

Pharmacologic Management of Metastatic Prostate Cancer: Current Standards and the Expanding Clinical Role of the Pharmacist

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Background

- Prostate cancer: 2nd most common cancer in men worldwide; leading cause of male cancer death in 52 countries.
- Risk factors: advanced age, African ancestry, family history, DNA repair mutations (e.g., BRCA1/2, TP53), obesity, and inactivity.
- Androgen deprivation therapy (ADT): standard systemic treatment; tumors often progress to metastatic castration-resistant prostate cancer (mCRPC).
- mCRPC: defined by castrate testosterone (<50 ng/mL or 1.7 nmol/L) with new/progressive metastases or rising PSA levels.
- Treatment decisions are based on stage, prior therapies, comorbidities, toxicity, drug interactions, cost, and patient preference.
- Pharmacists play a critical role in optimizing therapy, managing adverse events, and supporting personalized, multidisciplinary care.

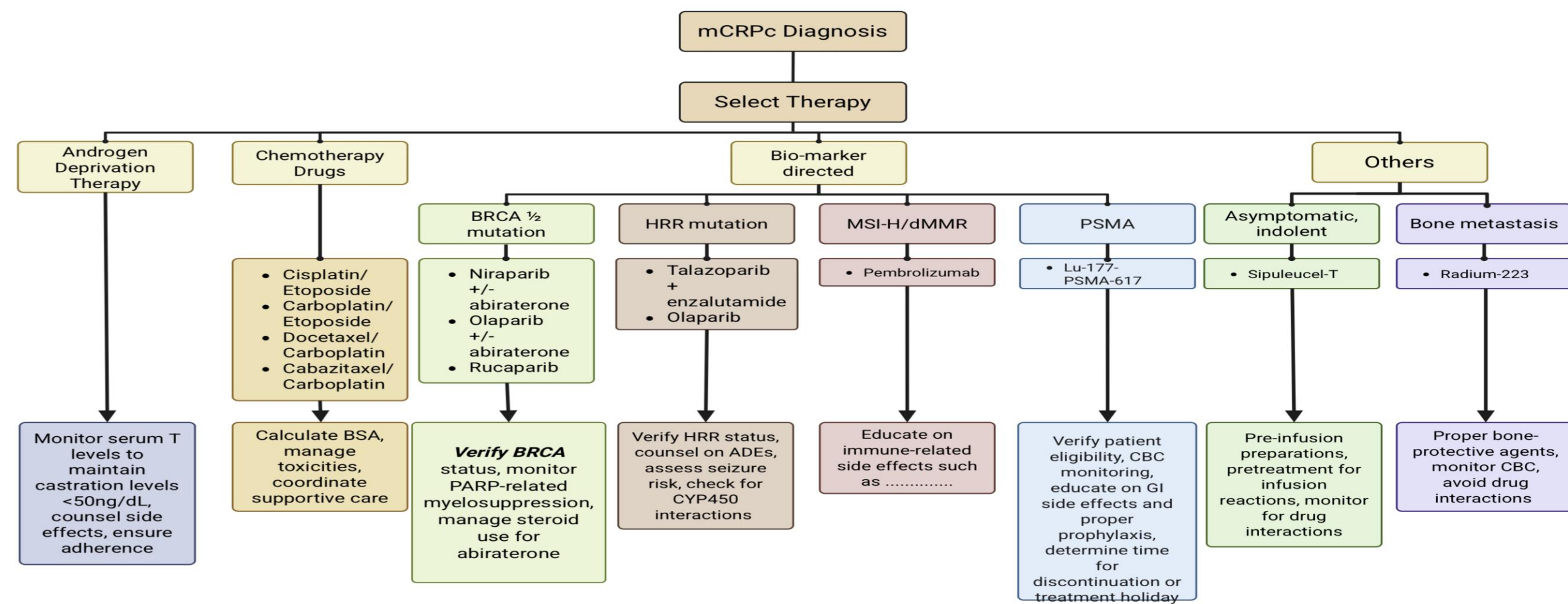
Objectives

- Describe the global incidence, mortality, and risk factors for prostate cancer.
- Summarize guideline-recommended pharmacologic treatments by disease stage.
- Highlight the pharmacist's role in therapy selection, adverse event management, and patient education.
- Identify opportunities for pharmacists to enhance guideline adherence, precision medicine, and collaborative care.

Methods

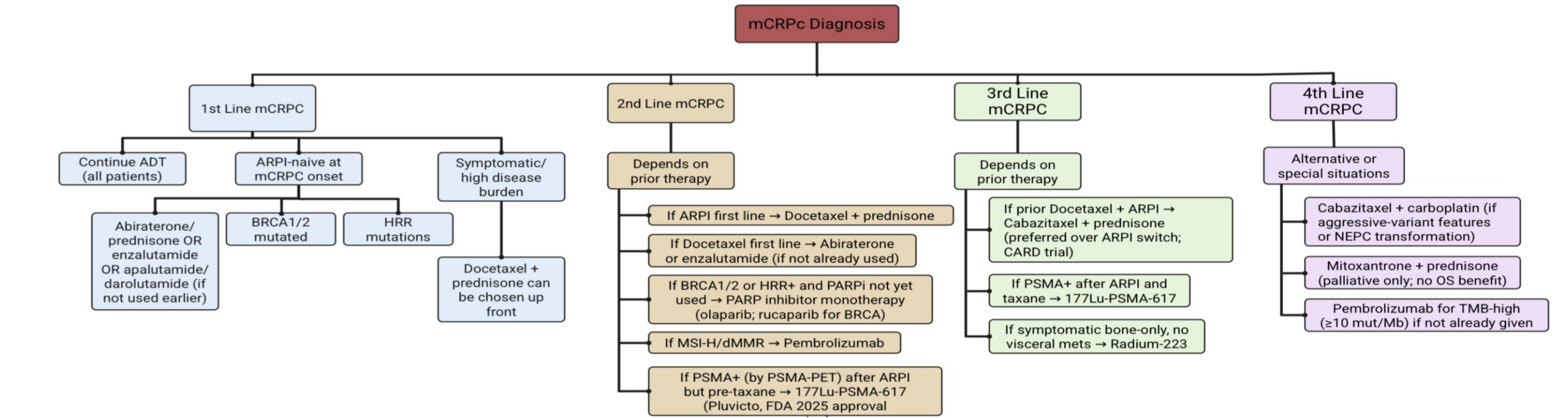
This review summarizes key pharmaceutical strategies for metastatic prostate cancer management, the expanding role of pharmacists in prostate cancer care, and incorporates National Comprehensive Cancer Network (NCCN) and American Society of Clinical Oncology (ASCO) guideline updates, and epidemiologic data from peer-reviewed literature and global cancer registries. Specifically, it draws upon the NCCN Guideline Version 2.2025 for Prostate Cancer, ASCO guidelines for mCRPC updated in 2025, and relevant literature concerning pharmacist involvement in prostate cancer care. The review focuses on current pharmacologic standards and the expanding clinical role of oncology pharmacists.

Results



mCRPC: Metastatic Castration-Resistant Prostate Cancer; ADT: Androgen Deprivation Therapy; ARPI: Androgen Receptor Pathway Inhibitor; BRCA1/2: Breast Cancer Gene 1 and 2; HRR: Homologous Recombination Repair; MSI-H: Microsatellite Instability-High; dMMR: Deficient Mismatch Repair; TMB-high: Tumor Mutational Burden-High (≥10 mutations per megabase, FDA cutoff); PSMA: Prostate-Specific Membrane Antigen; PARPI: Poly (ADP-ribose) Polymerase Inhibitor; Lu-177-PSMA-617: Lutetium-177 labeled PSMA-617 (Pluvicto, radioligand therapy); Radium-223: Radium dichloride (Xofigo, alpha emitter for bone metastases); Sipuleucel-T: Autologous cellular immunotherapy (Provenge); CBC: Complete Blood Count; BSA: Body Surface Area (used for chemotherapy dosing); ADEs: Adverse Drug Events; CYP450: Cytochrome P450 enzyme system (involved in drug metabolism); NEPC: Neuroendocrine Prostate Cancer (aggressive variant transformation).

Figure 1: Treatment Landscape



mCRPC: Metastatic Castration-Resistant Prostate Cancer; ADT: Androgen Deprivation Therapy; ARPI: Androgen Receptor Pathway Inhibitor; BRCA1/2: Breast Cancer Gene 1 and 2; HRR: Homologous Recombination Repair; MSI-H: Microsatellite Instability-High; dMMR: Deficient Mismatch Repair; TMB-high: Tumor Mutational Burden-High (≥10 mutations per megabase, FDA cutoff); PSMA: Prostate-Specific Membrane Antigen; PARPI: Poly (ADP-ribose) Polymerase Inhibitor; Lu-177-PSMA-617: Lutetium-177 labeled PSMA-617 (Pluvicto, radioligand therapy); Radium-223: Radium dichloride; Sipuleucel-T: Autologous cellular immunotherapy; NEPC: Neuroendocrine Prostate Cancer (aggressive variant transformation).

Figure 2: ASCO 2-25 Guideline Update

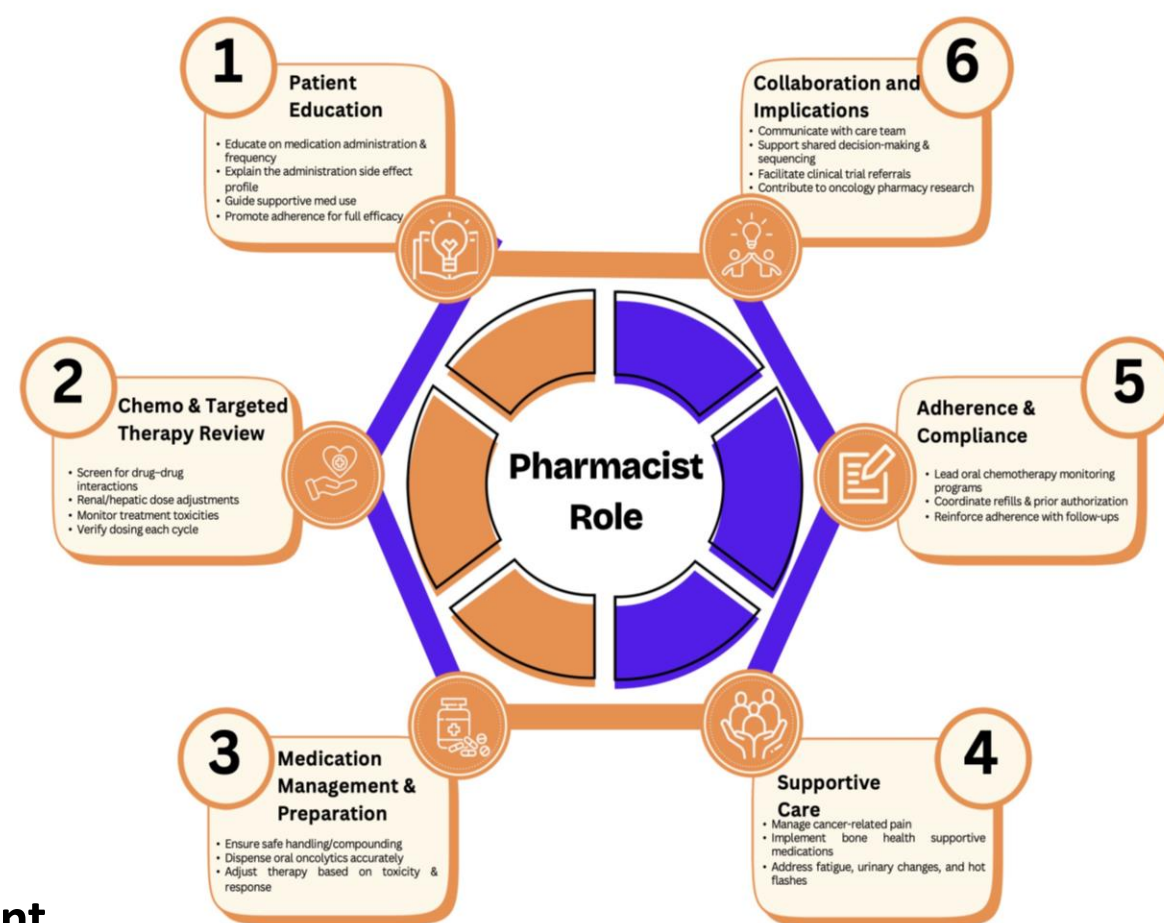


Figure 3: Pharmacist Involvement

Discussion

The management of prostate cancer is characterized by increasing complexity, driven by an expanding array of effective therapies, including novel hormonal agents, PARP inhibitors, chemotherapies, and radioligands. Within this intricate landscape, the pharmacist plays a vital and expanding role. Pharmacists contribute their knowledge of pharmacotherapy, patient education, and interdisciplinary coordination ensuring patients receive timely, effective, and safe care aligned with their preferences and goals. Their expertise is critical for personalizing therapy, identifying and managing complex drug interactions (e.g., CYP3A4 interactions), and mitigating adverse drug reactions. Through comprehensive patient education, pharmacists empower patients to understand their regimens, adhere to therapy, and effectively manage side effects. Furthermore, their involvement in coordinating diagnostic testing (e.g., genomic testing) and facilitating interdisciplinary communication ensures seamless, patient-centered care and optimized outcomes.

Conclusion & Future Directions

- Current management: maintain castrate testosterone in advanced disease; use combination systemic therapy for high-risk or metastatic patients; maximize biomarker-directed therapies; integrate bone health and early palliative care.
- Guideline alignment: Strategies reflect NCCN v2.2025 and ASCO 2025 recommendations, continuously updated with emerging evidence.
- Future direction: Next-generation anti-androgens, immunotherapies, epigenetic agents, and pathway inhibitors will expand treatment options.
- Impact: Pharmacists remain integral in ensuring therapy is evidence-based, safe, cost-conscious, and patient-centered, ultimately improving survival and quality of life.

References

