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Multimodal Management of Localized and Locally Advanced Prostate Cancer: A Retrospective Study of 30 Cases

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Abstract | **Original Research Article**

Objective: To evaluate early oncologic outcomes and functional tolerance of a multimodal strategy combining radical prostatectomy, postoperative radiotherapy, and hormone therapy in patients with localized or locally advanced prostate cancer at intermediate to high risk. ***Materials and methods:*** This was a retrospective, descriptive, single-center study conducted at the Mohammed VI Center for Cancer Treatment, Ibn Rochd University Hospital, Casablanca, between January 2020 and December 2025. Thirty patients with non-metastatic prostatic adenocarcinoma were included. All underwent radical prostatectomy followed by either adjuvant or salvage radiotherapy, together with adjuvant hormone therapy. Clinical, biological, pathological, therapeutic, toxicological, and outcome data were analyzed. ***Results:*** The mean age was 66 years, and the mean initial PSA level was 16.55 ng/mL. According to the D'Amico classification, 60% of patients were high risk. On pathological examination, 74% of tumors were staged pT3, 53% had positive surgical margins, and 20% had nodal involvement (pN+). Radiotherapy was delivered in the adjuvant setting in 67% of cases and as salvage treatment in 33%, with a mean dose of 66 Gy. The mean duration of hormone therapy was 16.8 months. Postoperative sequelae included urinary incontinence in 83% of patients and erectile dysfunction in 100%. Acute genitourinary and gastrointestinal radiotherapy toxicity was observed in 70% and 50% of cases, respectively; late genitourinary and gastrointestinal toxicity occurred in 33% and 30% of patients, respectively. After a median follow-up of 12.5 months following combined radiotherapy and hormone therapy, overall survival was 100%, and locoregional recurrence was documented in 7% of patients. ***Conclusion:*** In this series, multimodal treatment achieved excellent early oncologic control in patients with unfavorable pathological features. However, urinary and sexual toxicity was substantial, underscoring the need for careful patient selection and systematic discussion in a multidisciplinary tumor board.

Keywords: prostate cancer; multimodal treatment; radical prostatectomy; adjuvant radiotherapy; hormone therapy; retrospective study.

INTRODUCTION

Prostate cancer is a major global public health issue. It is one of the most common cancers in men and remains an important cause of disease-specific mortality. GLOBOCAN estimates have highlighted the growing burden of this disease across all world regions, including middle-income countries [1]. In Morocco, increasing life expectancy, improved access to diagnosis, and evolving healthcare-seeking behavior are likely to result in a steady rise in the number of diagnosed cases.

Although a substantial proportion of localized prostate cancers has a favorable prognosis, unfavorable intermediate-risk, high-risk, and locally advanced disease poses a particular therapeutic challenge. These tumors are associated with a high risk of biochemical progression, locoregional relapse, and metastatic spread. Historically, radiotherapy combined with androgen deprivation therapy has been the standard strategy for many patients with locally advanced disease, in light of the randomized SPCG-7/SFUO-3 and PR.3/MRC UK PR07 trials, which demonstrated the benefit of combining radiotherapy with androgen suppression compared with hormone therapy alone [6,7].

At the same time, growing interest has emerged in a multimodal approach involving upfront radical prostatectomy followed by adjuvant or salvage radiotherapy and hormone therapy. This strategy can

reduce tumor burden, provide precise pathological staging, and identify adverse prognostic factors warranting treatment intensification. The EORTC 22911 and SWOG 8794 trials notably established the role of postoperative radiotherapy in patients with unfavorable pathological features after prostatectomy [2,3].

The aim of the present study was to report, from a retrospective single-center series of 30 patients treated at the Mohammed VI Center in Casablanca, the early oncologic outcomes and functional tolerance of this trimodality strategy in localized and locally advanced prostate cancer.

MATERIALS AND METHODS

Study design and setting

This was a retrospective, descriptive, single-center study conducted in the oncology department of the Mohammed VI Center for Cancer Treatment at Ibn Rochd University Hospital in Casablanca. The study period extended from January 2020 to December 2025.

Population and selection criteria

Included patients had histologically confirmed prostatic adenocarcinoma, no metastatic disease at diagnosis, intermediate- to high-risk disease according to the D'Amico classification, and had received the complete therapeutic sequence consisting of radical prostatectomy, postoperative radiotherapy (either adjuvant or salvage), and adjuvant hormone therapy. Patients with metastatic disease before prostatectomy were excluded.

Treatment strategy

All patients underwent radical prostatectomy, performed by retropubic laparotomy in 63% of cases and by laparoscopy in 37%. Iliac-obturator lymph node dissection was associated in 97% of cases. Postoperative external-beam radiotherapy was administered to the entire cohort, as adjuvant treatment in 67% of cases and as salvage treatment in 33%, with a mean dose of 66 Gy. Intensity-modulated conformal radiotherapy was used in 53% of patients. Adjuvant hormone therapy with LH-RH analogs was also given, for a mean duration of 16.8 months, exceeding 12 months in 70% of high-risk patients.

Variables and assessment

The analysis covered epidemiological and clinical data (age, symptoms, digital rectal examination, performance status), biological data (initial PSA and follow-up), pathological data (Gleason score, pTNM stage, surgical margins), treatment-related variables, and outcomes. Radiotherapy toxicity was assessed according to the Radiation Therapy Oncology Group criteria. Postoperative functional outcomes, especially urinary continence and erectile function, were reported based on clinical assessment and the tools used in the department, particularly the IPSS and IIEF-5 when available.

Statistical analysis

Given the descriptive nature of the series and the limited sample size, the analysis relied on simple descriptive statistics expressed as means, medians, ranges, and percentages.

RESULTS

Cohort characteristics

Thirty patients were included. The mean age was 66 years, with a range of 51 to 85 years. Most patients were symptomatic at diagnosis, particularly with dysuria. The mean initial total PSA level was 16.55 ng/mL. According to D'Amico risk stratification, 60% of patients were classified as high risk, 37% as intermediate risk, and 3% as low risk.

Pathological findings

Analysis of the surgical specimens confirmed the aggressive profile of the cohort. Pathological stage was pT3 in 74% of cases, including both pT3a and pT3b disease. Surgical margins were positive in 53% of patients. Nodal involvement (pN+) was identified in 20% of cases. The Gleason score was 7 in 50% of cases and greater than 7 in 37%, reflecting a predominance of high-grade tumors.

Adjuvant and salvage treatments

All patients received postoperative external-beam radiotherapy. This was delivered immediately as adjuvant treatment in 67% of cases and delayed as salvage treatment in 33%. The mean delivered dose was 66 Gy. Adjuvant hormone therapy was administered to the entire cohort, for a mean duration of 16.8 months.

Functional morbidity and toxicities

Postoperative morbidity was substantial. Urinary incontinence was observed in 83% of patients, including 10% with severe forms, and erectile dysfunction was reported in the entire cohort. Only 7% of patients responded to intracavernosal injections. Regarding radiotherapy, acute genitourinary toxicity was observed in 70% of patients and acute gastrointestinal toxicity in 50%. Late toxicities, mainly grades 1 and 2, affected 33% of patients in the genitourinary domain and 30% in the gastrointestinal domain.

Oncologic outcomes

After a median follow-up of 12.5 months following radiotherapy plus hormone therapy, overall survival was 100%. Locoregional recurrence, specifically nodal recurrence, was documented in 7% of patients. These recurrences were managed with stereotactic radiotherapy.

Table 1: Summary of the main clinical, pathological, and outcome data

Variable	Result
Sample size	30 patients
Study period	January 2020 – December 2025
Mean age	66 years
Mean initial PSA	16.55 ng/mL
High risk (D'Amico)	60%
pT3 stage	74%
Positive surgical margins	53%
Nodal involvement (pN+)	20%
Adjuvant / salvage radiotherapy	67% / 33%
Mean radiotherapy dose	66 Gy
Mean duration of hormone therapy	16.8 months
Post-prostatectomy urinary incontinence	83%
Post-prostatectomy erectile dysfunction	100%
Acute genitourinary toxicity	70%
Acute gastrointestinal toxicity	50%
Late genitourinary toxicity	33%
Late gastrointestinal toxicity	30%
Median follow-up after radiotherapy and hormone therapy	12.5 months
Locoregional recurrence	7%
Overall survival	100%

DISCUSSION

This series confirms that patients managed with a multimodal strategy including upfront radical prostatectomy represent a selected population at high risk of progression, characterized by a high initial tumor burden and adverse pathological features. The mean age of 66 years observed in our cohort is close to that reported in several large contemporary series and remains consistent with the general epidemiology of prostate cancer [1,2]. However, the mean initial PSA level of 16.55 ng/mL and the frequently symptomatic presentation suggest later diagnosis than in many Western cohorts from screening-intensive settings.

The main value of surgery in this approach lies in providing refined pathological assessment, which can upstage or reclassify patients and guide adjuvant treatment. In our series, 74% of patients had pT3 disease, 53% had positive margins, and 20% were pN+, indicating a high risk of recurrence after surgery alone. These findings support the relevance of postoperative irradiation in this population. The randomized EORTC 22911 and SWOG 8794 trials showed that adjuvant radiotherapy after prostatectomy in patients with pT3 disease and/or positive margins improved biochemical control and reduced the risk of progression, and possibly long-term metastases [2,3]. Our data are conceptually aligned with these findings, although the small sample size and follow-up duration preclude robust comparative estimation of benefit.

It should nevertheless be emphasized that for locally advanced prostate cancer, the best-established standard remains radiotherapy plus androgen deprivation therapy, based on phase III evidence. The SPCG-7/SFUO-3 and PR.3/MRC UK PR07 studies showed that adding local radiotherapy to androgen suppression significantly improved tumor control and survival compared with hormone therapy alone [6,7]. In this context, radical prostatectomy should not be considered a universal standard, but rather one possible component of therapeutic escalation in carefully selected patients discussed in a multidisciplinary tumor board.

Our early oncologic results are encouraging, with overall survival of 100% and a locoregional recurrence rate of 7% after a median follow-up of 12.5 months. This observation must, however, be interpreted with caution. First, follow-up remains short for a disease that often has a prolonged natural history. Second, the absence of a comparator arm does not allow any claim of superiority for the multimodal strategy. The ProtecT trial showed, at 10 years, no major difference in prostate cancer-specific or overall survival between active monitoring, surgery, and radiotherapy for localized disease, while highlighting differences in progression and quality of life according to treatment modality [4]. In very high-risk patients, retrospective analyses have nevertheless suggested that intensified local strategies may be associated with improved oncologic outcomes. Tilki *et al.,* reported competitive results for intensified surgical approaches in Gleason 9–10 tumors [9], whereas Kishan *et al.,* highlighted the importance of optimal local intensification in highly aggressive tumors [10].

The major trade-off of this therapeutic escalation remains functional toxicity. In our experience, urinary incontinence affected 83% of patients and erectile dysfunction 100% of cases after radical prostatectomy. Acute and late radiation-induced toxicities were also non-negligible. These findings

illustrate the cumulative effect of surgery, radiotherapy, and hormone therapy on quality of life. In the study by Jang *et al.,* the combination of radical prostatectomy plus adjuvant radiotherapy was associated with higher rates of severe incontinence than radiotherapy plus hormone therapy, despite potentially favorable oncologic control in some advanced cases [5]. Data from the ProtecT trial similarly show that survival equivalence does not imply equivalence in functional morbidity [4].

Overall, our observations support cautious and targeted use of multimodal treatment. This approach appears particularly relevant when surgery reveals adverse prognostic features that justify adjuvant irradiation and androgen suppression. Conversely, its functional cost requires detailed patient counseling and rigorous selection based on general condition, life expectancy, comorbidities, and quality-of-life priorities. The ongoing prospective randomized SPCG-15 trial, which directly compares radical prostatectomy with radiotherapy plus androgen deprivation therapy in locally advanced prostate cancer, should help better define the exact role of surgery in the coming years [8].

Study Limitations

This study has several limitations: its retrospective design, the small sample size, the absence of a control group, the single-center data collection, and the short follow-up period. These factors limit the comparative scope of the findings and preclude any definitive conclusion regarding the oncologic superiority of the multimodal strategy. Nevertheless, this series provides useful clinical data from a still under documented North African context and highlights the delicate balance between oncologic intensification and functional preservation.

CONCLUSION

Multimodal treatment of localized and locally advanced prostate cancer, combining radical prostatectomy, postoperative radiotherapy, and hormone therapy, achieved excellent early oncologic control in this series of patients with adverse histopathological prognostic factors. However, the potential benefit of this intensified approach must be weighed against substantial urinary, sexual, and radiation-related morbidity. In practice, this strategy should be considered only for carefully selected patients after multidisciplinary evaluation and fully informed discussion of oncologic goals and functional risks. Prospective trials, particularly SPCG-15, are needed to clarify its definitive place relative to the standard of radiotherapy plus hormone therapy.

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