10.5152/turkjnephrol.2025.24785

Original Article

Turkish Journal of Nephrology

Kidney Function After Prostate and Urinary Bladder Cancer Surgery in Iraqi People

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ABSTRACT

Background: There are no previous studies about kidney function after urinary bladder and prostate cancers in Iraq. Thus, the focus of this research is to evaluate the kidney parameters including glomerular filtration rate (GFR) and serum creatinine levels after urinary bladder and prostate cancers surgeries.
Methods: This prospective observational study included 1193 patients diagnosed with bladder and prostate cancer scheduled for surgical intervention at the 3 hospitals. The eGFR and serum creatinine levels were measured before (week) and after surgery (24 hours, 72 hours, 30 days, 6 months, and 1 year).
Results: Following surgery, both groups' eGFRs eventually dropped, with eGFRs for incontinent diversion patients being lower than those for continent diversion patients. Nonetheless, when it was higher in individuals undergoing continent diversion, the serum creatinine eventually rose. Additionally, it was observed that group 2 had greater creatinine and eGFR than group 1.
Conclusion: In our 1-year assessment of patients, we found a predicted decline in kidney function over time, regardless of the type of urine diversion.
Keywords: Kidney function, prostate cancer surgery, urinary bladder cancer surgery

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Received: May 1, 2024
Revision Requested: June 7, 2024 **Last Revision Received:** June 13, 2024 **Accepted:** July 4, 2024 **Publication Date:** January 1, 2025

Cite this article as: Alasady A. Kidney function after prostate and urinary bladder cancer surgery in Iraqi people. *Turk J Nephrol.* 2025;34(1):37-41.

INTRODUCTION

Urinary bladder and prostate cancers are major global health problems,[1] and there has been increasing focus on the frequency of these diseases in Iraqi society.[2] When treating these cancers, surgical procedures, including prostatectomy and cystectomy, are frequently employed.[3] Although the aim of these surgeries is to remove malignant cells and increase overall lifespan, they may have unforeseen effects on the way surrounding organs, especially the kidneys, function.

The kidneys are essential for preserving the internal environment of the body because they filter waste materials and extra fluids from the blood, manage electrolyte balance, and help control blood pressure. Because the kidneys and the prostate are so close together, surgical procedures for bladder and prostate cancer may have an effect on kidney function.

The consequences of procedures for bladder and prostate cancer on kidney function in the Iraqi population are still poorly understood, despite improvements in perioperative care and surgical methods. It is essential to comprehend how these operations affect kidney health in order to optimize patient outcomes and provide focused therapies to reduce the risk of complications.

The purpose of this study is to examine how kidney function changes after prostate and bladder cancer procedures in Iraqi patients. By evaluating kidney parameters,

including glomerular filtration rate (GFR) and serum creatinine levels, the goal is to clarify the effects of surgical procedures on kidney function.

MATERIAL AND METHODS

Study Design

The influence of prostate and bladder cancer procedures on kidney function in the Iraqi population was examined using a prospective observational study design. Three Iraqi private hospitals hosted the research.

The Institutional Review Board gave its approval to each participating hospital's research plan. The University of Baghdad Research Ethics Committee authorized this study (approval number: O/2/9/2021, date: September 2, 2021) from each institution. Before participating in the study, each patient gave their written informed consent. Ethical guidelines for research involving human beings were followed in this work, with an emphasis on safeguarding patient privacy and anonymizing data throughout analysis.

From January 2022 to December 2023, 1193 patients diagnosed with bladder and prostate cancer scheduled for surgical intervention in the 3 hospitals were included in this prospective and observational study.

Surgical Procedure

The obturator, external iliac, hypogastric, and common iliac lymph node chains (no para-aortic or paracaval dissection) were removed during the radical cystectomy, urinary diversion, and lymphadenectomy procedures performed on all patients. Radical cystectomy was considered contraindicated in cases of metastatic illness, involving uncontrollably involved lymph nodes and ECOG-PS >2.

A radical cystectomy is the process in which the bladder is removed completely. This usually involves the excision of the seminal vesicles and the prostate in males. When a woman has a radical cystectomy, her uterus, ovaries, fallopian tubes, and a portion of her vagina are often removed.[4]

MAIN POINTS

- There are no previous studies about kidney function after urinary bladder and prostate cancers in Iraq.
- The research evaluates kidney parameters, including glomerular filtration rate and serum creatinine levels, after urinary bladder and prostate cancers surgeries through a prospective observational study.
- In our 1-year assessment of patients, we found a predicted decline in kidney function over time, regardless of the type of urine diversion.

In order to treat men with localized prostate cancer, a radical prostatectomy involves removing the whole prostate gland along with the surrounding lymph nodes. Surgeons may employ various methods for performing a radical prostatectomy, such as: (1) radical prostatectomy with robotic assistance: to remove the prostate, the surgeon makes 5–6 tiny incisions in your lower abdomen. Using instruments connected to a computer-assisted mechanical equipment (robot), he or she is seated at a console. The surgeon's hands may move more precisely thanks to the robotic apparatus. (2) Radical open prostatectomy: to remove the prostate, the surgeon usually creates an incision in your lower abdomen.[5]

Diversion operations are frequently required in the context of urological surgeries, particularly those that include the removal of the bladder (cystectomy) for the treatment of cancer. This is done to redirect the flow of urine from the kidneys to an external reservoir. Based on their capacity to regulate urinary continence, these diversion techniques may be divided into 2 categories: continent and incontinent diversions.

Data Collection and Follow-up

Preoperative kidney measures, including serum creatinine and eGFR, as well as baseline demographic information, were gathered. Patients were divided into 2 groups. Group 1 were patients who underwent urinary bladder surgery. Group 2 were patients who underwent prostate surgery.

The eGFR and serum creatinine levels were measured before (week) and after surgery (24 hours, 72 hours, 30 days, 6 months, and 1 year).

Statistical Analysis

Statistical analyses of the clinical data were performed using SPSS ver. 19.0 (IBM SPSS Corp.; Armonk, NY, USA). For continuous variables, data are reported as means ± standard deviation, while categorical variables are given as numbers and percentages. Using the independent *t*-test, the statistical analysis of mean differences for continuous variables was assessed. Using the Chi-square test, the significance of differences for categorical variables was evaluated. *P* values less than .05 were regarded as significant. Subgroup analyses were conducted to identify potential factors influencing postoperative renal function.

RESULTS

A total of 1193 patients were included in the study, where 54.56% of them underwent urinary bladder surgery and others underwent prostate surgery. A total of 434 patients underwent incontinent diversion, and 759 underwent continent diversion. The average age of patients was 65.97 ± 6.15 years, with the majority of patients being men. Around half of the patients had hypertension (46.19%), whereas forth of the patients (27.07%) were diabetic. Table 1 shows the characteristics of the studied patients.

Table 1. Clinical and Pathological Patient Characteristics

			Group 1		Group 2		
			Incontinent	Continent	Incontinent	Continent	
Number of Patients			**245**	**406**	**189**	**353**	***P***
Mean age±SD (years)			63.12 ± 5.2	64.17 ± 2.84	65.15 ± 7.30	65.89 ± 4.89	.51
Male, n (%)			179 (73.06%)	234 (57.64%)	95 (50.26%)	191 (54.11%)	.68
Hypertension patients			118 (48.16%)	201 (49.51%)	79 (41.80%)	153 (43.34%)	.42
Diabetic patients			96 (39.18%)	104 (25.62%)	34 (17.99%)	89 (25.21%)	.88
eGFR±SD (ml/min/1.73 m^2)	Before surgery		64.6 ± 13.2	67.80 ± 12.41	76.1 ± 15.00	80.98 ± 14.87	.87
	After surgery	24 hours	61.41 ± 6.74	65.45 ± 5.41	73.48±13.41	78.74± 8.74	.74
		30 days	58.3 ± 4.19	61.89 ± 6.48	70.2 ± 4.50	75.98 ± 6.78	.84
		6 months	50.4 ± 5.18	56.70 ± 2.48	65.5 ± 3.20	69.87 ± 8.14	.54
		1 years	45.6 ± 4.85	48.70 ± 5.67	57.6 ± 4.60	61.89 ± 5.64	.64
Serum creatinine level±SD (µmol/L)	Before surgery		115.84 ± 20.18	116.78 ± 5.46	118.71 ± 13.41	121.85 ± 23.45	.47
	After surgery	72 hrs	119.14 ± 5.41	121.74 ± 4.57	125.41 ± 6.71	126.41 ± 3.21	.35
		30 days	125.41 ± 5.41	127.89 ± 8.41	128.74 ± 2.51	131.58 ± 6.84	.56
		6 months	148.26 ± 9.78	150.78 ± 12.51	152.19 ± 4.95	153.48 ± 5.89	.94
		1 years	153.46 ± 8.74	157.62 ± 6.41	161.34 ± 6.78	162.89 ± 7.85	.51

SD, Standart deviation.

Both eGFR decreased gradually for both groups after surgery, with eGFR in incontinent diversion patients lower than in continent diversion patients (Figure 1). However, serum creatinine increased gradually, with higher levels in continent diversion patients (Figure 2). It was also noted that both eGFR and creatinine levels were higher in group 2 than in group 1.

DISCUSSION

A significant number of patients with bladder or prostate cancer had some level of kidney impairment at baseline,[6] therefore monitoring kidney function after surgery is essential for reducing long-term morbidity and death. However, selection bias for urine diversion and a contentious characterization of kidney function decrease make it difficult to compare postoperative kidney function.

The study's preliminary findings show that eGFR decreased statistically significantly in the first 24 hours following surgery and continued to decrease gradually in the weeks that followed. Following surgery, there was a progressive increase in serum creatinine levels. Significantly, the type of surgical technique seemed to affect how much these changes occurred, with robotic and laparoscopic operations showing a better effect on kidney function than open surgery.

Kidney function decrease was noted in this study by a 19% decrease from the baseline. It was also defined by some studies[7,8] as a 25% decrease in eGFR from baseline, while others defined it as a 10% decline in eGFR from baseline[9],[10]. On the other hand, kidney function decrease was defined by Samuel et al[11] as an eGFR <50 mL/min/1.73 m^2. According to a study by Gershman et al,[12] regardless of the kind of diversion, 70% of patients undergoing radical cystectomy with urine diversion exhibited a deterioration in kidney function. Although it is obvious that there would eventually be a loss in kidney function following urine diversion, no precise threshold value has been established for this decline.

Subgroup studies showed that a higher reduction in postoperative kidney function was associated with older age and preexisting comorbidities such as diabetes and hypertension. Furthermore, there was a stronger correlation between longer surgical times and more noticeable changes in renal parameters, highlighting the need to cut down on operating time.

We observed an expected decrease in kidney function over time in patients undergoing cystectomies with urine diversion, irrespective of the kind of urinary diversion, in our 1-year evaluation of patients.

These initial results warrant more investigation into the complex interactions among surgical methods, patient attributes, and kidney outcomes. Not only do these discoveries have direct therapeutic consequences, but they also contribute to a better understanding of the intricate link between kidney function and urological procedures. This insight will help shape future research and improve patient care.

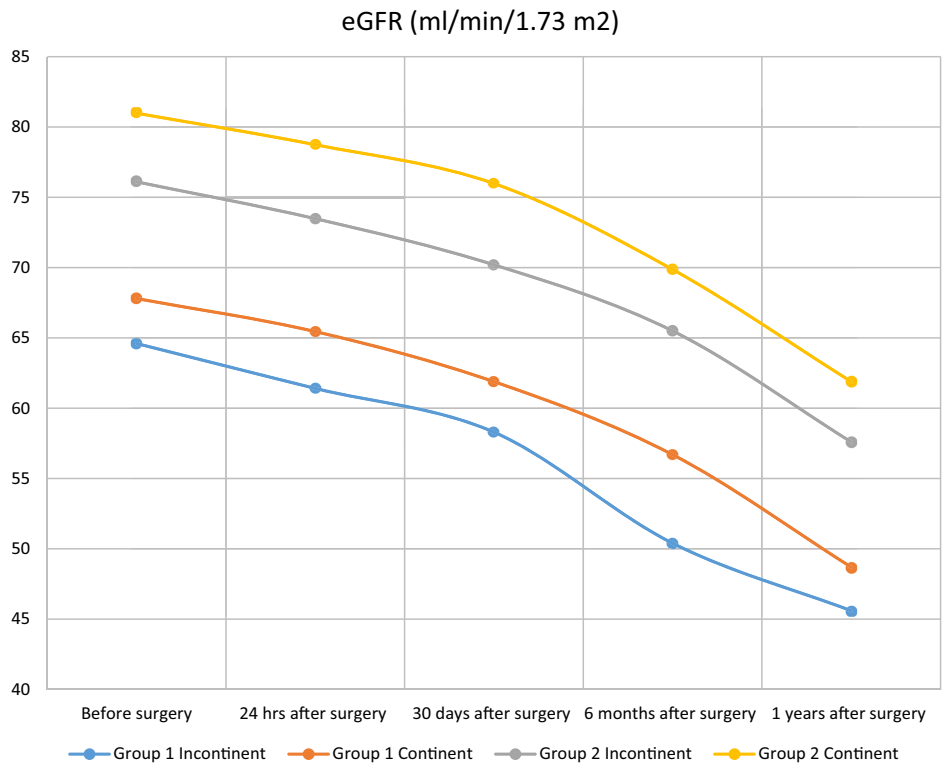

Figure 1. Key trends and differences in eGFR following bladder and prostate cancer surgeries.

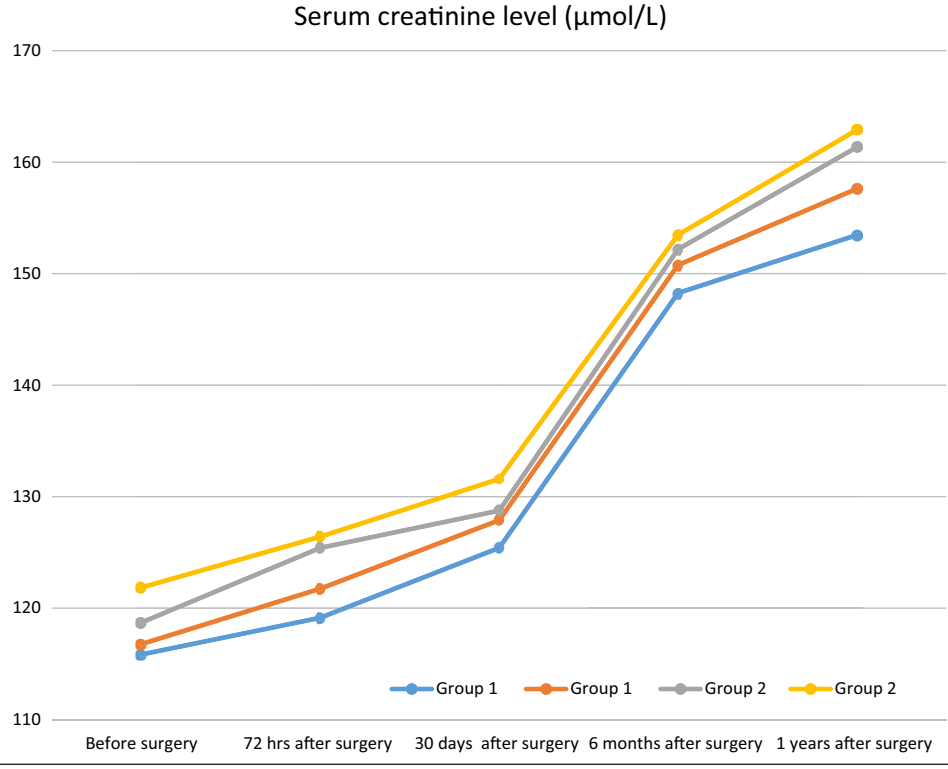

Figure 2. Key trends and differences in serum creatinine level following bladder and prostate cancer surgeries.

There are no prior investigations on kidney function in Iraq following prostate and bladder malignancies. Therefore, the primary goal of this study was to assess kidney parameters following surgery for prostate and bladder cancer, such as eGFR and serum creatinine levels. In this prospective observational analysis, 1193 patients with prostate and bladder cancer who were scheduled for surgery at the 3 institutions were included. Before (1 week) and after (6 months, a year, 30 days, and a week following surgery), the eGFR and serum creatinine levels were assessed. After surgery, eGFRs declined in both groups, although more in the case of patients receiving incontinent diversion than in the case of patients receiving continent diversion. However, the serum creatinine eventually increased more when it was greater in those receiving continent diversion. It was also noted that group 2's creatinine and eGFR were higher than group 1's. Regardless of the type of urine diversion, we observed an expected deterioration in kidney function over time in our 1-year assessment of the patients.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author.

Ethics Committee Approval: Ethics committee approval was received for this study from the Ethics committee of University of Baghdad (approval number: O/2/9/2021; date: September 2, 2021).

Informed Consent: Written informed consent was obtained from the patients who agreed to take part in the study.

Peer-review: Externally peer-reviewed.

Declaration of Interests: The author has no conflict of interest to declare.

Funding: The author declared that this study has received no financial support.

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