

Effect of B/i Orchidectomy in Men with Carcinoma Prostate: A Prospective StudyNitish Kumar¹, Saket Singh², Parvez Ahmad³¹Assistant Professor, Department of Urology, All India Institute of Medical Sciences, Patna, Bihar, India²Assistant Professor, Department of Urology, All India Institute of Medical Sciences, Patna, Bihar, India³Senior Resident, Department of Urology, All India Institute of Medical Sciences, Patna, Bihar, India

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Abstract:

Background: Prostate carcinoma is a prevalent health concern among men, demanding evolving therapeutic strategies for improved patient outcomes. Bilateral orchidectomy, or surgical castration, remains a vital component of advanced prostate cancer management due to its impact on testosterone levels, a key driver of disease progression. Orchidectomy, however, carries complex implications encompassing physiological, psychological, and quality of life aspects.

Methods: This prospective study enrolled 64 male patients diagnosed with prostate carcinoma, evaluating the comprehensive impact of bilateral orchidectomy. Baseline characteristics, cardiovascular risk factors, and psychological well-being were assessed over a 24-month follow-up period. Data analysis employed descriptive and inferential statistics to elucidate the physiological and psychological effects of orchidectomy.

Results: Analysis of cardiovascular risk factors revealed no statistically significant differences between pre- and post-orchidectomy groups. Systolic and diastolic blood pressure, total cholesterol, LDL cholesterol, HDL cholesterol, and fasting blood glucose remained stable. The psychological consequences were not explored in detail but necessitate further investigation. The study emphasizes the multifaceted nature of orchidectomy's impact on prostate carcinoma patients.

Conclusion: Orchidectomy does not significantly alter short-term cardiovascular risk factors in men with prostate carcinoma, suggesting a need for comprehensive patient care addressing physiological, psychological, and quality of life aspects. Future research should focus on long-term effects and emotional well-being, advocating for a multidisciplinary approach to prostate carcinoma management.

Recommendations: Healthcare providers should offer psychological support and counselling to patients undergoing orchidectomy. Larger cohorts and extended follow-up durations are warranted to assess long-term effects comprehensively.

Keywords: Prostate Carcinoma, Bilateral Orchidectomy, Cardiovascular Risk Factors, Psychological Impact.

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Introduction

Prostate carcinoma, a significant health concern worldwide, predominantly affects men, particularly in their later years. The management of this disease has evolved over time, incorporating various treatment modalities to improve patient outcomes and quality of life. Among these treatments, bilateral orchidectomy, also known as surgical castration, has been a cornerstone in the management of advanced prostate cancer [1]. This procedure involves the surgical removal of both testicles, which are the primary source of testosterone in men. Testosterone plays a crucial role in the growth and proliferation of prostate cancer cells; thus, its reduction is a key therapeutic strategy [2].

The impact of bilateral orchidectomy on men with prostate carcinoma is multifaceted, encompassing physiological, psychological, and quality of life

aspects. From a physiological standpoint, the procedure leads to a significant reduction in circulating testosterone levels, which in turn can cause a dramatic regression in prostate cancer progression [3]. This hormonal manipulation has been shown to alleviate symptoms, reduce tumor burden, and in some cases, prolong survival [4]. However, the benefits of this treatment must be weighed against its irreversible nature and the potential for significant side effects.

Psychologically, the implications of bilateral orchidectomy are profound. The loss of testicles can have a deep impact on a man's self-image, sexual identity, and emotional well-being. Patients may experience feelings of loss, decreased libido, and changes in sexual function, which can lead to

emotional distress and affect interpersonal relationships [5].

Furthermore, the procedure's impact on the quality of life cannot be overstated. Side effects such as hot flashes, loss of bone density, weight gain, and increased risk of cardiovascular diseases can significantly alter a patient's lifestyle and daily functioning [1, 3]. These changes necessitate a comprehensive approach to patient care, involving not only medical treatment but also psychological support and lifestyle management.

The primary aim of this study is to evaluate the comprehensive impact of bilateral orchidectomy on men with prostate carcinoma, focusing on physiological changes, psychological effects, and quality of life outcomes. It seeks to understand the correlation between testosterone level changes and cancer progression, assess the emotional and mental health consequences, and analyze the long-term effects on patients' daily living and overall well-being.

Methodology

Study Design: This study adopts a prospective, single-center design.

Study Setting: The research was conducted within the confines of A.I.I.M.S., Patna between 2021-2022.

Participants: The study includes 64 male patients aged 18 years and older.

Inclusion Criteria: To be eligible for participation, individuals must meet several criteria, including a confirmed diagnosis of prostate carcinoma, a willingness to undergo bilateral orchidectomy, the ability to provide informed consent, no prior history of orchidectomy, and the capacity to communicate effectively in the primary language of the study.

Exclusion Criteria: Conversely, patients were excluded from the study if they meet specific exclusion criteria, such as contraindications for bilateral orchidectomy, concurrent participation in other clinical trials, a prior history of orchidectomy, an inability to provide informed consent, or the presence of severe cognitive impairment. These criteria aim to ensure the safety and appropriateness of the study population.

Bias: Every effort was made to mitigate potential sources of bias in this study. Selection bias was minimized through the clear definition and application of inclusion and exclusion criteria.

Variables: The study includes several variables of interest such as cardiovascular risk factors, including blood pressure, lipid profile, and glucose levels, bilateral orchidectomy, and covariates

include patient demographics, prostate carcinoma characteristics, and orchidectomy details.

Data Collection: Data collection for this study was a systematic process that encompassed various categories of information vital to the research objectives. Firstly, patient demographics, including age, ethnicity, and relevant medical history, provided foundational insights into the study population. Secondly, comprehensive data regarding prostate carcinoma characteristics, such as TNM staging, Gleason scores, PSA levels, and histological findings, allowed for an in-depth assessment of cancer severity and extent. Orchidectomy details, including timing and type of procedure, were documented, along with any surgical complications. Lastly, follow-up data, including follow-up duration, visit frequency, cardiovascular events, cancer progression, and survival status, were collected to evaluate long-term effects.

Data was primarily sourced from patient medical records, known for their reliability and accuracy. Additionally, patient interviews during follow-up visits provided firsthand accounts, while patient-completed questionnaires may have supplemented self-reported information. Ethical guidelines and consent procedures were strictly followed to protect participant rights. Collected data underwent rigorous quality control measures to ensure accuracy and reliability.

Statistical Analysis: Descriptive statistics was used to summarize patient demographics, prostate carcinoma characteristics, orchidectomy details, and follow-up data. Inferential statistics, including t-tests and chi-squared tests, was employed to compare cardiovascular risk factors between pre- and post-orchidectomy groups. A significance level of $p < 0.05$ was used to determine statistical significance.

Ethical considerations: The study protocol was approved by the Ethics Committee and written informed consent was received from all the participants.

Results

The study enrolled 64 male patients diagnosed with prostate carcinoma, with 32 patients in the pre-orchidectomy group and 32 patients in the post-orchidectomy group. Table 1 presents the baseline characteristics of the study participants. The two groups were comparable in terms of age, prostate carcinoma stage, Gleason score, and baseline PSA levels, ensuring that any observed differences in cardiovascular risk factors could be attributed to orchidectomy.

Table 1: Baseline Characteristics of Study Participants

Characteristic	Pre-Orchidectomy Group (n=32)	Post-Orchidectomy Group (n=32)
Age (years), Mean \pm SD	65.2 \pm 6.4	66.8 \pm 7.1
Prostate Stage		
- Localized (T1/T2)	12 (37.5%)	11 (34.4%)
- Advanced (T3/T4)	20 (62.5%)	21 (65.6%)
Gleason Score		
- \leq 6	8 (25.0%)	9 (28.1%)
- 7	13 (40.6%)	12 (37.5%)
- \geq 8	11 (34.4%)	11 (34.4%)
PSA Levels (ng/ml), Mean \pm SD	12.7 \pm 5.2	12.4 \pm 4.8

To assess the impact of bilateral orchidectomy on cardiovascular risk factors, various parameters were analyzed in both groups over a follow-up period of 24 months.

Table 2: Changes in Cardiovascular Risk Factors

Cardiovascular Risk Factor (Mean \pm SD)	Pre-Orchidectomy Group (n=32)	Post-Orchidectomy Group (n=32)	p-value
Systolic Blood Pressure (mmHg)	132.4 \pm 8.3	129.8 \pm 7.9	0.156
Diastolic Blood Pressure (mmHg)	78.6 \pm 5.2	77.3 \pm 4.8	0.421
Total Cholesterol (mg/dL)	190.7 \pm 15.2	187.3 \pm 14.8	0.289
LDL Cholesterol (mg/dL)	113.8 \pm 11.6	112.4 \pm 10.7	0.621
HDL Cholesterol (mg/dL)	45.2 \pm 4.5	46.3 \pm 4.1	0.275
Fasting Blood Glucose (mg/dL)	126.5 \pm 10.2	127.8 \pm 10.5	0.632

The table 2 presents the changes in cardiovascular risk factors between the two groups during the 24-month follow-up period. There were no statistically significant differences in systolic and diastolic blood pressure, total cholesterol, LDL cholesterol, HDL cholesterol, or fasting blood glucose levels between the pre- and post-orchidectomy groups.

Discussion

The results of this study, which investigated the impact of bilateral orchidectomy on cardiovascular risk factors in men with prostate carcinoma, reveal several key findings. The baseline characteristics of the study participants were comparable between the pre- and post-orchidectomy groups. This ensures that any observed differences in cardiovascular risk factors over the follow-up period can be attributed to the orchidectomy procedure itself rather than baseline disparities. Analysis of cardiovascular risk factors, including systolic and diastolic blood pressure, total cholesterol, LDL cholesterol, HDL cholesterol, and fasting blood glucose levels, did not demonstrate statistically significant differences between the two groups over the 24-month follow-up period.

These findings suggest that bilateral orchidectomy, whether performed before or after prostate carcinoma diagnosis or treatment, did not lead to significant changes in the assessed cardiovascular risk factors in this cohort of men. This is a notable result as there has been interest in understanding potential cardiovascular implications of hormonal treatments for prostate carcinoma.

Recent studies have explored the cardiovascular implications of orchidectomy and hormonal treatments in prostate cancer. A study comparing the efficacy of oestrogen therapy to castration highlighted the cardiovascular risks associated with orally administered oestrogen, suggesting that low-dose oestrogens combined with antiandrogens or antithrombotic agents might be better tolerated [6]. Another research found that the cardiovascular and metabolic impacts of orchidectomy were less severe compared to those observed with Gonadotropin-Releasing Hormone (GnRH) agonists, indicating a potential advantage of orchidectomy in managing metabolic and cardiovascular risks [7]. The increased risk of cardiovascular complications in patients treated with oestrogen for prostatic cancer was also emphasized, underscoring the need for careful treatment selection [8]. Long-term hormonal treatments in prostate cancer were shown to necessitate regular monitoring of hemoglobin levels and bone mineral density due to potential side effects [9]. Additionally, a study on Androgen Deprivation Therapy (ADT) revealed varying cardiovascular risks associated with different ADT methods, particularly highlighting the risks of heart failure and arrhythmia [10].

Conclusion

This study examined the impact of bilateral orchidectomy on cardiovascular risk factors in men diagnosed with prostate carcinoma, involving 64 patients over a 24-month follow-up period. The results indicate that bilateral orchidectomy, regardless of the timing in relation to prostate carcinoma diagnosis or treatment, did not lead to

significant alterations in cardiovascular risk factors. Baseline characteristics were well-matched between the two groups, enhancing the reliability of the findings. These results provide valuable insights into the cardiovascular implications of orchidectomy as a hormonal treatment for prostate carcinoma, potentially alleviating concerns regarding its short to medium-term effects. Nonetheless, the study's limitations, such as its sample size and follow-up duration, should be acknowledged, and further research is needed to explore individual patient variations and long-term cardiovascular outcomes in this context.

Limitations: The limitations of this study include a small sample population who were included in this study. The findings of this study cannot be generalized for a larger sample population. Furthermore, the lack of comparison group also poses a limitation for this study's findings.

Recommendation: Healthcare providers should offer psychological support and counselling to patients undergoing orchidectomy. Larger cohorts and extended follow-up durations are warranted to assess long-term effects comprehensively.

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