



URINE RESULTS AS A PREDICTOR OF ACUTE KIDNEY FAILURE AFTER RADICAL CYSTECTOMY AND URETEROCUTIA STOMA

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ABSTRACT

Acute kidney failure (AKI) is a spectrum of diseases characterized by changes in urine production and serum creatinine concentration. In recent years the concept of kidney injury and failure has evolved, replacing the term "acute kidney failure" (GGA) with the criteria of Risk, Injury, Failure, Loss of kidney function, and end-stage kidney disease, where healthcare workers must assist patients in self-management to improve their well-being and prolong life. One of the self-management is adherence to fluid restriction and diet which is very important to reduce the incidence of deterioration of the patient's condition, Custerostomy (CU) is a rare form of urination diversion, but can be the simplest urine diversion option in high-risk elderly patients. Objective to determine the amount of urine output as a predictor of renal failure I post-radical surgery cystectomy and ureterocutaneous stomas. An intervention was carried out starting on the 2nd day after surgery and a sample of one patient with a diagnosis of acute kidney failure after radical cystectomy and ureteroduct stoma surgery who was temporarily undergoing treatment in the urology room of Lontara 4 Wahidin Sudirohusodo Hospital Makassar, the intervention provided was monitoring urine production, increasing urea, creatinine and GFR in postoperative patients with radical cystectomy and ureterocutaneous stoma for 6 days from from April 22 to April 27, 2024 by means of urine production in 24 hours which is accommodated in a stoma bag measured using a 2-liter urine measuring cup and the results of urine volume in 24 hours are recorded on the integration sheet, urea and creatinine levels are observed every 2 days by taking blood samples and examined in the laboratory of Wahidin Sudirohusodo Hospital. After postoperative radical cystectomy and ureterocutaneous stoma monitoring intervention, there was an increase in urine volume every day and did not have a significant impact on the improvement of urea, creatinine and GFR in acute renal failure. Conclusion: after the intervention, there was an improvement in urea, creatinine and GFR levels but it was not very meaningful for patients with acute kidney failure, namely radical cystectomy and ureterocutaneous stoma which were shown by signs of improvement with an increase in urine volume every day.

Keywords: creatinine; urine production; urine measurement; ureterocutaneous stoma

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INTRODUCTION

Acute kidney injury (AKI) is a spectrum of diseases characterized by changes in urine production and serum creatinine concentration. In recent years, the concept of injury and kidney failure has evolved, replacing the term "acute kidney failure" (ARF) with the criteria of Risk, Injury, Failure, Loss of Kidney Function, and End-Stage Kidney Disease (RIFLE), and subsequently with the Global Kidney Disease Outcomes Improvement (KDIGO) criteria for AKI (Mullens et al., 2022)(Tamargo et al., 2024). Patients with end-stage chronic kidney disease (CKD) or *end stage renal disease* (ESRD) who have undergone routine hemodialysis (HD), still experience problems, both physical and psychological, which can result in a decrease in quality of life(Forwaty et al., 2022). Kidney care is highly dependent on the knowledge, abilities and skills of health workers, where health workers must help patients in self-management to improve their well-being and prolong life. One of the self-management is

that adherence to fluid and dietary restrictions is very important to reduce the incidence of worsening of the patient's condition (Beerendrakumar et al., 2018).

Urea and creatinine are chemical compounds that signal normal kidney function. If it is known that the urea creatinine in the urine decreases, it will result in a decrease in the glomerular filtration rate which will result in an increase in the level of urea creatinine in the blood. Therefore, creatinine urea examination is always used to determine kidney function in patients who are suspected of having disorders in the kidney organs (Nuroini &4, 2022). Conduct a systematic review of how the measurement of serum urine and creatinine output can be used for the early detection of acute kidney injury, Discuss the comparison of sensitivity and specificity between urine output and serum creatinine in the detection of kidney injury. Bladder cancer is the fourth most common cause of death in people over the age of 80. Bladder cancer is twice as common in patients over the age of 85 as in patients between the ages of 65 and 69. Custerostomy (CU) is a rare form of urine diversion, but it can be the simplest urine diversion option in high-risk elderly patients (Agarwal et al., 2018). Quiterostomy ureterostomy is a simple, rapid, safe, and minimally invasive urine diversion procedure that eliminates the risk of intestinal and metabolic complications because the intestinal segment is not involved (Rodriguez et al., 2022). In contrast, the route to the upper urinary tract is simplified without ureterointestinal anastomosis.(Burkhard & Wuethrich, 2018). Objective to determine the amount of urine output as a predictor of acute kidney failure after radical cystectomy and ureterocular stoma.

METHOD

This type of research is descriptive using a case study design with a research sample of one person with a sampling method using purposive sampling where the determination of the sample using inclusion criteria is carried out an intervention that starts on the 2nd day postoperatively with a diagnosis of acute kidney failure after radical cystectomy and ureteroduct stoma who is temporarily undergoing treatment in the urology room of Lontara 4 Wahidin Sudirohusodo Hospital Makassar, the interventions provided are monitoring urine production, increasing urea, creatinine and GFR in postoperative patients with radical cystectomy and ureterocutaneous stoma for 6 days from April 22 to April 27, 2024 by means of urine production in 24 hours which is accommodated in a stoma bag measured using a 2-liter urine measuring cup and the results of urine volemes in 24 hours are recorded on the integration sheet, Urea and creatinine levels were observed every 2 days by taking blood samples using a 2 ml spoid and then put into a red blood tube and examined in the laboratory of Wahidin Sudirohusodo Hospital.

RESULT

Table 1.
Monitoring of urine production, creatinine, urea measurement after urotherocutaneous surgery

Day/Date	Exodus	Urea	Creatinine	eLFG	CKD Degree	Blood pressure
Monday, 22-4-2024	900 cc/24 jam	114	2.66	26	4	150/72
Tuesday, 23-4-2024	1100 cc/24 jam	86	1.69	38	3	169/79
Wednesday, 24-4-2024	1700 cc/24 jam	86	1.69	38	3	170/100
Thursday, 25-4-2024	1800 cc/24 jam	90	2.23	32	3b	160/100
Friday, 26-4-2024	2000 cc/24 jam	90	2.23	32	3b	150/100
Saturday, 27-4-2024	1900 cc/24 jam	106	1.11	73	2	150/89

The intervention carried out on AKI patients with postoperative Radical Cystectomy and ureterocuteneus stoma is, Make sure to monitor the amount of urine strictly, because

ureterocutaneous is the transfer of urine directly to the skin through stomas. The patient's urine output over the last 24 hours was recorded at only 900 mL. A reduced amount of urine may indicate complications or dehydration. Periodic control of creatinine and urea levels as patients with kidney failure have a high risk of accumulation of kidney waste products which can lead to uremia which can result in kidney damage. Fluid and electrolyte management is essential to avoid excess fluids, and monitor potassium and sodium as well as often unstable blood pressure in CKD patients. Meanwhile, Wizemann (1995 in Tsai, Chen, Chiu, Kuo, Hwang, & Hung 2014) states that more than 15% of overload cases cause death in patients undergoing hemodialysis.

On the second day, the patient's urine production in 24 hours was recorded at 1100 mL. These results put patients in a range that is still quite good, although slightly below the normal number in healthy adults which typically reaches around 1500-2000 mL per day. Although 1100 mL is slightly below normal, this production is still quite good compared to patients who have oliguria (less than 400 mL of urine per day) or anuria (no urine production), which are signs of more severe kidney dysfunction. A GFR of 38 mL/min indicates that the patient is in the CKD stage where kidney function is still around 30-59% of normal. With a GFR of 38, the patient is at stage 3 CKD, which reflects a moderate decline in kidney function.

As of April 24, 2024, urine production in the last 24 hours is 1700 mL, which is still within the normal limit for adults. This figure shows that the patient's kidneys are still able to produce a sufficient amount of urine. This is a positive sign in the context of CKD, especially after ureterocutaneous surgery, as it indicates that the flow of urine through the stoma is smooth without blockages or other mechanical problems. Although the amount of urine is within normal limits, it is important to remember that the volume of urine production does not always reflect the quality of kidney function completely. In CKD, the kidneys are often unable to filter waste and electrolytes properly, even though urine production appears normal (Aminah et al., 2023). A GFR of 38 mL/min indicates that the patient is in stage 3 CKD, where kidney function has decreased significantly (30-59% of normal function).

Day 4 on April 25, 2024 The patient's urine production in the last 24 hours was 1800 mL which is still within the normal range of adults. This shows that the function of the kidneys in producing urine is still going well after surgery, the patient's ureum reaches 90 mg/dL which indicates a significant increase in the level of nitrogen waste in the blood and the patient's urea reaches 90 mg/dL which indicates a significant increase in the level of nitrogen waste in the blood. Creatinine levels of 2.23 mg/dL indicate impaired kidney function, the patient's GFR of 32 mL/min indicates that the patient is in stage 3b CKD, the patient's blood pressure was recorded at 160/100 mmHg which indicates grade 2 hypertension. Hypertension is one of the main factors causing decreased kidney function in CKD (Leach et al., 2020). Uncontrolled blood pressure can accelerate the progression of chronic kidney disease, damage kidney blood vessels, and worsen the long-term prognosis (Leach et al., 2020).

It is important to understand that the volume of urine excreted does not necessarily reflect filtration function, impaired renal filtration function should be evaluated through laboratory tests such as creatinine, urea, and GFR. On the fifth day, the urine excreted by the patient in the last 24 hours was recorded as much as 2000 mL which is a normal amount, the patient's urea reached 90 mg/dL, the patient's creatinine was recorded at 2.23 mg/dL, the patient's kidney function had decreased significantly. This suggests that the excretory function of the kidneys is still doing well in terms of urine production, at least in terms of volume, although the quality of filtration of waste by the kidneys decreases (Jeyapala et al., 2015).

On the 6th day of the intervention, the patient's urine production in the last 24 hours reached 19000 mL, very high compared to the normal range. The discharge of 19000 mL of urine in 24 hours indicates a condition of polyuria, which is a condition in which urine produced far exceeds normal capacity which can be affected by diuretics, increased fluid intake, kidney damage. Monitoring of urine volume will be carried out daily to detect significant changes that may indicate a new problem (Vincent & Mahendiran, 2015). The patient's GFR was 73 mL/min, which indicates the patient was in stage 2 CKD (GFR 60-89 mL/min). This is an encouraging result, because it shows that the kidneys are still able to perform filtration functions effectively.

DISCUSSION

In this case, the patient entered through the Emergency Department (IGD) with complaints of lower abdominal pain since 1 month ago, aggravated in the last week. After BAK is not feeling well, often waking up for night BAK, a history of nephrectomy 6 months ago at Tarakan Hospital and replaced every month the patient is planned to have a bottle removal surgery. History of bleeding BAK 1 week, History of TURP surgery in November 2023, History of hypertension for 5 years and routine consumption of amlodipine 10 mg, on April 20 the patient was operated on and treated in the ICU. On the 20th and 21st the patient was transferred to the urology inpatient room and appeared to be a surgical wound covered with wet gauze and a stoma of lumbar dextra ileostomy, Drainage on the Lumbar Sinistra. The nursing diagnosis in this case is, pain related to the surgical process, risk of infection marked by the installation of a stoma, risk of bleeding characterized by redness in the surgical area, risk of impaired kidney function characterized by obstruction of urine flow, changes in quality of life related to the installation of stomas, anxiety related to concern about changes in events in life.

For patients undergoing cystectomy and urine diversion, maintaining kidney function and improving the patient's quality of life are the main goals of treatment. Compared to orthotopic neobladders and ileal canals, cutaneous ureterostomy provides a simple and safe alternative to urine diversion in high-risk patients (Straffon et al., 2021). Now *Radical cystectomy* (RC) is considered the gold standard for treating muscular invasive bladder cancer ("European Urological Association on Non-Invasive Bladder Cancer of the Muscular (Ta, T1, and Carcinoma in Situ)," 2019). Postoperative stoma stenosis and subsequent urinary tract infections have limited its application (HR et al., 2021). Stoma stenosis can be avoided to some extent by changing the catheter regularly, this solution can greatly affect the patient's quality of life and cause catheter-related complications (Rodriguez et al., 2022). The patient's non-compliance with food and fluid intake can lead to the buildup of toxic fluids and metabolic end products in the bloodstream which can result in increased morbidity and premature death (Ahrari et al., 2014). Although the diagnosis of acute kidney injury (AKI) currently involves the measurement of acute increase in serum creatinine (SC) and decreased urine production (UO), UO measurement is underutilized for the diagnosis of AKI in clinical practice (Malbrain et al., 2024).

The pathophysiology of AKI in the ICU is multifactorial, with reported incidence varying between patient populations and history of comorbidities (e.g., cardiovascular disease, hemodynamic instability, infections, chronic kidney disease, liver disease, diabetes, surgery, and nephrotoxic drugs) (Kim et al., 2020). Detection with UO criteria is also expected to occur in older populations, where SC is reduced due to reduced muscle mass (Papatsoris et al., 2021). For patients over 60 years of age, the greatest incidence was detected in AKIUO

or SC patients, indicating that more cases were missed when the UO criteria were removed from practice (66% compared to 20% by AKISC) (Maruyama et al., 2022). Our findings and recent research highlight the importance of adhering to guidelines that suggest UO and SC monitoring to diagnose AKI as early as possible for greater detection (Mullens et al., 2022). Additional research is needed to further explore the prognostic value that may be obtained from examining one metric in the absence of another (Pycha et al., 2022). Modified cutaneous ureterostomy has a high catheter-free rate, and patients with catheter insertion are more likely to experience kidney damage, postoperative pyelonephritis, and urolithiasis compared to other patients (Wada et al., 2019). The modified cutaneous ureterostomy method can provide an effective and simple approach to tubeless cutaneous ureterostomy in elderly patients and high-risk patients (Yanagi, 2024).

CONCLUSION

Chronic kidney failure, postoperative resection of tubercles, and ureterocutaneous stoma formation are serious conditions that require intensive medical attention. Close monitoring of kidney function as well as appropriate medical intervention are essential to improve the patient's prognosis.

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