Urinary stone profile at Tabanan Hospital within July 2014 to June 2016

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Abstract. Urinary tract stone disease is one of the most common cases in urology. These cases are increasing nearly 12% every year. Most cases occur in age group 40 to 60 years, and more common in male about three to four times than female. Patient with urinary tract stone at Tabanan General Hospital, always increase and recurrence rate still high. This is a descriptive-retrospective study. Samples are taken from all urology patients diagnosed with urinary stone disease at operating room of Tabanan Hospital between July 2014 to June 2016. We collected data from medical record regarding sex, age, living area, comorbidities, stone location, and management of urinary stone disease. Total 226 cases with urinary stone disease were managed at operating room of Tabanan General Hospital. Half of these patients aged between 46 to 60 years old, with sex ratio male two times higher than female. Hypertension is one of comorbidities for patient with urinary tract stone. Most of Kidney stone were treated by PCNL, ureter stone by URS and bladder stone by lithotripsy. In conclusion, urinary tract stone disease in Tabanan General Hospital commonly occurs in male, age more than 45 years old and mostly comes from urban area. The management of the patient tends to move from invasive approach to less invasive approach.

1. Introduction

Urinary stone disease is the third case most suffered by patients in urology, after urinary tract infections and diseases of the prostate. [1] This case has been increased reached 2,1 billion cases worldwide in 2000, increased by 50% since 1994 and often associated with the current lifestyle. [2] Even though this disease was one of the most suffered disease by the modern people, this disease have been known for long in the old days, for example struvite stone that introduced by H.C.G von Struve (1772-1861). [1] In many countries, many people have suffered this disease every year, and increased throughout the world. [3] The men have four times higher occurrence than women, except struvite stone are more frequent in women. Average age of urinary stone disease is 30-50 years [1,4,5].

In Indonesia, there are still many people suffer this disease, but still lack of data. The prevalence of kidney stone based on the data collected from the hospital across Indonesia 37.636 new cases in 2002. While the number of patients who are treated are about 19,018 people, with the mortality case is 378 people. [6] According to Riskesdas in 2013, kidney stone cases in Indonesia reached 0.6%, in which the prevalence of highest at the age of 275 years, with prevalence of women are higher than men. A kidney stone prevalence of cases in rural areas (13.8%) was higher from urban areas (10.0%), and 15.3% of them work as farmers, fishermen, and labourers [7].
In the year 2013, the prevalence of urinary stone disease in Bali reached 0.6% (Riskesdas). According to the stone analysis data on Sanglah Hospital from January to December 2007, 100% of cases were calcium oxalates, struvite 96.5%, and cystine 66.4%. The incidence on men (80.5%) are more higher than women (19.5%), where the most cases were within age group of 40-60 years (39.8%). [8] This founding were a little different with Wahidin Sudirohusodo Hospital, with the most cases are calcium oxalates (87.4%), uric acid (32%), in which men (79.9%) are more than women (20.1%). The most cases are in age group of 31-45 years (35.7%) and in children below 15 years old are 4%. [4] Although the therapy of urinary stone disease keeps growing, the recurrence was still high about 50% within 3 years at first recurrence [9].

Identification of the cause of urinary stone is important to prevent damages to the kidneys even further. [1] The formation of urinary stone expected has to do with impaired the flow of urine, metabolic disorders, infections of the urinary tract, dehydration and other unknown conditions. There are two factors that establish a urinary stone are intrinsic factor (hereditary, age, sex) and extrinsic factor (geography, climate, temperature, the amount of water intake, diet, jobs, physical activity, cholesterol, hypertension, excess vitamin C intake, and the habit of holding bladder and obesity) [2,3,10].

2. Method
The research is the study descriptive retrospective, assess the profile of patients diagnosed with urinary stone in Tabanan Hospital during the period of July 2014 to June 2016. Data were collected from the medical record and registration record at the Urology polyclinic. The samples are all the patients who underwent a surgery in operating theater at Tabanan Hospital during this period. This data were collected and processed with the help of SPSS program 20, later retrieved the distribution of patients by age, sex, comorbid factors, diagnoses and surgery management.

3. Result
The research was conducted by using the medical record patient with urinary stone that underwent a surgery at Tabanan Hospital in July 2014 till June 2016. Based on the data, there were 226 patients diagnosed with urinary stone and underwent a surgery at Tabanan Hospital. These cases are those who underwent surgery, not including those who are treated with conservative treatment.

| Table 1. Urinary stone case distribution according to age and gender |
|---------------------------------------------------------------|
| Age (year) | Gender | Total |
|           | Male | Female | n | % | n | % | n | % |
| < 15      | 0    | 0      | 0 | 0 | 0 | 0 | 0 | 0 |
| 16-30     | 1    | 0.4    | 3 | 1.3 | 4 | 1.7 | 7 | 20.4 |
| 31-45     | 30   | 13.2   | 16 | 7 | 46 | 20.4 |
| **46-60** | **71** | **31.4** | **42** | **18.6** | **113** | **50** |
| 61-75     | 41   | 18.1   | 14 | 6 | 55 | 24.3 |
| >75       | 7    | 3      | 1 | 0.4 | 8 | 3.6 |
| Total     | 150  | 66.4   | 76 | 33.6 | 226 | 100 |

The number of the male patient are 150 people (66.4%), and female are 76 (33.6%), the most cases are age group 46-60 at which reaches a half of the total cases (Table 1). There is no case of children with urinary stone or below 15 years old age group. The youngest age of patients suffering from urinary stone is 26 years old and the oldest patient is 93 years.
The most patients with urinary stone derived from Tabanan district (19.9\%) and Kediri district (16.4\%). The least are from West Selidameg district only as many as six patients (2.7\%) and the rest spread almost evenly in another district. Patients from highland regions do not appear to be many cases, for example those from Penebel district (10.2\%), Baturiti district (5.8\%) and Pupuan district (4.4\%) as it seems at Figure 1.

![Figure 1. Urinary stone case distribution according to location](image)

Cases with history of Hypertension

![Figure 2. Urinary stone case distribution according to history of hypertension and diabetes mellitus](image)

Cases with history of Diabetes Mellitus

Table 2. Urinary stone case distribution according to diagnosis and management at Tabanan Hospital

| Diagnosis       | Open Surgery | PCNL  | URS  | ESWL | Vesikoli-thotomy | Total |
|-----------------|--------------|-------|------|------|------------------|-------|
|                 | n | %   | n | %   | n | %   | n | %   | n | %   | n | %   | n | %   | n | %   | n | %   |
| Kidney stone    | 17 | 7.5 | 80 | 35.4 | 0 | 0   | 3 | 1.3 | 0 | 0   | 100 | 44.2 |
| Ureter stone    | 0 | 0   | 0 | 0    | 82 | 36.3 | 0 | 0   | 0 | 0   | 82 | 36.3 |
| Bladder stone   | 0 | 0   | 30 | 13.3 | 0 | 0   | 14 | 6.2 | 14 | 6.2 | 44 | 19.5 |
| Total           | 17 | 7.5 | 80 | 35.4 | 112 | 49.6 | 3 | 1.3 | 14 | 6.2 | 226 | 100  |

History of hypertension that are spoken of as one of the comorbid factor of urinary stone is shown for patients who registered in this research (Figure 2). 64 people (28 \%) are with blood pressure in over 140/90 mmHg. But history of diabetes mellitus does not show similar things, in which only 19 patients (8 \%) have a history to have diabetes mellitus and only 6 patients (2.7 \%) which have both of the comorbid factors. Risk factors such as metabolic disorders (uric acid, cholesterol), body mass index, job, drinking intake, electrolytes (calcium levels, magnesium), and stone analysis cannot be seen in this research as lack of existing data on medical record.

From 226 of cases collected in Tabanan Hospital, There are 100 patients (44.2\%) with a kidney stone, 82 patient (36.3\%) with ureter stone, and 44 patients (19.5\%) with bladder stone. Table 2 shows distribution according to diagnosis and management each case. Throughout June 2014 until July 2016 in Tabanan Hospital, there are 100 case (44.2 \%) of a kidney stone to which 80 cases (35.4\%) underwent PCNL, 17 cases (7.5\%) underwent Open Surgery, and only 3 cases (1.3\%) underwent extracorporeal
The cases of a urinary stone in Tabanan Hospital are similar to several hospitals in Indonesia including dr. Wahidin Sudirohusodo Hospital at Makasar on the same length of time with total 199 cases, dr. Kariadi Hospital at Semarang has average of 12 cases of urinary stone patients per month, or Sultan Agung Islamic hospital Semarang who has 15 cases of urinary stone patients per month [4,7].

Most of cases are obtained on age group 46-60 years old which almost half of the cases. There are similarity to some countries, such as Japan and United States, which has peak incidence at age group 40-49 years for men and 50 – 59 years for women. Meanwhile after age 60 years, there are significant decrease. [11] Urinary stone are more frequent in men than women about 2:1 male-to-female ratio. Some report in developing countries stated that stone disease in men were more frequent than female. [12-14] because of calcium levels in urine as the primary ingredient in the stone formation are lower in women than men, and the level of citric acid in urine as inhibitor of stone formation in women is higher than man. [15] In addition, the female hormones estrogen preventing aggregation of calcium salts, while the testosterone hormone that high in man causes an increase on the endogenous oxalate in hearts and facilitate the crystallization. [7,16] Patients who suffered urinary stone in Tabanan hospital are from urban areas, such as Tabanan district and Kediri district. These were probably caused by unhealthy diet in urban community mostly with middle to upper economic status. Foods that contain many cholesterol, uric acid, calcium and lack of consumption drinking water is a risk that would improve the urinary stone.

The urethra stone case was not found in this research as some urethra stone have handled in emergency room when patient came first to the hospital. Incidence of kidney stones in Indonesia is quite high, reached 0.6 % most occur in elderly according to Riskesdas data in 2013. [7] Management of kidney stones has several modality actions that can be done from which invasive (open surgery), minimal invasive as PCNL and retrograde intrarenal surgery (RIRS), or non invasive (ESWL). With the advent of the technology, management of urinary stone always make an effort for could be done with modality the least invasive so complications posed also minimal. PCNL is first line modality to kidney stones, especially kidney stone more than 2 cm while ESWL was chosen to handling kidney stones less than 2 cm. The majority of cases of kidney stone in Tabanan hospital were done using modality PCNL as many as 80 cases (80% of a total of the case of a kidney stone), 17 cases with open surgery because it is impossible with another modality, and only 3 cases of patients who were done by ESWL. This was very different terms with another hospitals in Indonesia to which most of the choose are over ESWL as modality therapy. This is because Tabanan hospital did not have the adequate tools for ESWL. So that if the patient choose to be done with ESWL so they were suggested to private hospital in the Tabanan [1,3].

In the case of ureter stone, the patients in Tabanan hospital underwent URS with additional management by lithotripsy if necessary. Modality has been almost always used for management of ureter stone. The ureter stone was quite a lot in Tabanan hospital as many as 82 cases (36,3%), because the patient normally come to the emergency room because colicky pains that did come out of obstruction of the ureter stone. While in the case of bladder stone, those underwent lithotripsy as many as 30 patients (68% out of the total case of bladder stone), because this procedure was minimal invasive, and if this procedure failed, or of the size of bladder stone was too large will be handled by open vesicolithotomy (14 cases / 32% out of the total case of bladder stone in Tabanan hospital) [1,3].

5. Conclusion
This research was found the urinary stone patients in Tabanan hospital during July 2014 to June 2016 as many as 226 cases, where most occur on old age within 46-60 years by comparison men and women about 2:1. Most of urinary stone patients were from urban areas are Tabanan district and Kediri district, and highland regions with cold temperature was obtained few cases of urinary stone. Hypertension was
being one of the comorbid factors in the urinary stone case in Tabanan hospital. Kidney stone is the most cases found, which underwent PCNL as minimal invasive procedure, while ureter stone case were managed by URS, and the bladder stone cases were done by lithotripsy to reduce complication. The result of this research is expected to be a reference further research more in-depth in the field of urology. However, patient medical record had to be filled more complete and additional examination as stone analysis, cholesterol levels, uric acid were done routinely in urinary stone patients to reveal the etiology that causes the disease in each patient and to prevent a recurrence.

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