

## Comparative Outcomes of Robotic Assisted Versus Open Radical Prostatectomy in Prostate Cancer Surgery

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### Abstract

Radical prostatectomy, the surgical removal of the prostate gland, is a common treatment for localized prostate cancer. With advancements in surgical techniques, robotic-assisted radical prostatectomy (RARP) has emerged as an alternative to traditional open radical prostatectomy (ORP). This study aims to compare the outcomes, including perioperative and oncological results, of RARP and ORP. A retrospective cohort study was conducted on 500 patients who underwent radical prostatectomy for localized prostate cancer between 2015 and 2020. The cohort was divided into two groups: those who underwent RARP (n=300) and those who underwent ORP (n=200). Data on patient demographics, perioperative outcomes (operative time, blood loss, and hospital stay), postoperative complications, and oncological outcomes (positive surgical margins, biochemical recurrence) were collected and analyzed.

**Keywords:** Prostate cancer; Radical prostatectomy; Robotic-assisted surgery; Open surgery; Oncological outcomes; Perioperative outcomes

### Introduction

Prostate cancer is the second most common cancer in men worldwide and a significant cause of morbidity and mortality. In the United States alone, it is estimated that over 248,000 new cases will be diagnosed in 2021, with approximately 34,000 deaths attributed to the disease [1]. While localized prostate cancer can often be managed with various treatment modalities, radical prostatectomy remains a cornerstone in the curative approach for many patients. Radical prostatectomy involves the surgical removal of the prostate gland and surrounding tissues and is recommended for patients with localized prostate cancer who have a life expectancy of greater than 10 years and are deemed fit for surgery [2]. The primary goals of radical prostatectomy are to achieve complete tumor excision while preserving urinary continence and erectile function to the greatest extent possible. Over the years, radical prostatectomy techniques have evolved significantly, with advancements in surgical technology and techniques aimed at improving perioperative outcomes and enhancing cancer control. Traditional open radical prostatectomy (ORP) has historically been the standard approach, providing excellent cancer control but often associated with significant perioperative morbidity, including blood loss, pain, and prolonged hospital stays. The introduction of minimally invasive surgical techniques, particularly robotic-assisted radical prostatectomy (RARP), has revolutionized the field of prostate cancer surgery [3,4]. RARP offers several potential advantages over ORP, including improved visualization, greater surgical precision, reduced blood loss, and shorter hospital stays. These benefits have fueled the widespread adoption of robotic-assisted techniques in recent years, leading to a shift in the surgical landscape for prostate cancer.

### Methodology

**Study Design:** Retrospective cohort study  
**Population** the study included 500 patients diagnosed with localized prostate cancer and underwent radical prostatectomy between 2015 and 2020.

### Data collection:

Demographics age, body mass index (BMI), prostate-specific antigen (PSA) levels, Gleason score. Perioperative Outcomes operative time, estimated blood loss, length of hospital stay, postoperative complications. Oncological Outcomes positive surgical margins,

biochemical recurrence (defined as PSA  $\geq 0.2$  ng/mL post-surgery).

### Analysis:

**Statistical Methods:** Comparative analyses were conducted using t-tests for continuous variables and chi-square tests for categorical variables. Multivariable logistic regression models were used to adjust for potential confounders. Data analysis was performed using SPSS version 25.0 (IBM Corp., Armonk, NY). Ethical Considerations the study was approved by the institutional review board and patient consent was waived due to the retrospective nature of the study. This study's retrospective design may introduce selection bias [5]. The follow-up period was limited to 2 years, which may not capture long-term oncological outcomes. Further prospective studies with longer follow-up periods are recommended to validate these findings and assess long-term outcomes of RARP versus ORP.

### Results and Discussion

The results of this retrospective cohort study comparing robotic-assisted radical prostatectomy (RARP) with open radical prostatectomy (ORP) revealed several important findings. Perioperative Outcomes RARP was associated with significantly lower blood loss compared to ORP (mean 200ml vs. 450ml,  $p < 0.001$ ). Patients who underwent RARP had shorter hospital stays compared to those who underwent ORP (mean 2.5 days vs. 4.5 days,  $p < 0.001$ ) [6]. The incidence of postoperative complications was lower in the RARP group compared to the ORP group (15% vs. 25%,  $p = 0.01$ ). Oncological Outcomes there were no significant differences in positive surgical margin rates between the RARP and ORP groups (10% vs. 12%,  $p = 0.34$ ). Biochemical recurrence rates at 2 years post-surgery were similar between the two groups (RARP 8% vs. ORP 10%,  $p = 0.45$ ). The findings of this study

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provide valuable insights into the comparative outcomes of RARP and ORP in the surgical management of localized prostate cancer. Perioperative Benefits of RARP the observed reductions in blood loss and length of hospital stay associated with RARP are consistent with previous studies and highlight the advantages of robotic-assisted techniques in minimizing surgical trauma and accelerating postoperative recovery [7-9]. These benefits may lead to improved patient satisfaction and healthcare resource utilization. Safety Profile of RARP the lower incidence of postoperative complications in the RARP group suggests a favorable safety profile for robotic-assisted prostatectomy. Enhanced visualization, precise tissue dissection, and reduced intraoperative blood loss afforded by the robotic platform may contribute to these outcomes [10]. However, further research is warranted to investigate specific complications and their impact on long-term patient outcomes. Comparable Oncological Efficacy despite differences in surgical approach, the oncological outcomes, including positive surgical margin rates and biochemical recurrence rates, were similar between RARP and ORP groups.

## Conclusion

RARP is associated with better perioperative outcomes and similar oncological efficacy compared to ORP. These findings support the increasing adoption of robotic-assisted techniques in the surgical management of localized prostate cancer. The RARP group demonstrated significantly lower blood loss (mean 200 ml vs. 450 ml,  $p < 0.001$ ), shorter hospital stays (mean 2.5 days vs. 4.5 days,  $p < 0.001$ ), and fewer postoperative complications (15% vs. 25%,  $p = 0.01$ ) compared to the ORP group. Oncological outcomes, including positive surgical margin rates (RARP 10% vs. ORP 12%,  $p = 0.34$ ) and biochemical recurrence rates at 2 years (RARP 8% vs. ORP 10%,  $p = 0.45$ ), were comparable between the two groups. The RARP group demonstrated significantly lower blood loss (mean 200 ml vs. 450 ml,  $p < 0.001$ ), shorter hospital stays (mean 2.5 days vs. 4.5 days,  $p < 0.001$ ), and fewer postoperative complications (15% vs. 25%,  $p = 0.01$ ) compared to the ORP group. Oncological outcomes, including positive surgical margin rates (RARP 10% vs. ORP 12%,  $p = 0.34$ ) and biochemical recurrence

rates at 2 years (RARP 8% vs. ORP 10%,  $p = 0.45$ ), were comparable between the two groups.

## Acknowledgment

None

## Conflict of Interest

None

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