

Nephrolithiasis on The Right Kidney: A Case Report

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Abstract

Nephrolithiasis or kidney or renal stone, is a common disease in the World. In industrialized countries, the prevalence of upper urinary tract stones has persistently increased in the twentieth century, yet there are significant contrasts among countries and furthermore inside a similar countries. The case of this Nephrolithiasis on right Kidney was reported at W.Z Johannes Hospital, Kupang, East Nusa Tenggara, Indonesia. The patient is a 64 year old female with right renal stone. The patient came to the ER with complaints of right flank pain and patient complains of hematuria first. Percutaneous Nephrolithotomy (PCNL) surgical procedure was performed to release the stone. Conclusion : The cause of the right renal stone should be considered to treatment as eliminating the cause and the underlying factor will reduce the complications and recurrence rates.

Keywords: Nephrolithiasis, Percutaneous Nephrolithotomy

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INTRODUCTION

Nephrolithiasis, or kidney stones, is the most common condition affecting the urinary system, affecting about 12% of the world population, with a yearly incidence of 600,000 in America. It is the result of a crystal or crystalline concretion traveling from the kidney through the genitourinary system. Kidney stones correlate with an increased risk of chronic kidney diseases, end-stage renal failure, cardiovascular diseases, diabetes, and hypertension.⁽¹⁾

CASE REPORT

A 64-year-old-female, visited W.Z Johannes hospital with a cover letter from dr. Arley, Sp. U, with right pyelo stone dextra and PCNL surgery plan. At first, she complained about right flank pain, the pain feels comes and go and felt like stabbing. The pain worsening if she does a daily activity. she has ever used balm and oil to reduced the pain and it's not impacting the pain. After that, she has been given a medication to reduce the complaints, named renax and the complaints are now reduced. She also complained that she red-brownly urine (hematuria) since the end of Mei 2022 and and occurs for 1-2 weeks. Vomiting(-) nausea(+).

On physical examination , vital signs were within normal limits. There was no costo vertebral angle (CVA) knock pain on both side. There were no abnormalities in the external genitalia. Laboratory test showed increasing on red blood cell and glucose cause the patient have a diabetes mellitus type 2. X-ray imaging showed right renal multiple stone with susp scoliosis (Figure 1). CT SCAN (Figure 2) showed local upper pole ectasis, right nephrolithiasis, left renal cyst, and there is incidental finding such as cholelithiasis. From the surgical procedure, there is multiple stone (Figure

3). Patient underwent PCNL dextra surgical procedure. The first procedure, the patient should in galdacao modified position, then make a small 1 cm incision on the right flank area A tube is placed through the incision into the kidney under x-ray guidance. A guide wire is then passed through the tube in order to visualize the stone, do the puncture bulls eye the stone on low pole and the guide wire in to the upper pole break it up and remove it from the body. There is residual stone on the low pole so nefrostomi tube added. After clean the stone. Sew the operation with chromic cat gut 1.0. Make sure the operation wound after sew clean.

After the Operation , the patient went X-Ray BOF imaging again to evaluate and make sure renal stone were cleared. X-Ray BOF showed residual stone on right renal.



Figure 1. Plain BOF shows right renal multiple stone with susp scoliosis.

DISCUSSION

Nephrolithiasis (kidney stones) is one of the kidney diseases, where stones containing crystal components and organic matrix are found which are the most common causes of urinary tract infection.⁽¹⁾

whereas stones that are small (<5mm) generally can pass spontaneously, larger ones usually remain in the ureter and cause inflammation and cause chronic obstruction in the form of hydroureter or hydronephrosis.⁽²⁾



Figure 2. CT SCAN shows right renal stone.



Figure 3. Multiple stone from right renal.

In Indonesia itself, the most common kidney disease is kidney failure and kidney failure nephrolithiasis. The highest

prevalence of nephrolithiasis is in DI Yogyakarta (1.2%), followed by Aceh (0.9%), West Java, Central Java, and Central Sulawesi each (0.8%). The prevalence of this disease is estimated at 7% in adult women and 13% in adult men. Four of the five patients were male, while the peak age was in the third to fourth decade. The location of a typical kidney stone is found in the calyx, or pelvis and when it comes out it will stop and clog the ureter (ureteric stones) and bladder (bladder stones). Kidney stones can form from calcium, oxalate stones, calcium oxalate, or calcium phosphate. But the most common in kidney stones are calcium stones.

The exact cause that forms kidney stones is not known, because many factors are involved. It is suspected that two processes are involved in kidney stones, namely supersaturation and nucleation. Supersaturation occurs when the substances that make up stones are present in large amounts in the urine, that is, when the volume of urine and the urine chemistry that suppresses stone formation decreases. In the nucleation process, sodium hydrogen urate, uric acid and hydroxypatite crystals form the nucleus. The calcium and oxalate ions then stick (adhesion) in the core to form a rock mixture. This process is called heterogeneous nucleation.

The formation of kidney stones is thought to correlate with urinary flow disorders, metabolic disorders, urinary tract infections, dehydration, and idiopathic. There are several risk factors for stone formation, including intrinsic and extrinsic factors. Intrinsic factors include heredity (heredity), age (often found at 30-50 years old), and gender (three times as many male patients as female patients). Some of the extrinsic factors include geography, climate, temperature, water intake (lack of water

intake and high levels of calcium, minerals in the water consumed), diet (diet with lots of purines, oxalate, calcium), and work (lack of activity or sedentary life)



Figure 4. Plain X-ray shows multiple nephrolithiasis on right renal (residual) after PCNL surgery.

More than 80% of urinary tract stones consist of calcium stones, both those that bind to oxalates and to phosphates, forming calcium oxalate stones and calcium phosphate; while the rest come from uric acid stones, magnesium ammonium phosphate stones (infection stones), xanthine stones, cysteine stones, and other types of stones. Although the pathogenesis of the formation of the stones above is almost the same, the atmosphere in the urinary tract that allows the formation of the type of stone is not the same. In this case, for example, uric acid stones are easily formed in an acidic atmosphere, while magnesium ammonium phosphate stones are formed because urine is alkaline.

The formation of kidney stones is influenced by intrinsic and extrinsic factors. Intrinsic factors are age, gender, and heredity, while extrinsic factors are

geographical conditions, climate, eating habits, substances contained in urine, work, and so on.

The risk factors for nephrolithiasis (kidney stones) are generally due to a history of stones at a young age, a family history of stones, gout, local and systemic medical conditions, genetic predisposition, diabetes, metabolic syndrome, low fluid intake, working or living in a hot environment and the composition of the urine itself. The composition of urine determines stone formation based on three factors, the excess of stone-forming components, the amount of stone-forming inhibitory components (such as citrate, glycosaminoglycans) or triggers (such as sodium, urate). The anatomy of the anatomical tract also determines the tendency of stone formation

Our patient, a female aged 64 where the factor of age. The other factor is habit of our patients in terms of drinking habits where our patients rarely drink water and had past medical history like diabetic.

Patients with nephrolithiasis often get complaints of pain in the lower flank and front. Pain can be colic or non-colic. The pain can persist and be very intense. Nausea and vomiting are often present, but fever is rare in patients. There may also had hematuria.

The most common clinical manifestation of nephrolithiasis was flank pain, followed by hematuria. These symptoms were more prominent in the presence of complications. And sometimes there is tenderness on CVA/

Plain abdominal radiographs aims to see the possibility of radioopaque stones in the urinary tract. Calcium oxalate and calcium phosphate stones are radioopaque

and most often found other types of stones, while uric acid stones are radiolucent. IVP to see non-opaque stones indicated by the presence of filling defects. If there is a stone, it will show echoic shadow. Non-contrast CT-Scans can determine the size and density of stones. CT-Scan can detect uric acid stones and xanthine. In this patient, an ultrasound examination was carried out and it was found that there was a multiple right kidney stone and mild hydronephrosis. A BNO examination was carried out and a multiple right kidney stone was obtained. A CT scan was performed and a nephrolithiasis dextra in the renal pelvis was obtained. Urinalysis examination needs to be done to determine certain substances in the urine, such as blood cells, protein, glucose, crystals, ketones, bilirubin, or bacteria. The presence of these substances in the urine can indicate that you may have a certain disease, such as a urinary tract infection, kidney disease, or diabetes. The supporting examination carried out to establish the diagnosis in this patient is a laboratory examination in the form of complete blood, which is obtained by high glucose and red blood cells. In this patient, an examination of urinalysis was also carried out and it was found that it there is red blood cells (+3) in the urine with cloudy urine and urine have red color.

Stones in the urinary tract that have caused problems in the urinary tract must be removed as soon as possible. The indication to take action on the patient is if the stone has caused obstruction, infection or must be taken due to social indications. Stone treatment can be in the form of medicamentous or surgically. Medicamentosa if the stone is <5 mm in size is expected to come out spontaneously. Other types of surgical options are ESWL if the stone is in the proximal ureter, PNL if the stone is in the kidneys and ureteroscopy

is inserting a ureteroscopic device per urethra to see the condition of the ureter then the stone is broken through ureteroscopic guidance.⁽³⁾

The gold-standard surgical treatment for multiple renal stone the percutaneous nephrolithotomy (PCNL). Although a complete stone-free postoperative status with only one session is a hard achievement when treating a complete staghorn stone, a well-planned approach (staged or not) may lead to very satisfactory outcomes. In a systematic review and meta-analysis comparing PCNL with retrograde intrarenal surgery, authors concluded that PCNL was associated with higher stone-free rate. PCNL has been shown to be done safely in patients with a history of open nephrolithotomy without a higher risk of complications such as bleeding and sepsis and with a success rate similar to that of PCNL in patients with no prior open intervention. In this patient, there is multiple stone measured >2 cm so that the patient do PCNL surgery.⁽⁴⁾

Therate of this disease will return to a very high (recurrent), depending on how we manage life when after the elevation of the stone. After the stones are removed from the urinary tract, it is necessary to carry out prevention. Prevention can be in the form of: 1) Avoiding dehydration by drinking enough and trying to produce 2-3 liters of urine per day; 2) Diet to reduce levels of stone-forming components; 3) Sufficient exercise and 4) Administration of medicamentosa. Lifestyle changes may be the prevention such as increase in fluid intake (drinking advice): 2.5-3.0 L/day to neutralize the pH of your urine, adopting a balanced diet, with less meat and alcohol and more vegetables and fibre, to have healthy calcium levels and

less animal protein, maintaining a healthy weight (normal body mass index) and adequate physical activity.⁽⁵⁾

CONCLUSION

A case of right kidney stone (nephrolithiasis) have been reported at W.Z Johannes Hospital, Kupang, East Nusa Tenggara, Indonesia. The diagnostic methods based on anamnesis, physical examination and investigations revealed a right kidney stone. The patient was treated in the form of PCNL dextra on August 10, 2022. During treatment at the hospital the patient received treatment according to indications, open nephrolithotomy surgical procedure. The cause of staghorn renal stone should be considered prior to staghorn renal stone treatment as eliminating the underlying cause will reduce recurrence rates..

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