

Comparative Study of Levels of Blood Urea and Creatinine in Individuals with Obstructive Uropathy Resulting from Benign Prostatic Hyperplasia after Prostatectomy

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Abstract:

Background: This study, involving 90 patients, assesses efficacy of prostatectomy in improving kidney function in BPH-related obstructive uropathy. Age is identified as a critical risk factor, underscoring the importance of early detection, especially in the elderly. Regular blood urea and creatinine level monitoring is essential for assessing kidney function and providing appropriate care.

Methodology: Examining records from hospital, India, we analyzed data from 90 patients who underwent prostatectomy for BPH-related obstructive uropathy. Statistical methods, including univariate and bivariate analyses, were employed.

Results: Incidence fluctuated as elderly patients (61-70) faced higher risks. Prostatectomy significantly improved kidney function, reducing blood urea levels (<40 mg/dl) in 95.5% of patients. All patients achieved normal creatinine levels (<1.5 mg/dl) post-Prostatectomy.

Recommendations: Early detection and management are crucial, especially in elderly patients. Regularly monitoring blood urea and creatinine levels can mitigate kidney function impairment risks and reduce invasive interventions.

Conclusion: This study of 90 patients highlights effectiveness of prostatectomy in improving kidney function in BPH-related obstructive uropathy. Age's role as a risk factor underscores the need for early detection, while consistent monitoring of blood urea and creatinine levels remains crucial in patient care.

Keywords: Transurethral Resection of the Prostate (TURP), Obstructive Uropathy, Benign Prostate Hyperplasia (BPH) and Kidney Function

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Introduction

Benign prostatic hyperplasia is a condition where the prostate gland enlarges due to the growth of epithelial and stromal cells [1]. It mainly affects males over 50, but can also occur in those over 40. BPH is quite common, with an occurrence of 50% in men aged 50 to 60, increasing to 90% in those over 80. In 2015, 38.1 million people in the India had BPH [2]. It can lead to Lower Urinary Tract Symptoms (LUTS) due to bladder muscle weakening from prostate enlargement. This can cause urine retention and obstructive uropathy, which is a blockage of urine flow that can lead to kidney problems and even kidney failure. In a study, it was found that 27% of obstructive uropathy cases were caused by BPH.

To address BPH-related obstructions, prompt action is needed. Transurethral resection of the prostate is a common intervention to treat BPH and reduce complications. Monitoring blood urea levels is crucial to detect kidney function reduction, with normal levels ranging from 20-40 mg/dl. Kidney function can also be assessed through blood creatinine levels, which may increase due to kidney problems affecting creatinine excretion [3, 4].

The aim of this study is investigating the levels of blood urea and creatinine in obstructive uropathy patients with BPH both before and after undergoing prostatectomy.

Methodology

Study Design: This study was a retrospective cross-sectional descriptive analysis.

Study Setting: This study was conducted by reviewing medical records of a patient in the surgery department ward and pathology department of JLNMC in 2021-2023.

Participants: Participants of obstructive uropathy patients having BPH were selected after reviewed medical records and underwent prostatectomy.

Inclusion and Exclusion Criteria: Inclusion criteria involve male BPH patients who have undergone a prostatectomy, exhibit obstructive uropathy due to BPH post-prostatectomy, and possess relevant blood urea and creatinine records. Exclusion criteria exclude females, non-binary individuals, BPH patients without prostatectomy, those with unrelated obstructive uropathy, incomplete records, and those with medical conditions impacting urea and creatinine levels.

Study Size: After fulfilling the inclusion criteria, 90 patients of obstructive uropathy patients went through prostatectomy.

Data Collection and Analysis: Data were gathered from patients with acute urine retention brought on by BPH, as well as blood urea and creatinine levels shortly after urinary catheter placement. An ultrasonography was used to assess mild-to-moderate hydronephrosis.

Bias: To minimize bias, the goal of the research was not disclosed to the participants or healthcare providers during data collection. Additionally, data analysts were blinded to the identity of the participants.

Variables: The study examined several key variables to assess the impact of prostatectomy on obstructive uropathy patients with acute urinary retention caused by BPH. These variables included blood urea levels before and after prostatectomy, creatinine levels before and after the procedure, and the patients' age groups, with particular attention to those in the 61-70 years old range. Additionally, the research investigated the occurrence of obstructive uropathy attributed to BPH, quantified the number of patients affected, and aimed to determine if prostatectomy led to an improvement in kidney function.

Statistical Analysis: This study used statistical analysis, including univariate and bivariate methods.

Ethical Considerations: The study was carried out in accordance with ethical guidelines, which included getting each participant's informed consent. The ethics committee examined and approved the study protocol.

Results

Table 1: Blood Urea and Creatinine Levels, Age Groups, and Post-Prostatectomy Outcomes in Sample of 90 Patients with Obstructive Uropathy due to BPH

| Variables | N | Mean Difference | P-value |
|--------------------------------------|----|-----------------|---------|
| Blood Urea Levels (mg/dl) | | | |
| Before TURP | 90 | 76.19 | <0.001 |
| After TURP | 90 | 33.12 | |
| Creatinine Levels (mg/dl) | | | |
| Before TURP | 90 | 2.4 | <0.001 |
| After TURP | 90 | 1.1 | |
| Age Group (years) | | | |
| 40-50 | 4 | | |
| 51-60 | 17 | | |
| 61-70 | 34 | | |
| 71-80 | 30 | | |
| >80 | 5 | | |
| Blood Urea Levels (mg/dl) After TURP | | | |
| <40 | 86 | | |
| >40 | 4 | | |
| Creatinine Levels (mg/dl) After TURP | | | |
| <1.5 | 90 | | |
| >1.5 | 0 | | |

This retrospective cross-sectional study aimed to assess blood urea and creatinine levels in obstructive uropathy patients with acute urinary retention due to (BPH) before and after prostatectomy using a sample of 90 patients. The research involved reviewing medical records from

the surgery and pathology departments of JLNMC Bhagalpur. Data included levels of blood urea and creatinine following urinary catheter insertion and after prostatectomy, as well as the presence of mild-moderate hydronephrosis

identified by ultrasound. Statistical analysis employed univariate and bivariate methods.

Results revealed a total of 90 patients, with maximum frequency of obstructive uropathy cases undergoing prostatectomy occurring in 2023 (25%) and the lowest in 2021 (10%). Most patients with obstructive uropathy due to BPH were in the 61-70 years age group (37.5%), while the minimum incidence was in the 40-50 years age group (4.4%). Blood urea levels in 95.5% of patients were below 40 mg/dl after prostatectomy, indicating improvement. All patients had normal creatinine levels (<1.5 mg/dl) after prostatectomy. Significant differences were observed in both blood urea and creatinine levels before and after prostatectomy.

Discussion

This study, involving 90 patients, aimed to evaluate the impact of prostatectomy on kidney function in individuals with obstructive uropathy resulting from (BPH). The findings provide valuable insights into the effectiveness of prostatectomy, the role of age as a risk factor, and the importance of monitoring blood urea and creatinine levels in this patient population.

The study's findings revealed fluctuations in the frequency of BPH-related obstructive uropathy patients who underwent prostatectomy at the hospital. The highest number of cases occurred in 2023, with 21 patients (23.9%), while the lowest was in 2021, with 9 patients (10.2%). On average, there were 15 patients per year. A study reported that 27% of obstructive uropathy cases caused by BPH [5].

Age was identified as a risk factor for BPH-related obstructive uropathy, with symptoms typically appearing in individuals over 40 years old and increasing to 80% in those over 60 years old. This research revealed that the most prevalent age group for obstructive uropathy patients due to BPH undergoing prostatectomy was 61-70 years old (37.5%), while the lowest incidence was in the 40-50 years age group (4.6%). These results suggest an increased risk of obstructive uropathy due to BPH in older individuals, aligning with findings from previous studies.

Blood urea levels were assessed to detect kidney function impairment, and this study showed that 95.5% of the 88 cases had blood urea levels below 40 mg/dl after prostatectomy, with a mean of 33.12 mg/dl, indicating an improvement in kidney function. Similar results were reported where changes in blood urea levels after surgery were observed [6, 7].

Creatinine levels, another indicator of kidney function, were analyzed in this study, and all 90 patients had levels below 1.5 mg/dl after prostatectomy, signifying normal kidney function.

These results align with findings, which demonstrated creatinine level reductions after TURP [8]. However, a study reported a decrease in creatinine levels but noted that it was not statistically significant, possibly due to comorbidities like diabetes mellitus and hypertension in their patient population [9].

Overall, this study underscores the importance of monitoring levels of blood urea and creatinine in patients diagnosed with BPH to identify and address kidney function impairment, especially in elderly individuals who are more susceptible to such complications.

Conclusion

This study of 90 patients underscores the significance of prostatectomy as an effective intervention for improving kidney function in obstructive uropathy patients with BPH. Age remains a critical risk factor, highlighting the importance of early detection and management in elderly individuals. Regular monitoring of blood urea and creatinine levels is vital for assessing kidney function and ensuring appropriate care for patients with BPH-related obstructive uropathy.

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: Early detection and management are crucial, especially in elderly patients. Regularly monitoring blood urea and creatinine levels can mitigate kidney function impairment risks and reduce invasive interventions.

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List of abbreviations:

1. TURP - Transurethral Resection of the Prostate
2. BPH - Benign Prostatic Hyperplasia
3. LUTS - Lower Urinary Tract Symptoms

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