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Radical retropubic prostatectomy by laparoscopic approach versus open surgery for localized prostate cancer. Techniques and results in two Cameroonian university teaching hospitals

Prostatectomie radicale retro pubienne par voie coelioscopique versus ciel ouvert pour cancer localisé de la prostate : techniques et resultats dans deux hôpitaux universitaire du Cameroun

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Original Article

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ABSTRACT

Introduction: Prostate cancer is a significant global health issue. The aim of our study was to analyse the short and medium-term outcomes of laparoscopic and open retropubic radical prostatectomy in two Cameroonian Teaching Hospitals.

Materials and methods: We conducted a retrospective and prospective analysis of all patients who underwent radical retropubic prostatectomy (RRP) and radical laparoscopic prostatectomy (RLP) in the Urology and Andrology Departments of the Yaoundé Central and Douala Laquintinie Hospitals over a 14-year period (2010-2024). We used validated self-administered questionnaires, including International Consultation Incontinence Questionnaire (ICIQ) and International Index of Erectile Function (IIEF 5) to assess perioperative data, disease progression and the quality of life.

Results: In total, 17 patients underwent radical prostatectomy, of which 10 patients had open PRR and 7 had a PRL. Their mean age was 66.1, with majority being from four regions of Cameroon. The period between diagnosis and surgery was 4.3 months. Participants who had open surgery had a higher blood transfusion rate (80% vs 28.7%; p= 0.001); longer catheter and drain removal time (13.1 vs. 11.7 days; 6.3 vs 4.2 days); and longer hospital stay (15.8 vs. 8.2 days). Mid-term complications were comparable in both groups, with erectile dysfunction representing 50% for PRR vs 42.8% for PRL (p = 0.33) and urinary incontinence was present in 10% for PRR vs 28.5% for PRL (p= 0.1).

Conclusion: Surgical treatment for localized prostate cancer provides adequate carcinologic control in our setting. Open surgery had more peri-operative complications, medium term outcomes showed no significant differences between both approaches.

RESUME

Introduction : Le cancer de la prostate est un problème de santé mondial. Notre but était d'analyser les résultats à court et moyen terme de la prostatectomie radicale retro pubienne par voie laparoscopique (PRL) et à ciel ouvert (PRR) dans deux hôpitaux Universitaire Camerounaise.

Matériels et méthodes : Etude rétrospective et analytique ayant inclus les patients ayant subi une PRR et PRL dans les départements d'urologie et d'andrologie des hôpitaux Central de Yaoundé et Laquintinie de Douala sur une période de 14 ans (2010-2024). Des questionnaires auto-administrés validés, ainsi que spécialisés étaient utilisés pour évaluer les données peropératoires, la progression de la maladie et la qualité de vie.

Résultats : Dix-sept patients avec un âge moyen de 66.1 provenant de quatre régions du Cameroun, ont subi une prostatectomie radicale, dont 10 ayant eu un PRR ouvert et 7 un PRL. La période entre le diagnostic et la chirurgie était de 4,3 mois. Le taux de transfusion sanguine était plus élevé chez ceux ayant eu un PRR (80% contre 28,7% ; P = 0,001) ; et un plus long délai d'ablation de sonde et drain (13,1 vs 11,7 jours ; 6,3 vs 4,2 jours) ; et plus long séjour hospitalier (15,8 vs 8,2 jours). Dans le moyen terme, les complications étaient superposables pour les deux groupes, avec une dysfonction érectile représentant 50% pour PRR vs 42,8% pour la PRL (p = 0,33) et l'incontinence urinaire était présente dans 10% pour PRR vs 28,5% pour le PRL (P = 0,1).

Conclusion : Le traitement chirurgical du CaP localisé permet un contrôle carcinologique suffisant dans notre contexte. L'abord en ciel ouvert a plus de complications per-opératoires. Néanmoins, a moyen terme, il n'y avait aucune différence significative entre les deux voies.

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Introduction

Cancer has emerged as a leading public health concern worldwide, impacting both developed and developing countries. According to the International Agency for Research on Cancer (IARC), 14.1 million new cases were diagnosed globally in 2014. Among men, prostate cancer is the most prevalent malignancy in those over 50 years of age, accounting for 1.1million new cases annually and ranking as the second leading cause of cancer related mortality after lung cancer. In Cameroon, data from GLOBALCAN 2022 data, prostate cancer is third most common cancer, following breast and cervical cancer, with an annual incidence of 2,050 cases and a prevalence of 3,895 per 100,000 inhabitants [2]. Prostate disease is generally characterised by lower urinary tract symptoms [3], but the advent of markers of prostate disease has led to diagnosis of asymptomatic cancer via early biopsy and histologic analysis [4]. Mortality and morbidity from this cancer largely depends on its grade [5,6]. Radical surgery to obtain a cure is indicated for localised disease. Laparoscopic or open approaches both follow the same surgical steps as described in standard literature[7]

Our study objective was to analyze the short and medium-term outcomes of laparoscopic and open retropubic radical prostatectomy in two Cameroonian teaching hospitals.

Methodology

This was a retrospective and analytical cross-sectional study, conducted in two teaching hospitals in Cameroon: Yaoundé Central and Douala Laquintinie Hospitals, from October 1st 2023, to August 30th, 2024 (11 months) considering a Study period from 2010 – 2024. The study population comprised 132 patients diagnosed with localised prostate cancer who underwent either an open retropubic radical prostatectomy or a laparoscopic prostatectomy.

To carry out this study we obtained an ethical clearance of the faculty of medicine and biomedical sciences (FMBS), the research authorisation from the various places of study. The data has been processed in strict compliance with confidentiality.

We consulted the medical registers which permitted us to get in touch with our patients in order to obtain their consent and to fill out the informed questionnaires and then we had access to the patient files. The files not having exclusion criteria were retained. Using these files, we completed our information collection sheets.

Independent variables were socio demographic profile (age, sex, religion, marital status, ethnicity, profession, and residence), clinical parameters Prostate specific antigen (PSA) level in ng/ml, prostate volume in gram, Gleason score) and therapeutic factors (lymph node dissection, nerve-sparing surgery).

Dependent variables included complications and follow-up findings like Blood transfusion, Urinary incontinence, Erectile dysfunction, ICIQ-UI score, International index of erectile dysfunction (IIEF-5) score, PSA level post-surgery and Additional treatment.

Data were thus collected and analysed using the R software.

The statistical analysis was conducted using R software version 4.4.3. Qualitative data were presented as frequency (n) and percentage (%) while quantitative data were expressed as mean and standard deviation (σ). The Chi-square test was used to compare proportions. The student's t-test was used to compare means. A significance threshold was set at P = 0.05.

Surgical technique

a. Surgical Instruments for open approach

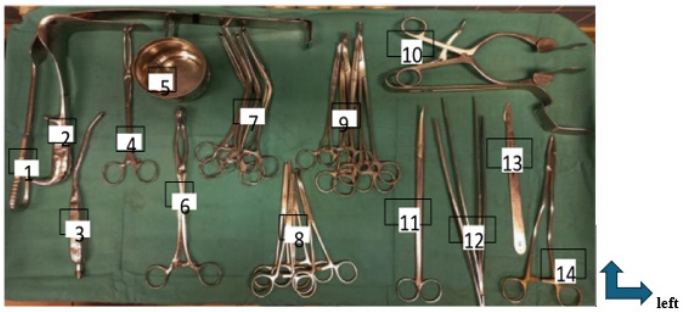

Figure 1 : Instrument table (1. Deaver retractor, 2. retractor, 3. suction cannula, 4. Straight Allari forceps, 5. Cup, 6. Prostate crusher, 7. Curved Allari forceps, 8. Kocher forseps, 9. Jeal-Louis fort forceps, 10. Hryntschak retractor, 11. Metzenbaum scissors, 12. Dissecting forceps, 13. Scalpel blade N° 23 mounted on a handle, 14. Angled needle holder)

Figures 2 : (A) Laparoscopy column (monitor, insufflator, light source, Ligasure) (B) Laparoscopic instruments (a-Curved needle holder, b-Suction cannula, c-Straight needle holder, d-0-degree laparoscope, e-Ligasure f.Traumatic grasping forceps, g-Bipolar forceps, h-Atraumatic grasping forceps, p-Insufflation tubing, q-Camera cover, i-Curved scissors)

Results

a. Peri-operative data

The table below prevents the perioperative data from our study. Among patient who underwent open

radical prostatectomy, up to 80% required blood transfusion, compared to 28,6% in laparoscopic surgery group. Five out of ten patients received at least 1000cc of whole blood. In contrast with those who had laparoscopic surgery, where only two out of seven patients received 500cc of blood during the procedure.

Table I : perioperative data

Variables	n =17	Open Surgery	Laparos-copy	P-Value
Duration of Surgery (min)				
Average	230	220	245	0.2
Blood Transfusion	**n (%)**	**n (%)**	**n (%)**	**0.001**
> 2000 cc	2 (11.8%)	2 (100%)	0 (0.0%)	
1500 cc	2 (11.8%)	2 (11.8%)	0 (0.0%)	
1000 cc	2 (11.8%)	1 (50%)	1 (50.0%)	
500 cc	4 (23.5%)	3 (75.0%)	1 (25.0%)	
No transfusion	7 (41.2%)	2 (28.6%)	5 (71.0%)	
Post-operative fever	**n (%)**	**n (%)**	**n (%)**	**0,1**
Yes	4(23.5%)	3(75%)	1(25%)	
Catheter removal delay (days)				
Mean ± SD	12.2±3.3	13.1±4.2	11.7±2.1	0.6
Drain removal time (days)				
Mean ± SD	5.8±1.8	6.3±2.1	4.2±1.3	0.1
Hospital stay (days)				
Mean ± SD	12.5±4.9	15.8±3.7	8.29±2.7	<0.001

N= number, n= percentage

Among the ten patients, who underwent open radical prostatectomy, three developed post-operative fever, while only one of the seven patients in the laparoscopic group had fever. The mean duration for transurethral catheter removal was 12.2 ± 3.3 days, with earlier removal in the laparoscopic group (11.7 days) compared to the open surgery group (13.1 ± 4.2 days). The average hospital stay was 8.29 ± 2.7 days for laparoscopic surgery compared to 15.8 ± 3.7 days for open surgery.

b. Late Complications

The distribution of complications related to erectile dysfunction was homogeneous in both groups of our study (p value = 0.33). Severe erectile dysfunction (3 out of 17 patients in our study population) was more frequently observed in patients who underwent open prostatectomy. Only 3 out of 17 operated patients experienced moderate to severe urinary incontinence. Of these 3 patients, 2 had hypertension and the other had diabetes. They all presented with erectile dysfunction before surgery.

Table II : Late Complications

Variables	n = 17	Open Surgery	Laparos-copy	P-Value
Erectile Dysfunction (IIEF5 score)	**n (%)**	**n (%)**	**n (%)**	**0.331**
Normal: 21-25	4 (23.5%)	2 (50.0%)	2 (50.0%)	
Mild: 16-20	4 (23.5%)	2 (50.0%)	2 (50.0%)	
Moder: 11-15	4 (23.5%)	3 (75.0%)	1 (25.0%)	
Severe: 5-10	3 (17.6%)	3 (100%)	0 (0.0%)	
Non interpretable : 1-4	2 (11.8%)	0 (0.0%)	2 (100%)	
Urinary Incontinence (ICIQ-UI score)				**0.152**
Mild: 1-6	9 (75.0%)	6 (66.7%)	3 (33.3%)	
Moder: 7-12	1 (8.3%)	1 (100%)	0 (0.0%)	
Severe : >12	2 (16.7%)	0 (0.0%)	2 (100%)	

c. Results of Histopathologic analysis of specimen

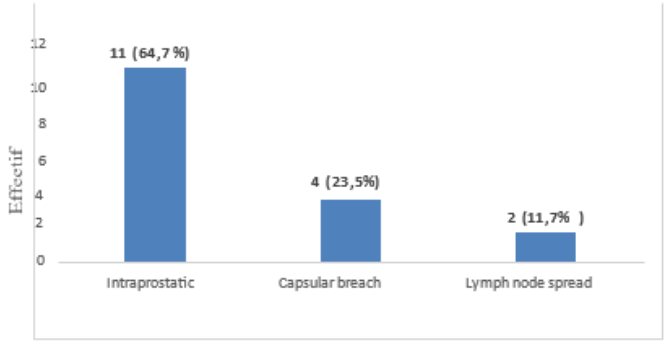

Figure 3: Histopathology results of the surgical specimen

The histopathologic analysis of the surgical specimens revealed 100% adenocarcinoma. Among the patients ,11(64.7%,) had tumors confined to the prostate. Capsular invasion was identified in 4 patients (23.5%), while lymph node involvement was noted in 2 patients (11.7%).

d. Complementary treatment after surgery

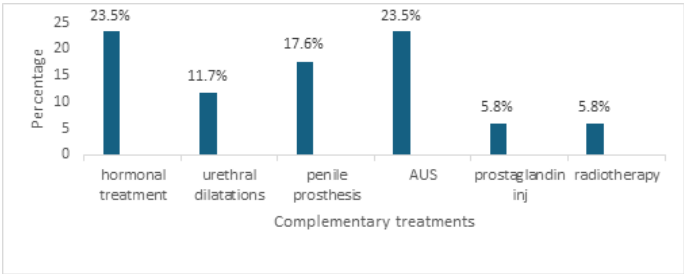

Figure 4: Complementary treatments after surgery

In our study, 12 patients received additional treatment after surgery. The most common modalities were hormone therapy, placement of an artificial urinary sphincter followed by penile prosthesis implantation. Two patients developed long-term anastomotic strictures, for which regular urethral dilation sessions were performed at specific intervals.

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e. Total PSA fluctuations

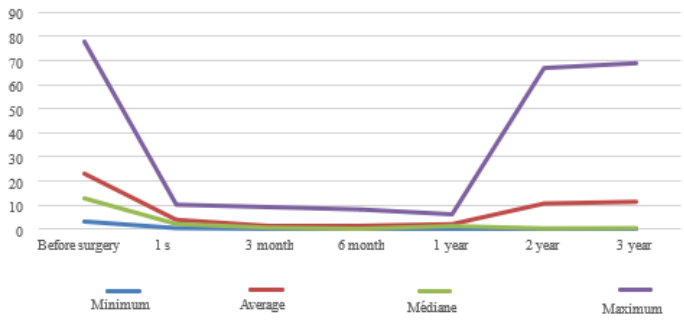

Figure 5: PSA Kinetics

This curve describes PSA kinetics before and after surgery. The nadir is reached from the 3rd month onward. We observe a significant decrease in PSA during the first year. However, we note two cases of PSA persistence and increase after the second year.

Table III: factors associated with the choice of surgery

Variables	aOR	CI 95%		P-value
		Minimum	Maximum	
Hospitalization duration	10-6	NA	Lower	1
	Blood transfusion			1
1500cc	10-6	0	NA	
500cc	10-6	0	NA	
Not	1015	0	NA	

Although we obtained significant values regarding hospitalization duration ($p < 0.001$) and blood transfusion ($p = 0.001$), logistic regression analysis allowed us to determine values that were not statistically significant.

Discussion

Laparoscopy was used in 41.2% of cases, while open surgery was accounted for 58.8%. No cases required conversion from laparoscopy to open surgery. The choice of surgical approach depended on several factors, including the hospital's technical capabilities, the surgeon experience, and the cost of the procedure. In a 2014 study by Verdier et al. Titled Open versus Laparoscopic Radical Prostatectomy: Experience of a French Centre, 20.5% underwent RRP, while 79.5% had RLP []. In Verdier's study, patients who underwent open surgery did so between 2000 and 2003, while those who underwent laparoscopic surgery did so between 2003 and 2012. This highlights that with the advent of laparoscopy, developed countries quickly adapted, and open surgery became an abandoned option. In contrast, in developing countries, healthcare facilities are still in a process of learning and equipping themselves.

The duration of surgery was evenly distributed in our study ($P = 0.2$), with an overall average of 230 minutes. Laparoscopy generally took more time, with an average of 245 minutes compared to 220 minutes for open surgery. Surgical durations in the literature vary from 80 to 500 minutes in the study by Drouin et al. [9]. In the 2002 study on Localized Prostate Cancer: Treatment by Laparoscopic Radical Prostatectomy, analysing 841 cases by Vallancien et al., the average operative time was 2 hours and 30 minutes (ranging from 1 hour 30 minutes to 6 hours 30 minutes) [10].

The rate of blood transfusion was heterogeneously distributed in our study ($P = 0.001$). A total of 58.8% were transfused during or immediately after surgery. We had 28.6% of patients transfused in the RLP group versus 80% in the RRP group. These results are higher than those of Verdier et al., who reported a transfusion rate of 0.7% versus 2.9% for RLP and RRP, respectively [8]. Bastide et al., in a critical analysis of a comparative meta-analysis on morbidity, functional, and oncological outcomes of total prostatectomy based on the surgical approach, found an average transfusion rate of 51% for Open surgery and between 0% and 30% for laparoscopic surgery [11].

In our study, cases of fever were observed during hospitalization and were evenly distributed ($P = 0.1$). Among the 23.5% of patients who developed fever, 11.8% had malaria, likely due to multiple transfusions. Among the remaining 11.8%, no specific aetiology was identified as biological tests were normal, and the patients were on antibiotics during their hospital stay.

We found no statistically significant difference regarding catheter and drain removal ($P = 0.6$; $P = 0.1$), although the average removal time was earlier in LRP patients (11.7 vs. 13.1 days for the catheter and 4.2 vs. 6.3 days for the drain, respectively). Verdier et al. reached the same conclusion in their study comparing RRP and RLP. Patients who underwent RRP had longer hospital stays, with a heterogeneous distribution ($P = 0.001$) as RLP patients were discharged earlier (8.29 days vs. 15.8 days). Our data contrasts with the literature; Verdier et al. reported 6 days vs. 6.3 days for RLP and RRP, respectively [8].

The distribution of erectile dysfunction complications was homogeneous in both groups of our study ($P = 0.33$). Severe erectile dysfunction (17.6%) was more common in patients who underwent open prostatectomy. This could be explained by the fact that these three patients had comorbidities such as diabetes and hypertension. Additionally, in two of these three patients, the neurovascular bundles were not preserved during surgery.

In our study, there was no statistically significant difference ($P = 0.152$) in the occurrence of urinary incontinence after surgery. Only 17.6% of operated patients presented moderate to severe urinary incontinence.

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Anastomotic strictures were evenly distributed (P = 0.2). Verdier et al. reported an incontinence rate of 37.3%, as their follow-up period was 12 months compared to our study, which had a three-year follow-up [7].

The rate of positive surgical margins in our study was 23.5%, which was moderate compared to figures reported in the literature, even considering their wide variability (11% to 41.5%) [8]. Other authors have found no significant difference in positive margins between RRP and RLP. Notably, Tewari et al, in their recent literature review, highlighted an equivalent margin rate between RRP and robot-assisted RLP, but a lower rate compared to conventional RLP [12]. Balla Bouzid reported a 6% rate in his thesis defended in Rabat in 2009. This lower rate compared to ours may be due to the fact that in his study, only 13% of patients were classified as high risk according to D'Amico. After radical prostatectomy, PSA levels normally become undetectable within 4 to 6 weeks. In our study, the nadir was reached at the third month. A total of 52.9% had undetectable PSA levels after three years of follow-up; 11.8% experienced biochemical recurrence within a year, for which salvage therapy was instituted, either through hormone therapy or radiotherapy. Our results are similar to those of Barret et al., who found that after treatment, the median PSA levels at 3, 6, and 12 months were 3.1, 2.9, and 2.7 ng/mL, respectively [13].

Conclusion

Surgical treatment for localized prostate cancer provides adequate control in our setting. While Peri-operative complications like blood transfusion, duration of transurethral catheter post op, length of hospital stay, erectile dysfunction and urinary incontinence are more frequent with open surgery. Medium term outcomes though show no significant differences between open and laparoscopic approaches.

Limitation

1. This study was carried out in one centre, but we wish to extend the study to other centres.
2. The sample size in this study was not large
3. Practice of laparoscopic surgery in our two study centres is still at an early phase

Ethical Clearance: Study was approved by institutional ethics committee.

Authors' Contribution: All the authors contributed to the research work. They read and agreed to the final version of the manuscript.Junior MEKEME and FOUDA conceived and designed research.

Junior MEKEME, GAYMA Guillaume and FOUDA, collected data.
Junior MEKEME and GAYMA Guillaume analysed data.
Junior MEKEME, GAYMA Guillaume and FOUDA interpreted results.
Junior MEKEME and GAYMA Guillaume drafted manuscript.
All co-authors edited and revised manuscript.

All authors read and approved final manuscript.

Conflicts of Interest: The authors declare no competing financial or personal interests

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