

Characteristic of Urinary Tract Stone Patient in Sido Waras General Hospital Mojokerto

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Objectives. Urinary tract stones have been discovered since the ancient Egyptian period. In the eighteenth century, a Russian scientist, H.C.G von Struve, discovered a struvite stone whose formation was initiated by a urinary tract infection. The prevalence of kidney stone disease in Indonesia was 0,6% in 2013, and in the United States, the incidence of kidney stone disease was 116/100.000 people in 2000. This research aims to determine the characteristics of urinary tract stone patients treated in Sido Waras General Hospital Mojokerto, East Java.

Methods. The design of this research is a descriptive study. The inclusion criteria are all new cases of urinary tract stones treated in Sido Waras General Hospital between 2017 and 2018. All clinical data regarding urinary tract stone disease is obtained from medical records retrospectively.

Results. There are 285 new cases of urinary tract stones treated in Sido Waras General Hospital Mojokerto in 2 years, in which 236 cases (83%) are male and 49 (17%) are female. Most urinary tract stone patients are classified in the 40-60 age group, with 197 cases in two years. The most common urinary tract stone is kidney stone, with 147 cases (51%). In two years, open surgery is the most common management method for urinary tract stone disease (52%). Based on comorbid disease, there are 120 urinary tract stone patients (42%) suffering from hypertension and 84 urinary tract stone patients (29%) suffering from diabetes mellitus.

Conclusions. The incidence of urinary tract stones in Sido Waras General Hospital is 285 cases. Urinary tract stones are more common in males, with a male-to-female ratio of 4:1. Most cases are kidney stones.

Keywords: urinary tract stone, characteristic, Sido Waras General Hospital

Introduction

Urinary Tract Stone Disease has been known since ancient Egyptian times; this is proven by the discovery of stones in the bladder of a mummy. In the 18th century, a scientist from Russia, H.C.G von Struve (1772-1861), discovered struvite stones in the formation process, which begins with an infection process in the urinary tract. In today's modern era, the increasing prevalence of kidney stones has become a global phenomenon. Data obtained from five countries in Europe, the United States, and Japan shows an increase in the prevalence and incidence of kidney stones from 1960 to 2000. In the United States, in 2000, the incidence of kidney stones reached 116/100,000 people, while in Japan, in 2005, the incidence of kidney stones reached 114/100,000 people [1][3-4].

In several European countries, there is an increase in the prevalence of kidney stones, such as in Germany, where in 2001 there was a 9% prevalence of kidney stone sufferers, and in Greece, the prevalence of kidney stones in 2006 reached 20%. In several countries in Asia, the prevalence of kidney stones was found to be 9.6% in 2002 in Taiwan, and in Iran, the prevalence rate for kidney stones was 8%. In Indonesia, complete data regarding kidney stone sufferers has not been widely reported. According to data from the Ministry of Health's Riskesdas in 2013, it was found that the prevalence of kidney stones in Indonesia was 0.6%, where the highest prevalence was in DI Yogyakarta Province at 1.2%, while the prevalence of kidney stones in East Java Province, namely 0.7%. Based on age, the highest prevalence was 1.3% at the age of 55-64 years, and based on gender, the highest prevalence was 0.8% for men.

The incidence of kidney stones in Indonesia in 2002, based on data collected from hospitals throughout Indonesia, was 37,636 new cases, totaling 58,959 visits. Meanwhile, the number of patients treated was 19,018 people, with the number of deaths being 378 people [4-6].

If we look at the composition of kidney stones, the results of research conducted at the Nephrology and Dialysis Center and Renal Stone Center in the city of Turin in Italy in 2010 stated that 50-70% of the composition of kidney stones is calcium, either bound to oxalate or bound to phosphate. Then 10-20% uric acid stones and 5-10% struvite stones. It is also in line with research conducted at the Clinical Pathology Department of FK Unhas/RS Wahidin Sudirohusodo, where the highest number of stone constituents was calcium oxalate at 87.4%, followed by uric acid stones at 32.2% and struvite stones at 24.6% [7-8].

Epidemiologically, several factors influence the formation of urinary tract stones, namely intrinsic and extrinsic factors. Intrinsic factors are factors that originate from a person's body, for example, heredity, age, gender, obesity, history of diabetes mellitus, metabolic syndrome, hypertension, and myocardial infarction. Extrinsic factors come from the environment around a person, for example, the geographical environment where they live, climate, temperature, nutritional intake in food and drink, and work [2-3].

Urinary tract management is divided into two, namely conservative and surgical. Conservative management includes increasing water consumption to produce urine production of 2L/day; adjusting diet to reduce animal protein intake and increasing consumption of vegetables and fruit; reducing weight for urinary tract stone patients with obesity; administering allopurinol and sodium bicarbonate therapy to patients—gout stone sufferers. Surgical management in the modern era has developed very rapidly. They started from conventional open surgical methods to minimally invasive and non-invasive surgical procedures. An example of a non-invasive therapy modality is ESWL (Extracorporeal Shockwave Lithotripsy), while an example of a minimally-invasive therapy modality is URS-L (Ureterorenoscopic-Lithotripsy) and PCNL (Percutaneous Nephrolitholapaxy). Although methods for managing urinary tract stones have improved, the recurrence rate can occur as high as 50% within five years and 70% within ten years. Therefore, identifying risk factors that cause urinary tract stones is important to prevent the emergence of urinary tract stones [1].

It is hoped that the results of this study will be able to provide data regarding the incidence of

urinary tract stones at Sido Waras Hospital, Mojokerto, during the period January 2017 - December 2018 and be able to provide an overview of the characteristics of urinary tract stone patients at Sido Waras Hospital, Mojokerto in terms of the aspects of gender, age, stone location, management actions taken and comorbidities (hypertension and DM). Apart from that, researchers hope this research could be the beginning of future research in the field of urology at Sido Waras Hospital.

Materials and Methods

This research design is descriptive research with inclusion criteria for the research sample, namely urinary tract stone patients (new cases) who came and were treated at Sido Waras Hospital from January 2017 to December 2018. Research sample data regarding gender, age, stone location, management actions undertaken, and comorbidities (hypertension and diabetes mellitus) were obtained by retrospectively searching the patients' medical records.

Results

This study used data from medical records of urinary tract stone patients who came and were treated at Sido Waras Hospital, Mojokerto Regency, from January 2017 to December 2018. Research sample data was collected retrospectively. Based on data from the research sample, there were 285 new cases (incidents) of urinary tract stones in two years at Sido Waras Hospital.

If viewed from the aspect of gender, it was found that the proportion of urinary tract stone patients for men was 83% (236 cases), and for women, it was 17% (49 cases), as shown in the diagram below (Fig. 1)

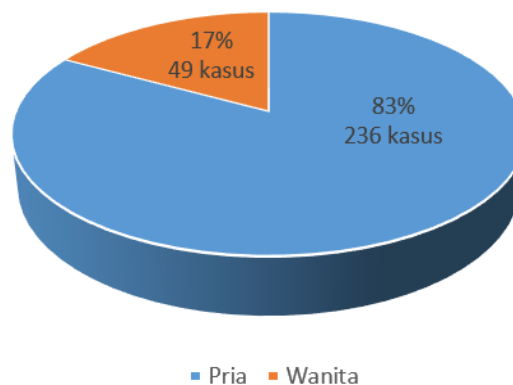


Figure 1. Proportion of urinary tract stone patients based on gender

If viewed from the age aspect, the largest distribution of urinary tract stone patients at Sido Waras Hospital, Mojokerto, is in the 40-60 year age group, followed by the >60 year age group, and the <40 year age group is the lowest in number. Moreover, within two years, there was an increase in the number of patients in all age groups, as seen in Figure 2.

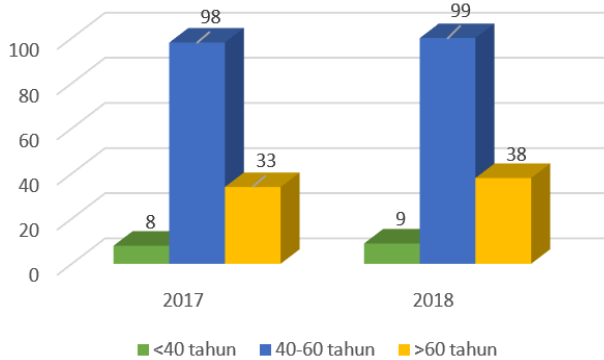


Figure 2. Distribution of urinary tract stone cases based on age

Figure 3 shows the proportion of urinary tract stone cases based on the location of the stone within two years, where the highest number of cases were kidney stones, with a percentage of 51% (147 cases), followed by ureteral stones with a percentage of 40% (114 cases), bladder stones with percentage of 8% (22 cases) and urethral stones with a percentage of 1% (2 cases).

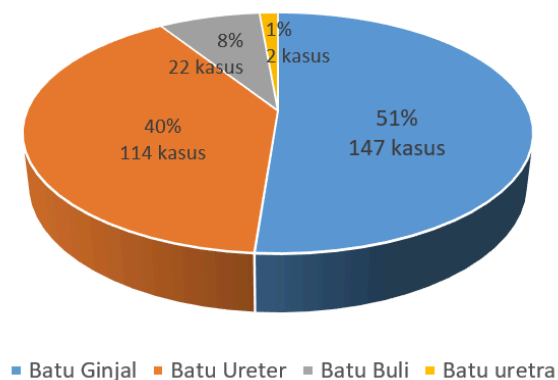


Figure 3. Proportion of urinary tract stone cases based on stone location

Based on the proportion of urinary tract stone management procedures at Sido Waras Hospital within two years, open kidney stone surgery (nephrolithotomy, bivalve nephrolithotomy, and pyelolithotomy) was the most frequently performed procedure with a percentage of 52% (124 cases), followed by URS with a percentage of 39 % (95

cases), vesicolithotomy with a percentage of 8% (19 cases) and meatotomy with a percentage of 1% (2 cases), as seen in Figure 4.

Based on data from the research sample, it was found that the proportion of urinary tract stone patients who had comorbid hypertension was 42% (120 patients), and the proportion of urinary tract stone patients who did not have comorbid hypertension was 58% (165 patients). The proportion of urinary tract stone patients who had diabetes mellitus (DM) was 29% (84 patients), and the proportion of urinary tract stone patients who did not have DM was 71% (201 patients), as seen in Figure 5.

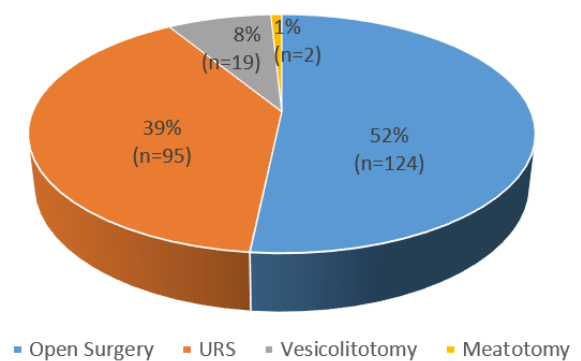


Figure 4. Proportion of urinary tract stone management actions

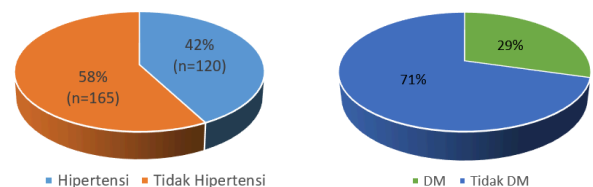


Figure 5. Proportion of urinary tract stone cases based on concomitant diseases

Discussion

From collecting research sample data, the total number of new cases of urinary tract stones in two years at Sido Waras Hospital, Mojokerto (January 2017-December 2018) was 285 cases. From the acquisition of this data, it can be concluded that the incidence of urinary tract stones at Sido Waras Hospital, Mojokerto, in 2017-2018 was 285 cases.

Based on the research sample data collected, it was found that the proportion of urinary tract stone cases based on gender was 83% (236 cases) for men and 17% (49 cases) for women. From these

data, it can be concluded that men experience more urinary tract stones than women, with a ratio of 4:1. The data collected from this study follows research conducted by Romero V et al. where in countries such as Iran, Japan, Italy, the United States, and South Korea cases of urinary tract stones are more common in men than women [16].

Based on the age aspect of the patients in the research sample, there was an increase in the number of patients with urinary tract stones within two years in each age group. The highest number of urinary tract stone patients are in the 40-60 age group. This condition aligns with research conducted by Nur Lina in 2008 at Dr. Kariadi General Hospital, Sultan Agung Hospital, and Roemani Hospital, where the results showed that most patients with urinary tract stones were in the age group 40-59 years [17].

If viewed from the aspect of the location of urinary tract stones, kidney stones are the largest number of urinary tract stones, with a total of 147 cases. In contrast, urethral stones are the urinary tract stones with the lowest incidence, with only two cases in two years. This study's results align with research conducted by Endrika Noviantrini at RSUPN Cipto Mangunkusumo regarding the characteristics of urinary tract stone patients, where the largest number of cases were kidney stones [18].

Over two years (January 2017-December 2018), open surgery for kidney stones was the most frequently performed medical treatment for urinary tract stones. The total number of open kidney stone surgery procedures in two years was 124. Open surgery for kidney stones is still often performed because therapeutic modalities such as ESWL or PCNL are still not available at Sido Waras Hospital. Treatment for bladder stones is still carried out using open surgery (Open Vesicolithotomy). The treatment for urinary tract stones at Sido Waras Hospital, which uses a minimally invasive method, is URS (Ureterorenoscopy). This condition is, of course, very different compared to what is currently happening in the United States, where open surgery for the management of urinary tract stones is rarely performed, where minimally invasive procedures such as ESWL, PCNL, and URS are the most frequently performed procedures [19].

Based on comorbidities in urinary tract stone patients who were the research sample, it was found that 42% (120 patients) had a history of hypertension, and 29% (84 patients) had a history of DM. These results follow research conducted by Chou et al. in Taiwan, where it was found that 23.9% of urinary tract stone patients had DM comorbidities and 50% of patients had hypertension

comorbidities. However, quite different conditions were obtained from research conducted by Basiri et al. in Iran, where 11.4% of urinary tract stone patients had DM comorbidities and 15.8% of urinary tract stone patients had hypertension comorbidities [20-21].

Conclusion

Based on the research results that have been obtained, several conclusions can be drawn as follows: the incidence of urinary tract stone patients (incidents) at Sido Waras Hospital in the period January 2017-December 2018 (2 years) was 285 cases, with an increase in the incidence of urinary tract stone cases over a period of two years, where in 2017 the total number of new urinary tract stone cases was 139 cases and in 2018 the total number of urinary tract stone cases was 146 cases. Urinary tract stones are most commonly experienced by male patients compared to female patients with a ratio of 4:1, mostly suffered by patients in the 40-60 year age group. Moreover, kidney stones are the most common cases of urinary tract stones at Sido Waras Hospital in a period of two years. Management of urinary tract stone cases is mostly carried out using open surgical methods rather than minimally invasive methods due to limited equipment available. 1. In patients with urinary tract stones, there are comorbidities such as hypertension and diabetes mellitus with proportions of 58% and 29% respectively.

Conflict of Interest

The authors declare that they have no conflict of interests.

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