

Multidisciplinary Treatment on a 69 years-old Male with Kidney Stone and Chronic Kidney Disease

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Abstract — Kidney stones (KS) are a common urological condition often associated with chronic kidney disease (CKD). This case report details a 69-year-old male with a large staghorn calculus in the right kidney, resulting in severe hydronephrosis and impaired renal function (eGFR 4 ml/min/1.73 m²). A bivalve nephrolithotomy was performed to remove the stone. Postoperative analysis identified the stone as calcium oxalate, prompting a multidisciplinary approach with urologists, nephrologists, and nutritionists. Dietary adjustments and CKD management improved the patient's renal function over three months. This case highlights the importance of early surgical intervention and a collaborative treatment strategy to reduce recurrence, slow CKD progression, and avoid renal replacement therapies.

Keywords — Kidney Stone; Urinary Obstruction; Chronic Kidney Disease; Treatment; Holistic Care.

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INTRODUCTION

Kidney stones (KS) are a common urological condition caused by crystal agglomerates that form in the urinary tract and are occasionally passed through it. Greek terms nephros, which means kidney, uro-, which means urinary, and lithos, which means stone, are also used to refer to it as nephrolithiasis or urolithiasis [1]. Around the world, there were over 115 million (95% uncertainty interval [95% UI] 93–140) incident cases of urolithiasis in 2019, and the age-standardized incidence rate (ASIR) (per 100,000 population) fell from 1696.2 (1358.1–2078.1) in 1990 to 1394 (1126.4–1688.2) [2]. Urinary flow obstruction caused by kidney stones leads to complications like chronic kidney disease (CKD). The complex association between kidney stones and CKD is that although stones can cause CKD, the likelihood of recurring stones falls as CKD worsens, which frequently results in underrecognition of this association [3,4]. Effective management strategies, including dietary modifications and increased fluid intake, could prevent the incidence of recurrency [5,6].

Kidney stone management and preventing the progression of CKD require a multidisciplinary strategy [7]. In order to address underlying metabolic disorders, create personalised treatment plans, and assure long-term follow-up care to prevent recurrence and manage potential complications, collaboration between urologists, nephrologists, nutritionists, and primary care providers is essential. This approach promises that patients achieve comprehensive treatment that attends to both the immediate and long-term impacts of kidney stones on their renal function [5].

CASE ILLUSTRATION

A 69-year-old male presented to the emergency department with complaints of persistent right-sided flank pain that had worsened over the past week. The patient reported experiencing intermittent episodes of flank pain over the past year, but had not sought medical evaluation until the pain became constant and unrelenting. He denied any recent history of trauma or fever, but did mention occasional dysuria. Initial radiological evaluations, including a plain X-ray and ultrasound, revealed the presence

of a large staghorn calculus occupying the right renal pelvis, which extended into multiple calyces. The patient also showed signs of severe hydronephrosis in the right kidney, suggesting long-standing obstruction. Blood tests were performed, revealing impaired renal function, with a significantly reduced estimated glomerular filtration rate (eGFR), indicative of CKD. Before surgery, the patient had an estimated Glomerular Filtration Rate (eGFR) of 4 ml/min/1.73 m² and a creatinine value of 11.92 mg/dL. Additional blood work showed mild anemia, which was consistent with renal impairment.

The patient was referred to a urologist for additional care due to the seriousness of the findings. The urologist examined the imaging results and suggested a surgical procedure called a bivalve nephrolithotomy to remove the large staghorn stones. The kidney had to be surgically opened in order to remove the stone fragments and guarantee total clearance. The kidney was preserved, and there were no notable intraoperative complications reported. After the procedure, the removed stone underwent a histopathological examination to ascertain its composition, which would help in developing a prophylactic plan to avoid recurrence. The findings suggested that the majority of the stones' composition was calcium oxalate, requiring a multidisciplinary approach including an internist and a nutritionist. The patient was then referred to a nutritionist to customise his diet, with the goal of minimising his consumption of animal proteins, sodium, and oxalate- rich foods while maintaining appropriate hydration. To lower the chance of developing stones in the future, a customised diet plan was put in place. The patient's comorbid conditions, such as chronic kidney disease (CKD) and anaemia, were also managed by the internist, who concentrated on stabilising kidney function and monitoring for any potential progression. Re-measurement was performed one month following surgery and multidisciplinary treatment, with the patient's creatinine outcomes of 10.11 mg/dL and eGFR of 5 ml/min/1.73 m². The patient's condition significantly improved in the third month, with an eGFR of 6 ml/min/1.73 m² and a creatinine of 8.47 mg/dL.

Table 1. Comparison of Kidney Function Test Results

Time	Creatinine mg/dL	eGFR ml/min/1.73 m ²
Before surgery	11.92	4
1 Month after surgery	10.11	5
3 Month after surgery	8.47	6

DISCUSSION

Urinary solutes precipitate to form crystalline material aggregates in the urine space, a condition known as kidney stone disease, nephrolithiasis, or urolithiasis [8]. Kidney stones can grow as an accumulation on crystalline deposits through the kidney's terminal collecting ducts or as an attachment to calcium phosphate deposits on renal papillary surfaces [9]. The risk and course of chronic kidney disease are greatly impacted by kidney stones [10]. Kidney stone incidence and prevalence are increasing worldwide due to a confluence of environmental, metabolic, and genetic factors [11]. Calcium oxalate stones are the most common type, and genetic predispositions play a significant role in stone formation. Metabolic abnormalities and dietary habits are also critical contributors [8,12]. There are several factors linked to hereditary kidney stones, including mildly impaired kidney function, early onset, frequent recurrence, and common bilateral affection. Kidney stones can be an insignificant, asymptomatic finding or a painful, recurrent condition with significant morbidity [13]. The incidence of a symptomatic recurrence increases with age, gender, pregnancy, obesity, family history of stones, and rarer stone compositions and radiographic kidney stone burden [14]. Renal outcomes can be improved with effective management and early treatment of kidney stones [15].

Open stone surgery (OSS) is effective for removing large and complex stones, such as staghorn calculi, in a single intervention, which can prevent further kidney damage [16,17]. OSS has a high stone-free rate, especially in cases where other methods might require multiple sessions like we found on this patient [17]. After undergoing surgery we need to do a stone

analysis to find out the composition of the patient's stones. Physical methods for stone analysis, such as morphologic examination and crystalluria study, enhance patient care by aiding in the diagnosis of underlying conditions that affect kidney stone formers [18]. Kidney stones can be prevented as much as possible, and effective prevention depends on patient education and compliance to the prescribed treatment plan [19]. Nephrologists play a pivotal role in the management of CKD patients with kidney stones, particularly through collaboration with urologists and nutritionists. Their involvement is crucial in optimizing treatment, managing complications, and providing patient education. Effective communication and clear delineation of roles between nephrologists and primary care providers are essential for improving patient outcomes. The integration of nephrologist expertise remains vital in managing complex cases and preventing complications [20]. Nutritionists are essential in the management of kidney stones and CKD because they can provide tailored dietary interventions, track nutritional status, and stop malnutrition, which can slow the progression of the disease and lower the risk of kidney stone recurrence [21].



Fig. 1. Abdominal x-ray showed multiple kidney stones.

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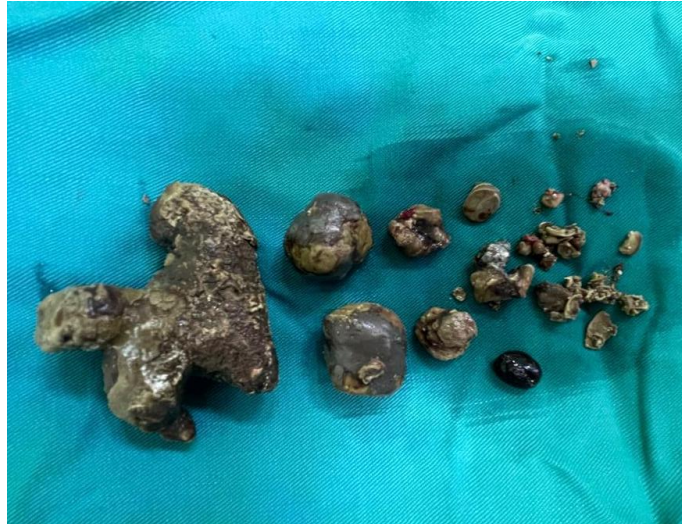


Fig. 2. The result of kidney stone removal by bivalve nephrolithotomy.

Research has demonstrated that applying a multidisciplinary approach to treat kidney disease can greatly enhance patient outcomes by addressing multiple aspects of the illness systematically. This approach involves a multidisciplinary team of experts including urologists, nutritionists, nephrologists, and primary care physicians. The aims are to reduce mortality, slow the progression of the disease, and reduce the need for renal replacement therapies such as dialysis or kidney transplants [7,22].

CONCLUSION

The importance of kidney stones on the development and risk of chronic kidney disease (CKD) is highlighted in this case report, especially in cases involving large, complex stones like staghorn calculi. In order to achieve a high stone-free rate and prevent further kidney damage, the patient's case illustrates how early intervention with open stone surgery (OSS) in conjunction with post-surgical stone analysis is essential. In order to prevent recurrence, it is crucial to address metabolic and dietary factors. The most important aspect to take away from this case is the need for a multidisciplinary approach in the management of kidney stones and CKD. Patients benefit from comprehensive care that preserves kidney function, treats underlying metabolic disorders, and provides personalized dietary recommendations when urologists, nephrologists, and nutritionists collaborate. Working with a nutritionist reduced the patient's consumption of oxalate-rich foods and ensured that they were drinking enough water, while the nephrologist closely monitored kidney function and managed the progression of CKD. Using this approach can improve long-term outcomes by slowing the progression of the disease, reducing the risk of a recurrence, and potentially reducing the need for renal replacement therapies such as dialysis or kidney transplantation. Effective management of kidney stone disease and CKD can greatly improve patient prognosis and quality of life, with clear clinical implications for practice.

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