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Latero-Posterior Approach–Gaston modified technique, Las Palmas Approach–Gaston modified technique (LPA-G) for robot-assisted radical prostatectomy

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Abstract

Objectives: To evaluate perioperative, pathological, and functional outcomes of radical prostatectomy using the Latero-Posterior Approach-Gaston modified technique, Las Palmas Approach-Gaston modified technique (LPA-G) with intrafascial neurovascular-bundle dissection and bladder neck preservation.
Methods: We conducted a retrospective, single-center study of patients who underwent robot-assisted radical prostatectomy using the standardized LPA-G between 2023–2026. The technique incorporated a posterior approach to the seminal vesicles and then intrafascial, tension and energy-minimizing dissection of the neurovascular bundles with preservation of the bladder neck and the pubovesical complex whenever oncologically appropriate. Preoperative, operative, pathological, complication, urinary-continence, and erectile-function data were collected. Functional outcomes were assessed at 1, 3, 6, 12, and 24 months.
Results: A total of 138 patients were included. Median age was 65 years (IQR 60–71), preoperative prostate-specific antigen was 6.79 ng/mL (IQR 5.02–10.6), and prostate volume was 43 mL (IQR 33–62). Median total operative, console, and docking times were 160 (IQR 120–236), 120 (IQR 81–195), and 16 minutes (IQR 13–21), respectively. Complications were documented in 27/138 patients (19.6%). Positive surgical margins occurred in 60/121 patients (49.6%), and higher preoperative PSA was independently associated with margin positivity (aOR 2.07, 95% CI 1.11–4.19). Continence increased from 54.5% at 1 month to 83.9% at 12 months. Erectile function increased from 39.7% at 1 month to 70.2% at 6 months. Median total operative time did not decrease across chronological periods (137, 161, and 205 minutes; $P = 0.129$).
Conclusions: Robot-assisted radical prostatectomy using the LPA-G was technically feasible and associated with progressive functional recovery among evaluable patients. The substantial positive-margin rate emphasizes the need for oncologically selective intrafascial dissection, standardized outcome assessment, and prospective comparative evaluation.
Keywords: Prostate cancer, robot-assisted radical prostatectomy, Latero-Posterior Approach-Gaston modified technique, Las Palmas Approach-Gaston modified technique (LPA-G), pubovesical complex, urinary continence, erectile function

Introduction

Prostate cancer is the most frequently diagnosed malignancy among men, accounting for 28.3% of new cancer diagnoses in men in 2024 [1]. Radical prostatectomy is an established treatment for appropriately selected patients with localized or selected locally advanced disease [2].

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Alongside cancer control, urinary continence and erectile function are important outcomes of surgery [3]. Their preservation depends in part on the surgical handling of the neurovascular bundles, bladder neck, urethra, and pelvic support structures [4]. Nerve-sparing dissection may improve erectile function and facilitate earlier continence, although outcomes also depend on patient characteristics, baseline function, tumor location, and the extent and plane of dissection [2, 5, 6].

The Latero-Posterior Approach-Gaston modified technique, Las Palmas Approach-Gaston modified technique (LPA-G) examined in this study builds on a pubovesical complex-sparing robot-assisted technique designed to preserve the endopelvic fascia, dorsal vascular complex, detrusor apron, bladder neck, and native pubic attachments of the bladder [7]. The group subsequently detailed an intrafascial technique based on tension-free and energy-free dissection of the neurovascular bundles [8]. Dissection begins laterally at the prostatovesical junction and advances posteriorly along the prostate, allowing progressive intrafascial release of the neurovascular bundles. The technique seeks to limit traction and thermal energy near neural tissue while preserving the pubovesical complex when oncologically appropriate [8]. Its defining feature is this lateral-to-posterior dissection sequence combined with selective preservation of anterior support structures.

Retzius-sparing robot-assisted radical prostatectomy provides related, but technically distinct, evidence on anatomy-preserving surgery. Randomized trials have shown faster early continence recovery compared with conventional anterior surgery [9, 10]. A systematic review suggests that this advantage may diminish by 12 months and identifies concerns about positive surgical margins in some patients, without a consistent erectile-function benefit [11].

These findings cannot establish the outcomes of the LPA-G, for which clinical evidence remains limited. Here, we aimed to describe the perioperative, pathological, and documented functional outcomes of a consecutive, single-center series of patients undergoing robot-assisted radical prostatectomy using the LPA-G, a pubovesical complex-preserving approach. We also examined outcomes across chronological case periods, with particular attention to positive surgical margins, complications, postoperative continence, and erectile function.

Methods

Study design and setting

We conducted a retrospective, single-center case series of patients who underwent robot-assisted radical prostatectomy using the LPA-G at the Department of Urology, University San Roque Hospitals, Las Palmas de Gran Canaria, between January 2023 and January 2026. Potentially eligible procedures were identified from operative logs and robotic surgery registries. Preoperative and perioperative characteristics, postoperative events, pathological findings, and functional assessments were extracted from patient records. Data were locked for this analysis on January 31, 2026. This study is reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology recommendations. The Institutional Review Board approved all study proceedings under the approval number DG-DECS-UPO-CT-4078. All information was deidentified before analysis and handled in accordance with applicable institutional and national data-protection requirements.

Study population

We included adult patients with histologically confirmed prostate adenocarcinoma who underwent robot-assisted radical prostatectomy using the LPA-G during the study period.

Surgical candidacy and the planned extent of nerve sparing were determined through multidisciplinary clinical assessment based on patient age, comorbidities, life expectancy, preoperative functional status, clinical stage, prostate-specific antigen (PSA), biopsy grade group, and preoperative imaging. Exclusion criteria were salvage prostatectomy, metastatic disease at the time of surgery, procedures converted to another surgical approach, incomplete operative records, or lack of pathological information. The final cohort comprised 138 consecutive patients who underwent radical prostatectomy between January 2023 and January 2026.

Preoperative assessment

Preoperative evaluation included age, history of previous pelvic or prostatic surgery, serum PSA, biopsy Gleason score and International Society of Urological Pathology (ISUP) grade group, and prostate magnetic resonance imaging findings, including the highest Prostate Imaging Reporting and Data System (PI-RADS) score.

Surgical technique

All procedures were performed by surgeons from the Department of Urology using the LPA-G with the HUGO™ RAS technology. The patient was placed in the 30° Trendelenburg position with a split-leg configuration to allow advancement of the camera arm. Three robotic 8-mm trocars and one 11-mm trocar for the camera were placed. Two additional laparoscopic ports, 12 mm and 5 mm, were used for the assistant, with insufflation at 12 mmHg. Docking was performed as follows. Arm 1 was positioned at an angle of 95° with a tilt of 5°. Arm 2 was positioned at an angle of 130° with a tilt of 5°, corresponding to the surgeon's left hand. Arm 3, for the endoscope, was positioned at an angle of 175° with a tilt of 5° between the patient's legs. Arm 4 was positioned at an angle of 210–220° with a tilt of 30° (Figure 1).

Following access to the pelvis, the procedure starts by upper traction using the Cadiere instrument in the midline in between bladder fatty tissue and the line of the rectum opening by a peritoneotomy, reaching the vas deferens and transected, then following laterally for each side accomplishing the seminal vesicles dissection, and cutting both vas deferens, once finished we continue dissection laterally at the prostatovesical junction under a classic

Gaston Lateral approach grasping the bladder and prostate junction into the right side. An avascular plane was developed between the prostate and bladder and extended posteriorly toward the posterior prostatic fascia. The overall strategy was based on intrafascial, tension-free, and energy-minimizing dissection of the neurovascular bundles, together with preservation of the pubovesical complex and the bladder neck. The neurovascular bundle was progressively released from the base and lateral surface of the prostate. Small vessels entering the prostatic capsule were identified and controlled selectively with 5 mm metallic clips, while lateral traction and peeling of the neurovascular tissue were applied, and no thermal energy was used near the bundles. Surrounding anatomy of the prostate as the endopelvic fascia, bladder neck and pubovesical ligaments were preserved. The extent of nerve sparing was not recorded. Apical dissection was performed with particular attention to maximizing membranous urethral length and avoiding thermal or traction injury to the adjacent neurovascular structures. After removal of the prostate, a running vesicourethral anastomosis was performed with barbed suture and tested for leakage with saline. Pelvic lymph-node dissection was performed when clinically indicated according to preoperative risk assessment.

Perioperative variables

Operative variables included anesthesia time, robotic docking time, console time, and total operative time. All time intervals were expressed in minutes.

Pathological evaluation

Prostatectomy specimens were assessed by the Pathology Department and were evaluated according to institutional protocols. Biopsy and prostatectomy Gleason scores were recorded as the primary and secondary architectural patterns. ISUP grade groups were defined as follows: grade group 1, Gleason score 3 + 3 = 6; grade group 2, 3 + 4 = 7; grade group 3, 4 + 3 = 7; grade group 4, Gleason score 8 (4 + 4, 3 + 5, or 5 + 3); and grade group 5, Gleason score 9–10. Biopsy-to-prostatectomy grade-group change was classified as upgrading, no change, or downgrading. Pathological T and N codes were extracted from the available pathology data. A positive surgical margin was defined as tumor at an inked specimen surface. For patients with a positive surgical margin, anatomical sites were coded from the narrative pathology descriptions as apical, anterior or anterolateral, posterior or posterolateral, lateral, basal, or an explicitly described extraprostatic-extension region. More than one site could be recorded for a patient, so site categories were not mutually exclusive. Descriptions without an identifiable anatomical site were classified as unspecified. Margin lengths stated in centimeters were converted to millimeters. When several exact lengths were reported for one patient, the largest measured focus was used for descriptive length summary.

Functional outcomes

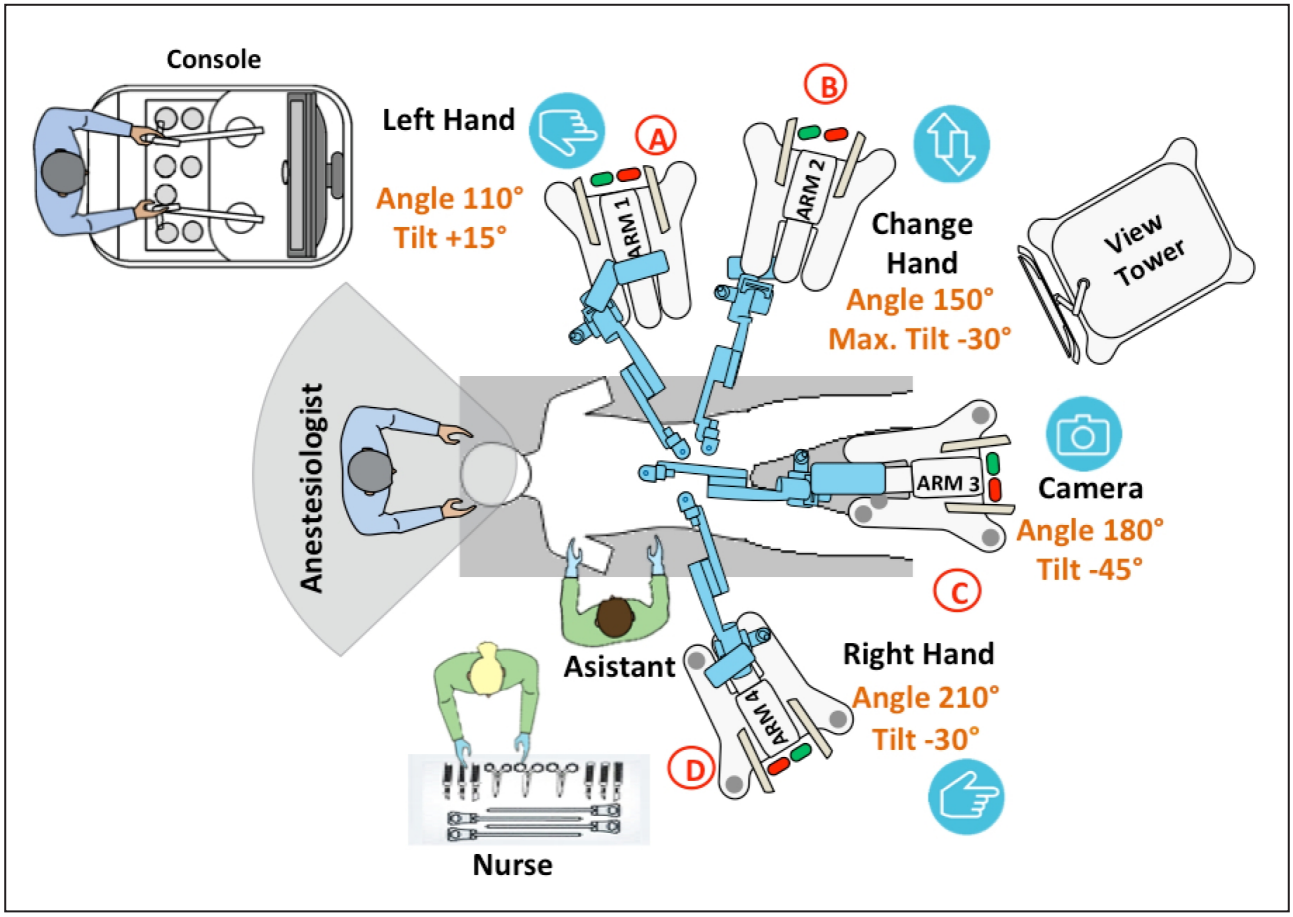


Figure 1. Operating room configuration and docking of the Hugo™ RAS.

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The principal functional outcome was postoperative urinary continence. Continence was evaluated at 1, 3, 6, 12, and 24 months after surgery and was defined as the use of 0-1 pads per day (social continence). The primary functional endpoint was continence at 1 month. Erectile function was evaluated at the same postoperative landmarks using the documented presence of erections.

Statistical analysis

Continuous variables were summarized using the median and interquartile range (IQR), and categorical variables were presented as frequencies and percentages. For variables with missing information, percentages were calculated using the number of patients with available data as the denominator and are reported as *n/N* (%). No imputation was performed for missing data. To explore changes across institutional experience, procedures were ordered chronologically and divided into three equal periods of 46 cases each. Total operative time was compared among the three periods using the Kruskal–Wallis *H* test. Complication and positive surgical-margin rates were summarized separately for each chronological period. Because of the limited number of events and incomplete operative-time documentation, chronological analyses were considered exploratory.

Agreement between biopsy and prostatectomy ISUP grade groups was described by classifying paired observations as upgraded, unchanged, or downgraded. Pathological outcomes, including positive surgical margins, lymphovascular invasion, perineural invasion, cribriform architecture, and intraductal carcinoma, were analyzed using available-case denominators. Postoperative continence and erectile-function outcomes were evaluated at 1, 3, 6, 12, and 24 months. At each landmark, the number of patients achieving the outcome was divided by the number with an evaluable assessment. Exact binomial 95% confidence intervals (CI) were calculated for the proportions displayed graphically. Exploratory multivariable logistic-regression analyses were performed to identify factors associated with positive surgical margins and 1-month continence. The positive surgical-margin model included log-transformed preoperative PSA, biopsy ISUP grade group, prostate volume, and chronological case number. The 1-month continence model included age, log-transformed preoperative PSA, prostate volume, and chronological case number. PSA was natural-log transformed because of its right-skewed distribution. Both models used complete-case analysis. Associations are reported as adjusted odds ratios (aORs) with 95% confidence intervals. All tests were two-sided, and a P-value < 0.05 was considered statistically significant. Analyses were performed using R software version 4.4.1.

Results

Baseline characteristics and perioperative outcomes

A total of 138 patients underwent radical prostatectomy using the LPA-G between January 2023 and January 2026. Baseline demographic, clinical, and perioperative characteristics are summarized in Table 1.

The median age at surgery was 65 years (IQR 60–71; n = 137), and the median preoperative prostate-specific antigen level was 6.79 ng/mL (IQR 5.02–10.6; n = 135). Median prostate volume was 43 mL (IQR 33–62; n = 113). Biopsy ISUP grade-group information was available for 134 patients. ISUP grade groups 1, 2, 3, 4, and 5 were identified in 23 (17.2%), 40 (29.9%), 34 (25.4%), 26 (19.4%), and 11 patients (8.2%), respectively. The most frequent biopsy Gleason score was 3 + 4, observed in 40 patients (29.9%), followed by 4 + 3 in 34 (25.4%) and 4 + 4 in 26 (19.4%). Preoperative magnetic resonance imaging findings were available for 126 patients; PI-RADS 4 and 5 lesions were identified in 39 (31.0%) and 47 patients (37.3%), respectively. Complete operative-time information was available for 77 patients. The median total surgical time was 160 minutes (IQR 120–236), and the median console time was 120 minutes (IQR 81–195). Median docking time was 16 minutes (IQR 13–21), while median anesthesia time was 184.5 minutes (IQR 144.5–258.2).

Pathological analysis

Pathological ISUP grade group was available for 125 patients. ISUP grade groups 1, 2, 3, 4, and 5 were reported in 31 (24.8%), 50 (40.0%), 26 (20.8%), 13 (10.4%), and 5 patients (4.0%), respectively. Paired biopsy and prostatectomy ISUP grade groups were available for 122 patients. Downgrading at final pathological evaluation was observed in 61 patients (50.0%), while the grade group remained unchanged in 37 (30.3%) and was upgraded in 24 (19.7%). Surgical-margin status was evaluable in 121 patients, of whom 60 had a positive margin (49.6%). Margin location descriptors were available for 58 of these 60 patients. Posterior or posterolateral involvement was present in 28/58 patients (48.3%), apical involvement in 20/58 (34.4%), anterior or anterolateral involvement in 12/58 (20.7%), lateral involvement in 11/58 (19.0%), and basal involvement in 4/58 (6.9%).

Sites were not mutually exclusive, and six descriptions did not identify a classifiable anatomical site. Twenty-nine positive-margin descriptions included a margin measurement. The largest exactly measured focus per patient had a median length of 3.0 mm (IQR 1.0–6.0 mm; range, 0.1–15 mm). Among 121 patients with both an evaluable surgical-margin result and recorded pT category, positive-margin proportions were 48/101 (47.5%) for pT2, 5/8 for pT3a (62.5%), and 7/12 for pT3b (58.3%).

Pathological N categories were available for 128 patients; 25 (19.5%) had nodal involvement, and 19/25 (76.0%) of those with nodal involvement had positive margins. Finally, among 120 patients with both an evaluable surgical-margin result and ISUP grade, positive margins were identified in 8/31 patients (25.8%) with grade group 1, 23/46 (50.0%) with grade group 2, 18/25 (72.0%) with grade group 3, 5/13 (38.5%) with grade group 4, and 5/5 (100%) with grade group 5.

In an exploratory multivariable logistic-regression analysis of 106 patients with complete data, higher preopera-

Table 1. Baseline demographic and preoperative clinical characteristics.

Characteristic	*N* = 138[1]
Age, years	65 (60, 71)
Previous surgery	67/129 (51.9%)
Preoperative PSA, ng/mL	6.79 (5, 11)
Biopsy ISUP grade group	
1	23/134 (17.2%)
2	40/134 (29.9%)
3	34/134 (25.4%)
4	26/134 (19.4%)
5	11/134 (8.2%)
Biopsy Gleason score	
3+3	23/134 (17.2%)
3+4	40/134 (29.9%)
4+3	34/134 (25.4%)
4+4	26/134 (19.4%)
4+5	7/134 (5.2%)
5+5	4/134 (3.0%)
Highest PI-RADS score	
1	1/126 (0.8%)
2	25/126 (19.8%)
3	14/126 (11.1%)
4	39/126 (31.0%)
5	47/126 (37.3%)
Prostate volume (mL)	43 (33, 62)

Notes: [1]Median (Q1, Q3); *n* (%). Continuous variables are presented as median (first quartile [Q1], third quartile [Q3]), and categorical variables as *n/N* (%), where *N* represents the number of patients with available data for the corresponding variable. PSA, prostate-specific antigen; ISUP, International Society of Urological Pathology; PI-RADS, Prostate Imaging Reporting and Data System.

tive PSA was associated with increased odds of a positive surgical margin. Each one-unit increase in the natural logarithm of PSA was associated with an aOR of 2.07 (95% CI 1.11–4.19; $P = 0.030$). Biopsy ISUP grade group, prostate volume, and chronological case number were not independently associated with margin status. Among the remaining pathological features, perineural invasion was present in 99 of 124 evaluable specimens (79.8%), cribriform architecture in 31 of 120 (25.8%), lymphovascular invasion in 13 of 122 (10.7%), and intraductal carcinoma in 5 of 118 (4.2%). Pathological findings are summarized in Table 2.

Operative workflow, learning-curve analysis, and complication rates

Procedures were classified chronologically into three equal periods of 46 cases each (Figure 2). Total operative-time data were available for 15, 43, and 19 procedures in the first, second, and third periods, respectively. Median total surgical time increased from 137 minutes (IQR 118–164) in the first period to 161 minutes (IQR 119–244) in the second and 205 minutes (IQR 132–252) in the third. However, these differences in operative duration across

Table 2. Perioperative and pathological outcomes.

Characteristic	*N* = 138[1]
Anesthesia time, min	184.5 (144.5, 258.2)
Docking time, min	16 (13, 21)
Console time, min	120 (81, 195)
Total operative time, min	160 (120, 236)
Complications	27/138 (19.6%)
Clavien–Dindo I	16 (11.6%)
Clavien–Dindo II	9 (6.5%)
Clavien–Dindo III	2 (1.4%)
Pathological ISUP grade group	
1	31/125 (24.8%)
2	50/125 (40.0%)
3	26/125 (20.8%)
4	13/125 (10.4%)
5	5/125 (4.0%)
Pathological Gleason score	
3+3	31/125 (24.8%)
3+4	50/125 (40.0%)
4+3	26/125 (20.8%)
4+4	13/125 (10.4%)
4+5	3/125 (2.4%)
5+4	2/125 (1.6%)
Biopsy-to-specimen grade change	
Downgraded	61/122 (50.0%)
Unchanged	37/122 (30.3%)
Upgraded	24/122 (19.7%)
Tumor involvement, %	15 (6, 30)
Pathological T category	
pT2	112/132 (84.8%)
pT3a	8/132 (6.1%)
pT3b	12/132 (9.1%)
Pathological N category	
pN0	103/128 (80.5%)
pN1	25/128 (19.5%)
Positive surgical margin	60/121 (49.6%)
Lymphovascular invasion	13/122 (10.7%)
Perineural invasion	99/124 (79.8%)
Cribriform architecture	31/120 (25.8%)
Intraductal carcinoma	5/118 (4.2%)

Notes: [1]Median (Q1, Q3); *n* (%). Continuous variables are presented as median (first quartile [Q1], third quartile [Q3]), and categorical variables as *n/N* (%), where *N* represents the number of patients with available data for the corresponding variable. Operative-time components were available for a subset of the cohort. ISUP, International Society of Urological Pathology.

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the three periods were not statistically significant (P = 0.129). Positive surgical-margin rates showed no consistent chronological trend (53.5% [23/43], 44.7% [17/38], and 50.0% [20/40] in the first, second, and third periods, respectively). Complications occurred in 27/138 patients (19.6%) and were graded according to the Clavien-Dindo classification. The most common was ileus managed medically (16 patients, 11.6%); 9 patients (6.5%) required blood transfusion; one patient required endoscopic revision of the anastomosis with Foley catheter reinsertion, and another required interventional drainage of a lymphocele. No grade IV or V complications occurred.

Recovery of urinary continence

Continence status was documented in 112 patients at 1 month, 88 at 3 months, 58 at 6 months, 31 at 12 months, and 26 at 24 months, and preoperative continence status was unavailable. Among evaluable patients, continence was documented in 61/112 patients at 1 month (54.5%), 58/88 at 3 months (65.9%), 43/58 at 6 months (74.1%), and 26/31 at 12 months (83.9%). At 24 months, 21/26 evaluable patients were continent (80.8%). In an exploratory logistic-regression analysis of 94 patients with complete outcome and covariate data, age, preoperative PSA, prostate volume, and chronological case number were not significantly associated with 1-month continence.

The aORs were 0.97 per additional year of age (95% CI 0.92–1.03; P = 0.357), 0.63 per one-unit increase in log-transformed PSA (95% CI 0.32–1.20; P = 0.165), 1.00 per unit increase in prostate volume (95% CI 0.98–1.01; P = 0.701), and 1.00 per chronological case (95% CI 0.99–1.02; P = 0.442). Postoperative urinary-continence outcomes are presented in Figure 3A.

Recovery of erectile function

Erectile-function status was available for 68 patients at 1 month, 57 at 3 months, 47 at 6 months, 25 at 12 months, and 18 at 24 months. Erections were reported by 27/68 evaluable patients at 1 month (39.7%), 32/57 at 3 months (56.1%), and 33/47 at 6 months (70.2%). At 12 and 24 months, erections were documented in 16/25 (64.0%) and 14/18 patients (77.8%), respectively. Erectile-function completeness was limited, decreasing from 49.3% of the total cohort at 1 month to 18.1% at 12 months and 13.0% at 24 months. Postoperative erectile-function outcomes are presented in Figure 3B.

Discussion

In this single-center retrospective study, we evaluated the perioperative, pathological, and functional outcomes of 138 patients who underwent radical prostatectomy using the LPA-G. Our main findings were the technical feasibility of incorporating posterior dissection into the standard lateral approach, a median total operative time of 160 minutes, and progressive recovery of urinary continence

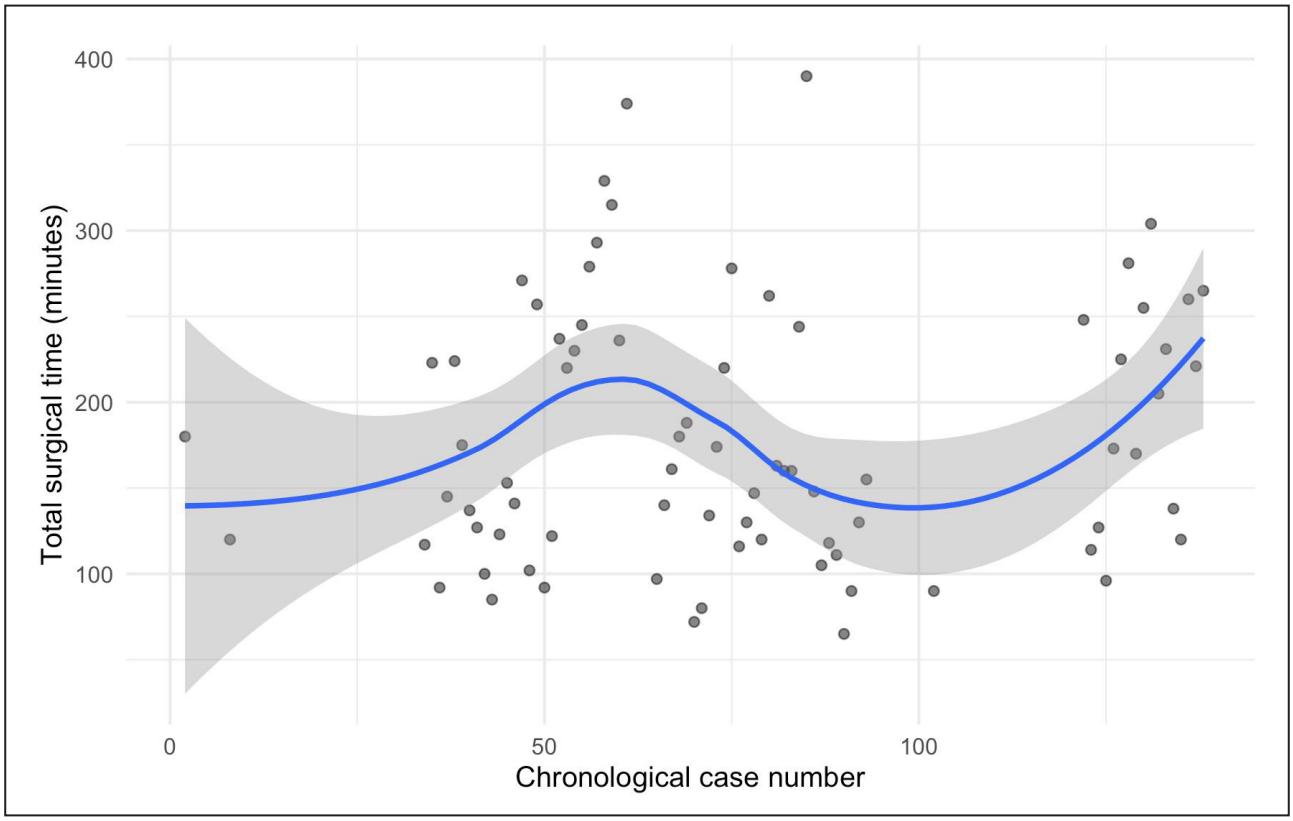


Figure 2. Chronological evolution of total surgical time during the institutional experience. Each point represents an individual procedure with available operative-time data. The blue line represents a locally estimated scatterplot smoothing (LOESS) curve, and the shaded area indicates its 95% confidence interval. Operative-time data were available for 77 of 138 procedures. Because documentation was incomplete and unevenly distributed across the case sequence, the curve should be interpreted as an exploratory representation.

and erectile function during follow-up.

However, the positive surgical-margin rate was substantial, operative-time documentation was incomplete, and the progressively smaller functional-outcome denominators limit conclusions regarding long-term recovery. Our findings should therefore be interpreted as an institutional assessment of feasibility and outcomes, and not as evidence of superiority over conventional radical prostatectomy.

The technique evaluated in this series was developed to preserve the anatomical structures involved in urinary continence and erectile function. Asimakopoulos et al. initially described preservation of the pubovesical complex, including the endopelvic fascia, dorsal vascular complex, detrusor apron, bladder neck, and native pubic attachments [7]. The technique was subsequently refined to incorporate intrafascial, tension-free, and energy-free dissection of the neurovascular bundles [8].

The LPA-G permits early identification of the vas deferens and seminal vesicles through a close posterior dissection, after which dissection continues laterally to allow progressive release of the neurovascular tissue while limiting disruption of anterior pelvic support structures. This approach is anatomically distinct from posterior-only Retzius-sparing prostatectomy, although both strategies share the objective of reducing damage to structures involved in continence recovery. The median total operative time of 160 minutes and docking time of 16 minutes recorded in our series indicate that the technique can be incorporated into a robotic surgical workflow without excessive procedural duration. Nevertheless, operative-time data were available for only 77 patients and were unevenly distributed across the chronological series. Median total operative time increased from 137 minutes in the first chronological third to 161 and 205 minutes in the second and final thirds, respectively. These differences were not statistically significant, and the data did not demonstrate the conventional reduction in operative time expected during a surgical learning curve. The apparent increase may reflect nonrandom documentation, changes in case complexity, different technical variants, surgeon or team composition, or progressive inclusion of patients with more challenging anatomy or higher-risk disease.

Systematic evaluations of robot-assisted radical prostatectomy have generally demonstrated low intraoperative mortality and major morbidity, although reported complication rates vary according to definitions, surveillance period, patient risk, and institutional experience [12]. Formal review and standardized grading of each event would strengthen the assessment of procedural safety and permit separate analysis of major complications.

Urinary continence improved progressively during the first postoperative year. Documented continence increased from 54.5% at 1 month to 65.9% at 3 months, 74.1% at 6 months, and 83.9% at 12 months. These findings are consistent with the anatomical premise that preservation of the bladder neck, urethral support, endopelvic fascia, and anterior pubovesical attachments may facilitate continence recovery [7, 8]. Current guidelines recognize bladder-neck preservation, maximization of membranous urethral length, and judicious nerve sparing as potentially important contributors to early continence recovery [2].

Randomized studies of other anatomy-preserving approaches provide additional context. Dalela et al. reported earlier continence recovery after Retzius-sparing robot-assisted radical prostatectomy than after a conventional anterior approach, with 71% versus 48% of patients continent 1 week after catheter removal [9]. Similarly, Qiu et al. found higher immediate continence after posterior surgery and a shorter overall time to recovery during 12 months of follow-up [10]. In the MASTER meta-analysis, Retzius-sparing surgery was associated with improved im-

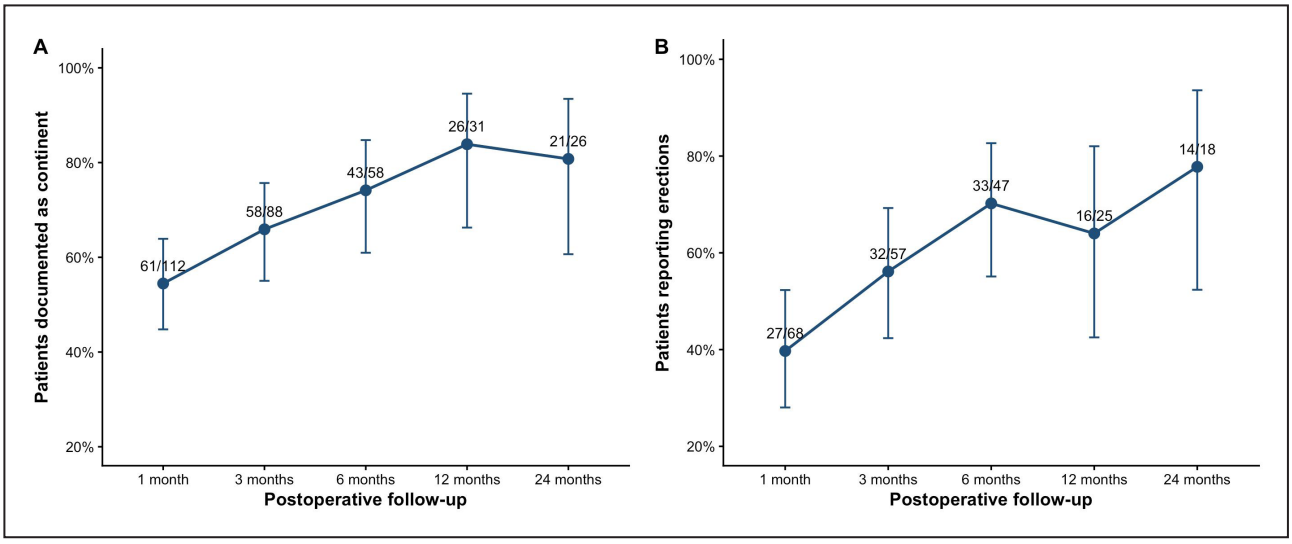


Figure 3. **Recovery of urinary continence and erectile function after radical prostatectomy. (A)** Proportion of evaluable patients achieving social continence, defined as the use of 0-1 pads per day, at each postoperative landmark. **(B)** Proportion of evaluable patients reporting erections at each postoperative landmark, irrespective of erectile-dysfunction treatment. Points represent observed proportions, error bars indicate exact 95% binomial confidence intervals, and labels show the number achieving the outcome divided by the number assessed (*n*/*N*). Lines connect cross-sectional estimates for visual clarity and do not represent complete paired longitudinal trajectories. Estimates at later follow-up should be interpreted cautiously because of the progressively smaller evaluable denominators.

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mediate continence, but the difference narrowed over time and was not significant at 12 months [11]. Although these procedures should not be considered technically equivalent to the LPA-G, they support the broader hypothesis that limiting disruption of periprostatic support structures may primarily influence early rather than definitive long-term continence.

Erectile-function recovery showed a similar progressive pattern. Erections were reported by 39.7% of evaluable patients at 1 month, 56.1% at 3 months, and 70.2% at 6 months. Rates at 12 and 24 months were 64.0% and 77.8%, respectively. These findings are compatible with the gradual recovery expected after neurovascular-bundle preservation and with the rationale for minimizing traction and thermal injury [4, 8]. The fascial plane of dissection, nerve-sparing extent, patient age, baseline erectile function, comorbidities, and postoperative rehabilitation can all influence erectile recovery [2, 4, 6]. However, these findings should be interpreted carefully. Only 68 patients had an evaluable assessment at 1 month, decreasing to 25 at 12 months and 18 at 24 months. Moreover, preoperative erectile function, bilateral versus unilateral nerve sparing, use of phosphodiesterase-5 inhibitors, and whether erections were sufficient for penetrative intercourse were not assessed in our study. The lack of distinction between spontaneous and treatment-assisted erectile function also prevents direct comparison with studies using International Index of Erectile Function thresholds. Our estimates are therefore best regarded as descriptive signals that warrant prospective evaluation with validated patient-reported measures.

Pathological evaluation identified a positive surgical margin in 49.6% of evaluable specimens. This rate is higher than that reported in many contemporary robot-assisted prostatectomy series, in which overall margin rates commonly range from approximately 15% to 30%, although considerably higher rates occur in locally advanced disease and during early surgical experience [13, 14]. In a large multi-institutional series of robot-assisted radical prostatectomy, Patel et al. reported an overall positive-margin rate of 15.7%, with a substantial stage-specific difference between pT2 and pT3 disease [14]. Direct comparison with our cohort is not currently possible because the present population included a substantial proportion of intermediate- and high-grade tumors.

The high margin rate may reflect several overlapping factors. More than half of patients with available biopsy data had ISUP grade group 3–5 disease, suggesting a clinically relevant burden of aggressive cancer. In addition, the intrafascial plane places dissection close to the prostatic capsule, creating a potential trade-off between maximal functional preservation and oncological clearance. Comparative evidence suggests that nerve-sparing dissection may increase the risk of ipsilateral or side-specific positive surgical margins, particularly when extracapsular extension is not recognized preoperatively [15, 16].

The MASTER meta-analysis similarly identified a higher positive-margin risk after Retzius-sparing surgery in patients with organ-confined disease, despite an early continence advantage [11]. These observations emphasize that anatomy-preserving dissection must be individualized according to tumor location, magnetic resonance imaging findings, pathological stage, biopsy grade, and the estimated probability of extracapsular extension.

In our exploratory multivariable model, higher preoperative PSA was independently associated with positive surgical margins, whereas biopsy ISUP grade group, prostate volume, and chronological case number were not. A one-unit increase in natural-log-transformed PSA was associated with approximately twice the odds of a positive margin. This finding may reflect the association between increasing PSA and greater tumor burden or non–organ-confined disease. Nevertheless, the model did not include validated pathological stage, tumor laterality, anterior versus posterior tumor location, nerve-sparing extent, or surgeon, and residual confounding is therefore likely. Comparison between biopsy and prostatectomy specimens demonstrated pathological downgrading in 50.0%, no grade-group change in 30.3%, and upgrading in 19.7%.

The upgrading rate is compatible with the recognized limitations of biopsy sampling, but the high frequency of downgrading merits further investigation. Possible explanations include referral-pathology differences, heterogeneous biopsy techniques, treatment or selection effects, and recording inconsistencies. Central review and standardized pathological reporting would improve interpretation of these findings. Corona et al. compared Retzius-sparing and modified Frankfurt approaches and reported better erectile-function outcomes with the modified Frankfurt technique, with no difference in continence between the two [17].

This study has several strengths. It represents a large single-center experience with a specific anatomy-preserving approach in a tertiary-care hospital, a setting for which published evidence remains limited. Our analysis included perioperative, pathological, urinary, and sexual outcomes and reported the available denominator for each endpoint. We also examined chronological operative, safety, and oncological outcomes. However, several limitations must be acknowledged. First, the retrospective, uncontrolled design prevents causal attribution of functional outcomes to the LPA-G; without a conventional-prostatectomy comparison group, the present study cannot establish superiority in continence, erectile function, complications, or oncological control. Second, missingness was substantial for operative-time and functional variables and increased markedly during longer follow-up. Because landmark-specific eligibility could not be distinguished from missing assessments, these counts cannot be interpreted as loss-to-follow-up rates. The later functional estimates may therefore be affected by incomplete follow-up and selection of the evaluated patients. Moreover, the number of patients screened and excluded per each exclusion criterion were unavailable, limiting assessment of how the study cohort was assembled. Third, continence and erectile function were not measured consistently with validated patient-reported instruments, and baseline erectile function and nerve-sparing extent were unavailable. Finally, biochemi-

cal recurrence, metastasis-free survival, salvage treatment, and other long-term oncological outcomes were not sufficiently mature for analysis.

Conclusions

Robot-assisted radical prostatectomy using the LPA-G, a pubovesical complex-preserving approach, was feasible within routine practice at a reference center and was associated with progressive recovery of documented urinary continence and erections among evaluable patients. We observed no reduction in operative time or improvement in surgical-margin rates. The substantial positive-margin rate highlights the importance of oncologically selective intrafascial dissection and improved preoperative risk stratification. Prospective comparative studies incorporating standardized nerve-sparing documentation, validated patient-reported outcomes, pathological-stage verification, and longer oncological follow-up are required to determine whether the anatomical preservation offered by this technique produces clinically meaningful benefits without compromising cancer control.

Declarations

Author contributions: Made substantial contributions to conception and design of the study: Juárez del Dago P, Corona-Montes VE, Gaston R; performed data acquisition, including the clinical and pathological records: Corona-Montes VE, Juárez del Dago P, Breda A, Noya-Mourullo A, González-Martínez CA, Nervo-Posada N, Vargas-Trujillo A, Rodezno-Elvir D; performed data analysis and interpretation: Corona-Montes VE, González-Martínez CA; conceived the figures and tables: Corona-Montes VE, González-Martínez CA; drafted the work: Corona-Montes VE, González-Martínez CA, Gaston R. All authors read and approved the final manuscript.

Availability of data and materials: Individual-level data underlying this study are not publicly available because they contain sensitive patient information. Deidentified data may be made available by the corresponding author upon reasonable request and subject to institutional approval and applicable data-protection requirements.

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References

1. Sung H, Filho A, Laversanne M, Ferlay J, Siegel R, Soerjomataram I, *et al*. Global cancer statistics 2024: GLOBOCAN estimates of incidence and mortality worldwide for 34 cancers in 186 countries. *CA Cancer J Clin*, 2026, 76(4): e70090. [Crossref]
2. Cornford P, van den Bergh R, Briers E, Van den Broeck T, Brunckhorst O, Darraugh J, *et al*. EAU-EANM-ESTRO-ESUR-ISUP-SIOG guidelines on prostate cancer-2024 update. Part I: screening, diagnosis, and local treatment with curative intent. *Eur Urol*, 2024, 86(2): 148-163. [Crossref]
3. Patel V, Sivaraman A, Coelho R, Chauhan S, Palmer K, Orvieto M, *et al*. Pentafecta: a new concept for reporting outcomes of robot-assisted laparoscopic radical prostatectomy. *Eur Urol*, 2011, 59(5): 702-707. [Crossref]
4. Walz J, Burnett A, Costello A, Eastham J, Graefen M, Guillonneau B, *et al*. A critical analysis of the current knowledge of surgical anatomy related to optimization of cancer control and preservation of continence and erection in candidates for radical prostatectomy. *Eur Urol*, 2010, 57(2): 179-192. [Crossref]
5. Shikanov S, Woo J, Al-Ahmadie H, Katz M, Zagaja G, Shalhav A, *et al*. Extrafascial versus interfascial nerve-sparing technique for robotic-assisted laparoscopic prostatectomy: comparison of functional outcomes and positive surgical margins characteristics. *Urology*, 2009, 74(3): 611-616. [Crossref]
6. Ficarra V, Novara G, Ahlering T, Costello A, Eastham J, Graefen M, *et al*. Systematic review and meta-analysis of studies reporting potency rates after robot-assisted radical prostatectomy. *Eur Urol*, 2012, 62(3): 418-430. [Crossref]
7. Asimakopoulos A, Annino F, D'Orazio A, Pereira C, Mugnier C, Hoepffner J, *et al*. Complete periprostatic anatomy preservation during robot-assisted laparoscopic radical prostatectomy (RALP): the new pubovesical complex-sparing technique. *Eur Urol*, 2010, 58(3): 407-417. [Crossref]
8. Asimakopoulos A, Corona-Montes V, & Gaston R. Robot-assisted laparoscopic radical prostatectomy with intrafascial dissection of the neurovascular bundles and preservation of the pubovesical complex: a step-by-step description of the technique. *J Endourol*, 2012, 26(12): 1578-1585. [Crossref]
9. Dalela D, Jeong W, Prasad M, Sood A, Abdollah F, Diaz M, *et al*. A pragmatic randomized controlled trial examining the impact of the Retzius-sparing approach on early urinary continence recovery after robot-assisted radical prostatectomy. *Eur Urol*, 2017, 72(5): 677-685. [Crossref]
10. Qiu X, Li Y, Chen M, Xu L, Guo S, Marra G, *et al*. Retzius-sparing robot-assisted radical prostatectomy improves early recovery of urinary continence: a randomized, controlled, single-blind trial with a 1-year follow-up. *BJU Int*,

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2020, 126(5): 633-640. [Crossref]
11. Barakat B, Othman H, Gauger U, Wolff I, Hadaschik B, & Rehme C. Retzius sparing radical prostatectomy versus robot-assisted radical prostatectomy: which technique is more beneficial for prostate cancer patients (MASTER study)? A systematic review and meta-analysis. *Eur Urol Focus*, 2022, 8(4): 1060-1071. [Crossref]
12. Novara G, Ficarra V, Rosen R, Artibani W, Costello A, Eastham J, *et al*. Systematic review and meta-analysis of perioperative outcomes and complications after robot-assisted radical prostatectomy. *Eur Urol*, 2012, 62(3): 431-452. [Crossref]
13. Yossepowitch O, Briganti A, Eastham J, Epstein J, Graefen M, Montironi R, *et al*. Positive surgical margins after radical prostatectomy: a systematic review and contemporary update. *Eur Urol*, 2014, 65(2): 303-313. [Crossref]
14. Patel V, Coelho R, Rocco B, Orvieto M, Sivaraman A, Palmer K, *et al.* Positive surgical margins after robotic assisted radical prostatectomy: a multi-institutional study. *J Urol*, 2011, 186(2): 511-516. [Crossref]
15. Moris L, Gandaglia G, Vilaseca A, Van den Broeck T, Briers E, De Santis M, *et al*. Evaluation of oncological outcomes and data quality in studies assessing nerve-sparing versus non-nerve-sparing radical prostatectomy in nonmetastatic prostate cancer: a systematic review. *Eur Urol Focus*, 2022, 8(3): 690-700. [Crossref]
16. Soeterik T, van Melick H, Dijksman L, Stomps S, Witjes J, & van Basten J. Nerve sparing during robot-assisted radical prostatectomy increases the risk of ipsilateral positive surgical margins. *J Urol*, 2020, 204(1): 91-95. [Crossref]
17. Corona-Montes V, Barzallo-Sánchez J, Sánchez-Núñez J, Gómez-López R, & Pérez-García A. Robot-assisted radical prostatectomy with Retzius-sparing approach *vs.* modified Frankfurt: comparison of results at 1 year of follow-up. *Cir Cir*, 2023, 12607. [Crossref]

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