intraoperative tissue trauma, local ischemia, inflammation, and the particularities of the tissue healing process in the development of anastomotic fibrosis.

The objective of this study was to evaluate the clinical, technical, and microvascular factors involved in the occurrence of vesicourethral anastomotic stricture following radical prostatectomy.

7.2. Materials and methods

The study included patients diagnosed with localized prostatic adenocarcinoma and surgically treated through laparoscopic or open radical prostatectomy.

Clinical and perioperative variables were analyzed, including age, body mass index, diabetes mellitus, metabolic syndrome, smoking status, PSA, prostate volume, ISUP grade, duration of surgery, and estimated blood loss.

Vesicourethral anastomotic stricture was defined as the occurrence of an obstruction at the level of the anastomosis requiring endoscopic treatment.

7.3. Results

The analysis of the results demonstrated that vesicourethral anastomotic stricture had a low incidence; however, the impact of this complication on postoperative functional evolution was significant.

Patients who developed anastomotic stricture frequently presented longer operative time and increased blood loss compared to patients without this complication.

The presence of diabetes mellitus and metabolic factors associated with microangiopathy was more frequently encountered in the group of patients with stricture.

7.4. Discussion

The obtained results support the hypothesis regarding the involvement of ischemic and microvascular mechanisms in the occurrence of vesicourethral anastomotic stricture following radical prostatectomy.

Prolonged duration of surgery and significant blood loss may contribute to impaired local vascularization and the occurrence of tissue ischemia, favoring the process of anastomotic fibrosis.

Metabolic factors such as diabetes mellitus and metabolic syndrome may negatively influence the healing process through impairment of microcirculation and tissue regeneration.

7.5. Conclusions

Vesicourethral anastomotic stricture represents an important late complication following radical prostatectomy.

Duration of surgery, blood loss, and the presence of microangiopathic factors were associated with an increased risk of developing anastomotic stricture.

The obtained results support the involvement of ischemic and microvascular mechanisms in the tissue healing process and highlight the importance of optimizing surgical technique and controlling metabolic and vascular factors in preventing late postoperative complications.

Chapter 8. Integrated analysis of results and conceptual model

8.1. Introduction

Postoperative evolution following radical prostatectomy is influenced by numerous clinical, biological, and technical factors, which interact in a complex manner and contribute both to oncological outcomes and to the patient's functional recovery.

The objective of this chapter was to integrate the results obtained in the previous studies and to develop a conceptual model of postoperative evolution based on the correlation of clinical, technical, and microvascular parameters.

8.2. Integration of perioperative and functional outcomes

The integrated analysis of the results demonstrated that the laparoscopic approach is associated with important perioperative advantages, including reduced blood loss and faster postoperative recovery.

Recovery of urinary continence was influenced not only by the surgical technique used, but also by the individual characteristics of the patient, such as age and body mass index.

The obtained results suggest that perioperative and functional parameters are closely interconnected and should be evaluated together in order to achieve a correct assessment of the effectiveness of surgical treatment.

8.3. Correlations between clinical, technical, and microvascular factors

Statistical analysis demonstrated the existence of significant relationships between the patient's clinical characteristics, the technical parameters of the intervention, and the occurrence of postoperative complications.

Advanced age and increased body mass index were associated with slower functional recovery, while prolonged duration of surgery and increased blood loss influenced the risk of late complications.

Microangiopathic and metabolic factors were involved in the impairment of tissue healing and in the occurrence of vesicourethral anastomotic stricture.

8.4. Multidimensional conceptual model

Based on the obtained results, a multidimensional conceptual model of postoperative evolution following radical prostatectomy was developed.

The proposed model integrates the patient's clinical factors, metabolic and microvascular characteristics, technical parameters of the surgical intervention, perioperative outcomes, and postoperative functional evolution.

This model supports the idea that postoperative evolution does not depend exclusively on the surgical technique used, but rather on the complex interaction between the patient's biological characteristics and the features of the surgical intervention.

8.5. Clinical implications and future perspectives

The obtained results highlight the importance of a personalized approach in the management of patients with localized prostatic adenocarcinoma.

Comprehensive preoperative evaluation of clinical, metabolic, and vascular status may contribute to the identification of patients at increased risk of complications and delayed functional recovery.

Future perspectives include the development of predictive models validated on larger patient cohorts and the integration of modern biological and imaging markers in the evaluation of functional and oncological prognosis following radical prostatectomy.

Conclusions and personal contributions

The laparoscopic approach was associated with significant perioperative advantages, including reduced blood loss, shorter hospitalization, and faster postoperative recovery.

The original contribution of the research consists in the development of an integrated perspective on postoperative evolution through the correlation of perioperative, functional, and microvascular parameters within a multidimensional evaluation and predictive model.

The obtained results support the need for individualized surgical management and therapeutic selection in order to optimize functional recovery and the quality of life of patients.

- Performing a comparative analysis between laparoscopic radical prostatectomy and open radical prostatectomy in patients diagnosed with localized prostatic adenocarcinoma through the integrated evaluation of perioperative, functional, and oncological parameters.
- Highlighting the perioperative advantages of the laparoscopic approach, represented by reduced blood loss, shorter hospitalization, and faster postoperative recovery.
- Evaluating the evolution of urinary continence at different postoperative intervals and identifying the main predictive factors involved in functional recovery following radical prostatectomy.
- Demonstrating the influence of age and body mass index on urinary continence recovery and postoperative functional evolution.
- Analyzing the relationship between technical factors, perioperative parameters, and the occurrence of vesicourethral anastomotic stricture.
- Highlighting the role of microangiopathic and metabolic factors in the occurrence of late complications following radical prostatectomy.

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