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The Profile of Urolithiasis Patient at Aeramo General Hospital: A Descriptive Research at Remote Area

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Introduction. Urolithiasis is the fourth leading cause of kidney failure in Indonesia. Indonesia does not have a comprehensive national profile for urolithiasis. This study aims to profile the urolithiasis patient at Aeramo General Hospital, East Nusa Tenggara.
Methods. This study used a descriptive design, collecting data on urolithiasis patients from non-electronic medical records from October 2020 to May 2024.
Results. A total of 80 patients with urolithiasis were included in this study, 44 with kidney stones, 33 with bladder stones, and 3 with both. The largest age group was 40–60 years (50%), with a male predominance (81.25%). Most were farmers (50%) with a high school education (35%). The majority of patients smoked (63.75%) and consumed alcohol (68.75%). The most common symptom was colic pain (67.5%). Abdominal ultrasound was the primary diagnostic modality (77%). Most kidney stones measured 1–2 cm (55%), and most bladder stones were >4 cm (47%). Forty-three patients underwent surgery, while 37 did not, primarily due to financial constraints (70.3%).
Conclusion. The highest incidence of urolithiasis was found in men aged 40-60 years, predominantly farmers with a high school education. Kidney stones were most common, with sizes of 1-2 cm, while bladder stones were mostly >4 cm. Financial constraints were the primary reason for refusing surgery.

Keywords: bladder stone, remote area, renal stone, urolithiasis

Introduction

The incidence of urolithiasis has significantly increased over the past three decades, mainly due to the enhanced use of diagnostic modalities. In Asia, the incidence has risen from 1-19% to 5-19.1% across various countries [1-2]. In Indonesia, urolithiasis is the fourth leading cause of renal failure. Despite this, no comprehensive national profile for urolithiasis incidence [3]. The management in Indonesia is primarily concentrated in major cities, with peripheral areas facing challenges due to limited diagnostic tools, therapeutic options, and lack of urologist [4]. The objective of this study was to explore the profile of urolithiasis patients at Aeramo General Hospital, East Nusa Tenggara.

Materials and Method

This study used a descriptive design, collecting data on urolithiasis patients from non-electronic medical records at Aeramo General Hospital, East Nusa Tenggara, Indonesia, from October 2020 to May 2024. We searched for data that included demographic characteristics, clinical characteristics, and the management performed.

The inclusion criteria include all patients with urolithiasis confirmed with radiological modalities who have a complete demographic characteristics in their medical records, including age, gender, occupation, level of education, and past medical history. In the clinical characteristic data, the diagnostic modality, symptoms, stone location, and stone size were included. We also included the treatment performed by either a general surgeon or urologist. We exclude patients with incomplete medical records and unknown treatments.

Result

From a total of 231 patients, 80 patients met the inclusion criteria. The data shows that the most common age group was 40-60 (50%), with a predominance of male patients (81.25%). Most were farmers (50%), and the education level was mostly high school (35%). Most patients reported smoking (63.75%) and consuming alcohol (68.75%). From the data, five patients had hypertension, two had type 2 diabetes mellitus, one had congestive heart failure, and two had recurrent stones. Table 1 shows the demographic characteristics.

Patients primarily presented with colicky pain (67.5%). Furthermore, the data shows 44 patients with renal stones, 33 patients with bladder stones, and 3 patients with both kidney and bladder stones. The most renal stone size was 1-2 cm (55%), and for bladder stone was >4 cm (47%). Table 2 shows the clinical characteristics.

Of the 80 patients, 43 underwent surgery, while 37 did not. The general surgeon's intervention is mainly done using the open surgery technique. Among those who had open surgery procedures, three experienced postoperative bleeding, and two developed surgical site infections. The most common reason for patients not undergoing surgery was financial constraints (70%). Table 3 shows the patient's management.

Table 1. Demographic characteristics

Characteristics	Number	Percentage (%)
Age		
<20	7	8.8
20-40	14	18
41-60	40	50
>60	19	23.8
Man	65	81.25
Woman	15	18.75
Work		
Farmer	40	50
Employee	19	23.75
Housewife	8	10
Unemployed	5	6.25
Student	4	5
Entrepreneur	3	3.75
Fisherman	1	1.25
Education level		
Elementary School	10	12.5
Middle School	17	21.25
High School	28	35
College	20	25
Not educated	5	6.25
Smoking		
Never smoke	29	36.25
Current/former smoker	51	63.75
Alcohol drinking		
Never drinker	25	31.25
Current/former drinker	55	68.75
Medical History		
Prostate Enlargement	12	17.5
Hypertension	5	6.25
Type 2 Diabetes	2	2.5
History of urinary tract stone	2	2.5
Chronic Heart Failure	1	1.25

Table 2. Clinical characteristics

Characteristics	Number	Percentage (%)
Stone Location		
Renal	44	55
Bladder	33	41.25
Both	3	3.75
Diagnostic Modalities		
Abdominal ultrasound	62	77
Abdominal x-ray	14	18
Abdominal CT	4	5
Symptoms		
Colic pain	54	67.5
Dysuria	43	53.8
Hematuria	35	43.8
Urinary Retention	11	13.8
Stone Size		
Renal		
<1 cm	16	34
1-2 cm	26	55
>2 cm	5	11
Bladder		
<2 cm	4	11

Characteristics	Number	Percentage (%)
2-4 cm	15	42
>4 cm	17	47

Table 3. Management of the patient

Characteristics	Number	Percentage (%)
Management		
Intervention by General Surgeon	26	32.5
Intervention by Urologist	17	21.25
Not operation	37	46.25
Complication after surgery (open procedure)		
Post operative hemorrhage	3	6.98
Surgical site infection	2	4.65
Reason for not having surgery		
Financial problem	26	70.3
Facility	11	29.7

Discussion

Demographic Characteristic

Aeramo General Hospital was located at Nagekeo Regency, East Nusa Tenggara Province, which includes the Stone Belt region. In addition to the interaction of risk factors and comorbidities, local drinking water quality and climate conditions also influence the incidence of urolithiasis in stone belt areas [5].

The incidence in men is higher than in women, although recent studies show an increase in cases among women compared to previous years [6]. In this study, the largest age group was 40-60 years, and the most common occupation was farmers. Urolithiasis incidence is most common between the ages of 30 and 60. Middle-aged individuals with physically demanding jobs are at a higher risk due to the increased likelihood of dehydration resulting from inadequate fluid intake and high fluid loss [2,7].

A total of 51 urolithiasis patients (63.75%) at Aeramo General Hospital were smokers, and 55 (68.75%) consumed alcohol. Smoking and alcohol are integral to the local culture in Nagekeo, making them difficult to separate from daily life. The presence of comorbidities, which interact with other risk factors, further elevates the risk of urinary stone formation. Metabolic diseases, such as diabetes mellitus, hypertension, and hypercholesterolemia, along with lifestyle factors like smoking and frequent alcohol consumption, increase the risk of kidney stone formation [7–9].

Clinical Characteristic

This study found that 47% of patients with bladder stones had stones larger than 4 cm. Stones of this size were classified as large stones, commonly found in developing countries such as Indonesia [10]. Bladder stones can develop primarily due to nutritional deficiencies, especially in children, while in adults, they are often associated with bladder outlet obstruction (BOO), such as benign prostatic hyperplasia (BPH) [11–13]. However, some studies suggest that bladder stones have multiple causes, mainly related to metabolic issues and a history of upper-tract urolithiasis [14].

In this study, ultrasonography (USG) was the most commonly used diagnostic modality, as its ease of use makes it a practical initial tool for patients with acute flank pain [15]. However, the European Association of Urology (EAU) recommends using non-contrast CT scans (NCCT) due to their higher sensitivity, specificity, and ability to provide detailed images of surrounding anatomical structures. Abdominal X-rays (BNO) may be considered when other modalities are unavailable [16-17].

Management of Urolithiasis

In this study, the treatment for renal stones was performed by a urologist, which means that the patient was referred to another facility in another city, while the bladder stone surgery was performed by a general surgeon, mainly with cystolithotomy.

The EAU recommended using Extracorporeal Shock Wave Lithotripsy (ESWL) or Retrograde Intrarenal Surgery (RIRS) for renal stones smaller than 2 cm, while Percutaneous Nephrolithotomy (PCNL) is preferred for stones larger than 2 cm [16]. ESWL has the lowest complication rate and may be used with Tamsulosin as an adjunctive medical expulsive therapy to reduce the recurrence rate [18-19].

This study found that most of the bladder stone cases are giant bladder stones. Surgical options for patients with bladder stones include Transurethral Cystolithotripsy (TUCL) and Percutaneous Cystolithotripsy (PPCL). In cases of larger stones (>4 cm or 100 grams), open cystolithotomy may be

considered [16,20]. Bladder stones frequently co-occur with BPH, making Transurethral Resection of the Prostate (TURP) with open cystolithotomy a viable option [21]. Cystolithotomy remains recommended for larger stones in pediatric cases, though the risk of bleeding should be carefully monitored [22].

We found that 6 patients out of the total undergoing open cystolithotomy experienced complications such as postoperative hemorrhage (6.98 %) and surgical site infection (4.65%). In addition to being influenced by age, nutritional status and certain medical conditions, these complications are also associated with the surgical method used. In several studies comparing the effectiveness of endourological procedures and open cystolithotomy, it was found that open cystolithotomy is still associated with complications such as small intestine injury and surgical site infections. However, the incidence of these complications is relatively low, making open cystolithotomy still a safe method to use [22-23]

In this study, 37 patients (46.25%) refused surgery, with financial issues being the most common reason (70.3%). Stones that are not properly managed, whether due to treatment refusal or asymptomatic presentation, can lead to obstructive nephropathy, increasing the risk of renal failure and potentially resulting in death [24].

Strength and Limitation

This study is the first to describe the profile of urolithiasis patients in Nagekeo Regency and to assess the treatment patients get. The profile data can serve as a baseline and reference for future studies. However, the small sample size in this study limits the ability to assess correlations between variables. Future research could examine the progress of patients who did not receive treatment compared to those who underwent surgery. Further studies could also explore the association of risk factors, geographic conditions, and healthcare facility resources with the high incidence of large bladder stones (>4 cm). Moreover, research on urolithiasis patient profiles could be expanded to other East Nusa Tenggara province regions.

Conclusion

The highest incidence of urolithiasis in Aeramo General Hospital, Nagekeo, East Nusa Tenggara, Indonesia occurred in men aged 40-60 years, with occupations as farmers and a high school education. The most common cases of urolithiasis found were kidney stones with sizes ranging from 1-2 cm. Most cases of bladder stones had stones larger than 4 cm. Patients who refused surgery mostly did so due to financial constraints.

Conflict of interest

The authors declare no conflicts of interest related to this study.

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