Research Article

Intravesical Blood Clot Retention? How We Manage it, a Tertiary Hospital Preference

Retensi Bekuan Darah Intravesikal? Bagaimana Kami Menanganinya, Sebuah Pilihan di Rumah Sakit Tersier

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ABSTRACT

Intravesical blood clot retention is one of the Urological emergencies. Ongoing haematuria and blood clot formation in the bladder obstruct the urine outflow and lead to urinary retention, abdominal pain, anemia, urinary tract infection (UTI), and renal function deterioration. Most of the cases required cystoscopy blood clot evacuation and definitive surgery to stop the ongoing bleeding. This study aimed to discover the demography, characteristics, management, and complication of patients with intravesical blood clot retention in Dr. Soetomo General Academic Hospital, Surabaya from January 2017 until April 2020. This is an observational study, a retrospective-descriptive design. We conducted a review on the medical records of 97 patients, 76 males and 21 females with an average age of 54.9 years old. Of all patients initially treated conservatively using normal saline irrigation with a large three-way catheter (22-24 fr), four were successfully treated without surgery, and 89 patients underwent cystoscopy and definitive surgery. The mean operation time was 69,6 minutes, with an average blood clot volume of 167,7 ml (25-600 ml). Sources of bleeding were mostly originated from malignancy (58%), Benign Prostatic Hyperplasia (BPH) (10%), and hemorrhagic cystitis (7%). The most common comorbidity found was hypertension (13) and chronic kidney disease (10). Based on our experience, managing intravesical blood clot retention with cystoscopy continued with definitive surgery in a one-step procedure is a good approach. Urological malignancy is the most frequent abnormality that causes intravesical blood clot retention.

Keywords: Cystoscopy, haematuria, intravesical blood clot retention

ABSTRAK

Retensi bekuan darah intravesika merupakan salah satu kegawatan di bidang Urologi. Hematuria dan pembentukan bekuan darah di buli-buli dapat menyumbat saluran kemih sehingga memicu terjadinya retensi urin, nyeri perut, anemia, infeksi saluran kencing (ISK), dan penurunan fungsi ginjal. Sebagian besar kasus memerlukan sistoskopi evakuasi bekuan darah dan operasi definitif untuk menghentikan proses perdarahan. Penelitian ini bertujuan untuk memaparkan data demografi, karakteristik, tatalaksana dan komplikasi dari pasien retensi bekuan darah intravesika di Rumah Sakit Umum Daerah (RSUD) dr. Soetomo Surabaya. Penelitian ini menggunakan metode retrospektif deskriptif dengan kurun waktu penelitian sejak Januari 2017 sampai April 2020, didapatkan 97 rekam medis pasien dengan diagnosis retensi bekuan darah di Rumah Sakit Umum Daerah (RSUD) dr. Soetomo Surabaya. Dari 97 pasien tersebut, 76 laki-laki dan 21 wanita, dengan rerata usia 54.9 tahun. Komorbiditas yang paling sering ditemukan adalah hipertensi (12) dan gagal ginjal kronis (10). Semua pasien awalnya ditangani secara konservatif menggunakan irigasi dengan normal salin melalui kateter besar 3 jalur (22-24 fr). Dalam masa perawatan 4 pasien berhasil dirawat tanpa menjalani operasi, 89 pasien menjalani sistoskopi dan operasi definitif. Rata-rata durasi operasi 69,9 menit, dengan volume bekuan darah 167,7 ml (25-600 ml), sumber perdarahan tersering berasal dari keganasan (58%), *Benign Prostatic Hyperplasia* (BPH) (10%) and sistitis hemoragis (7%). Dapat disimpulkan bahwa tatalaksana retensi bekuan darah intravesika dengan sistoskopi dilanjutkan dengan operasi definitif dalam satu tahap merupakan pendekatan yang memberikan keluaran baik. Keganasan urogenital merupakan kelainan tersering penyebab dari retensi bekuan darah intravesika.

Kata Kunci: Hematuria, retensi bekuan darah intravesika, sistoskopi

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INTRODUCTION

Hematuria accompanied by intravesical blood clot retention is often encountered by medical practitioners worldwide, both in the medical and surgical fields. This disease is easily found in both peripheral hospitals and referral hospitals in Indonesia. Studies show 5-10% of patients seeking treatment at urologists are due to hematuria. Intravesical blood clot retention is originated from underdiagnosed or untreated hematuria and, over time, results in large blood clots accumulated in the bladder (1).

Various etiologies of intravesical blood clot retention are bladder and prostate malignancy, benign prostate enlargement (BPE), radiation-induced cystitis, stones, urological trauma, and postoperative bleeding after transurethral resection of prostate (TURP) (2). The formation of blood clots in the bladder is one defense mechanism and an essential part of hemostasis. The body physiologically prevents bleeding that occurs due to defects in blood vessels. This process begins when the injured endothelial cells stimulate a prothrombin activator, which converts prothrombin to thrombin. Thrombin then acts as an enzyme that converts fibrinogen into fibrin that binds platelets, erythrocytes, and plasma into a blood clot (3).

Intravesical blood clot retention is generally related to the patient's underlying disease. This condition can re-occur and often requires repeated treatment and surgery. Inappropriate management of intravesical blood clot retention will increase patient morbidity and mortality. Complications of blood clot retention are anemia that requires a transfusion, urinary tract infections leading to urosepsis, and even death (2). This study aimed to discover and report the demography, characteristics, management, and complication of patients with intravesical blood clot retention who were treated at Dr. Soetomo General Hospital Surabaya.

METHOD

This study was conducted after obtaining ethical clearance from the Health Research Ethics Committee Dr. Soetomo General Academic Hospital Surabaya. This study was an observational study using a retrospective-descriptive design that collected patient's data from medical records dated from January 2017 until April 2020. The inclusion criteria were patients with intravesical blood clot retention, while the exclusion criteria were patients whose medical records were not available. A total sampling method was performed, and review was conducted on 97 medical records of patients treated in Dr. Soetomo General Academic Hospital. All data, since the patients were treated in ER, inpatient wards, and Operating Room (OR), were recorded. The data extracted were then displayed in tables and charts.

RESULT

At Dr. Soetomo General Hospital Surabaya, a tertiary referral type hospital for the eastern part of Indonesia, 97 cases of blood clot retention were found between January 2017 and April 2020. The baseline characteristics of this study are shown in table 1. There were 76 male patients and 21 female patients, with a mean age of 54.9 years, and the largest age group was 51-60 years (36%). As many as 44 patients had a history of previous hematuria, and 5 of

the 97 patients were taking anticoagulant drugs. This study showed that 63% of the patients had no comorbidities, while the remaining 37% were patients with a history of systemic diseases. The two most comorbidities found among patients with intravesical blood clot retention were hypertension (13 patients) and Chronic Renal Failure (CRF) (10 patients). From the results of the study, it was found that none of the hypertensive patients had decreased kidney function, so the hypertension is most likely primary hypertension.

Table. 1. Baseline characteristic of study

	n (%)
Age, years	54.9 (15.6)
10 - 20	5 (5.1)
21 - 30	2 (2.3)
31 - 40	5 (5.1)
41 - 50	19 (19.5)
51 - 60	31 (31.9)
> 60	35 (36.08)
Gender	
Male	76 (78.4)
Female	21 (21.6)
Comorbidities	35 (36.08)
Hypertension	13 (37.1)
Diabetes mellitus	7 (20.2)
Chronic kidney disease	10 (28.5)
Cerebrovascular accident	3 (8.5)
Coronary artery disease	2 (5.7)
History of haematuria	
Yes	44 (45.4)
None	53 (54.6)
Previous anticoagulant	
Yes	5 (5.8)
None	92 (94.2)

The data showed different baseline characteristics for each laboratory parameter (Table 2). The mean hemoglobin (Hb) level of the patients was 8.8 g/dl, with the highest value of 16.6 g/dl and the lowest value of 3.7 g/dl. It was also found that 68 patients with clot retention (70%) had anemia, Hb below 10 g/dl. The average leucocyte level of the patients was 12,550/ μ L, which was slightly above the normal value. There were 10 patients with CKD with baseline creatinine mean (6.7 $\pm$ 3.6 mg / dL), in this study only one in 10 patients with CKD were not anemic. From 97 culture samples, only 22 urine samples (23%) were sterile from bacterial growth (Table 2). Bacteria growth from the urine culture is generally gram-negative, and the most common findings are *E. coli* Extended Spectrum Beta Lactamase (ESBL) (+) as much as 26% and *Enterococcus faecalis* as much as 11%. Urine culture data indicated that clot retention was closely related to the manifestation of germs in the urine and genitourinary organs. The acidity level of urine is within normal limits (pH 6.45).

Table 2. Laboratory and urine culture result

Laboratory finding	Values
Haemoglobin (g/dL)	8.8 $\pm$ 2.6
WBC (x1000 cells/ μ L)	12.55 $\pm$ 7.2
Platelet (x1000 cells/ μ L)	348 $\pm$ 159
Potassium (mEq/L)	4 $\pm$ 0.83

Table 2. Laboratory and urine culture result

Laboratory finding	Values
Chloride (mEq/L)	102.6 ± 6.8
Sodium (mEq/L)	136.4 ± 6.04
ALT (mg/dL)	24.59 ± 16.06
ALP (mg/dL)	23.4 ± 23.3
Urine Culture n (%)	
Sterile	22 (23)
<i>Escherichia coli</i> ESBL	25 (26)
<i>Enterococcus faecalis</i>	11 (11)
<i>Escherichia coli</i>	7 (7)
<i>Streptococcus agalactiae</i>	5 (5)
<i>K. pneumoniae</i> ESBL	4 (4)
<i>Acinetobacter baumani</i>	4 (4)
<i>Pseudomonas stutzeri</i>	4 (4)
Others	15 (15.4)

In this study, 89 patients underwent surgery in the operating room to remove blood clot from bladder and evaluate the source of bleeding (Table 3). The mean surgery time was 69.6 minutes; the shortest operating time was 20 minutes, and the longest was 210 minutes. Eight patients underwent cystoscopy surgery to evacuate blood clots only, while the other 81 patients continued with definitive surgery. The definition of operating time in this study is the total time needed from anesthesia until the patient leaves the operating room.

Table 3. Summary of surgery and underlying diseases

	n (%)
Summary of surgery,	
Operative	89 (91.7)
Management	8 (8.3)
Clot evacuation procedure,	
Ellic evacuator	47 (52.3)
Toomey syringe	42 (47.1)
Clot volume (cc ± SD)	167.7 ± 137.5
Mean operating time (minutes ± SD)	69.6 ± 39.5
Length of stay (days ± SD)	14.06 ± 13.3
Operative procedure,	
Cystoscopy clot evacuation	8 (8.24)
Cystoscopy clot evacuation + TURB	39 (40.2)
Cystoscopy clot evacuation + TURP	23 (23.7)
Cystoscopy clot evacuation + URS	1 (1.0)
Fulguration	17 (17.5)
Selective embolization	1 (1.0)
Disease,	
Bladder cancer	38 (39.1)
Benign prostate hyperplasia	13 (13.4)
Prostate cancer	10 (10.2)
Other malignancies	9 (9.2)
Cystitis haemorrhagic	7 (7.2)
Nephrolithiasis	3 (3.1)
Ureterolithiasis	1 (1.0)
Bladder Trauma	4 (4.1)
Renal Trauma	2 (2.0)
Haematuria ex vacuo	2 (2.0)
Iatrogenic	1 (1.0)
Others	7
	(7.2)
Mortality rate	14 (14.4)

In eight cases where only cystoscopy was performed to evacuate blood clots, the average time required was 45.6

minutes. The mean blood clot volume was 167.7 ml (25-600 ml). Trans Urethral Resection of Bladder (TURB) tumor was directly performed in all patients with masses in the bladder (39 patients), while TURP was performed on patients with cystoscopy, in which the bleeding was originated from BPE and prostate cancer (23 patients). Fulguration was performed in bleeding cases due to cystitis and rectal/cervical cancer bladder infiltration (17 patients). Ureterorenoscopy (URS) was performed to treat ureteral stone (1 patient). The most common bleeding sources as the cause of blood clot retention are shown in Table 3. The bleeding mostly originated from malignancy (58%), which consisted of bladder cancer (39%), prostate cancer (10%), and cancers outside the genitourinary organs (9%). Benign prostate enlargement was the second most common (13%), followed by radiation cystitis/hemorrhagic cystitis (7%), urinary tract stones (4%), bladder trauma (4%), kidney trauma (2%), hematuria ex vacuo (2%), and iatrogenic due to catheterization (1%). Selective angioembolization was performed due to continued active bleeding on a patient who had previous nephrolithotomy. From 97 patient records, 14 patients were died; 10 patients died during postoperative care, and four others died before the surgical procedure was performed.

DISCUSSION

Since the national insurance coverage era, the number of cases treated in the tertiary hospitals decreased due to the referral system created by the Indonesian national insurance. This condition caused only 97 patients with intravesical blood clot retention to come to Dr. Soetomo General Hospital in the last four years. Most of the intravesical blood clot retention cases could be successfully managed by urologists at primary and secondary hospitals.

From 97 patients with intravesical blood clot retention, 76 patients were male. Male gender is highly associated as a risk factor for macroscopic hematuria and urogenital tract malignancies.¹ Long urinary tract in males is believed to be one of the factors underlying this theory. In this study, prostate disorders, such as BPE and prostate cancer, also contributed significantly to the incidence of blood clot retention by 23%. On the other hand, smoking, which is a significant risk factor for the incidence of cancer of the urogenital organs, is more common in men than in women. This is supported by data of high incidence of tobacco-induced bladder tumors in Indonesia, which is higher in men than women (4).

The mean age of patients with clot retention was 54.9 years. This finding is in line with the literature claiming that age over 40 is a risk factor for macroscopic hematuria (1). Geriatric is related with a high incidence of urogenital cancer and a high prevalence of BPH cases. Interesting finding that there were five patients had clot retention aged under 20 years old, with the youngest ages is a child seven years old with clot retention in the bladder prior to percutaneous nephrolithotomy (PCNL) and DJ stent placement. In pediatric cases, blood clot evacuation from the bladder is only successful through cystoscopy.

Of the 97 patients, 44 patients (45.5%) had a history of previous hematuria. Macroscopic hematuria has a high diagnostic value in cases of urological malignancy. Macroscopic hematuria was the initial symptom in more than 66% of patients diagnosed with Urology

malignancies. The consumption of anticoagulants is often postulated to associate with the incidence of hematuria because it is assumed that anticoagulant usage can increase the risk of bleeding. From the data we found only 5 out of 97 patients (5.8%) with blood clot retention had a history of taking anticoagulant drugs. According to Bolenz *et al.*, patients taking anticoagulants should not be treated differently in terms of the process of diagnosis and further management of hematuria (1). A higher prevalence of urogenital tumors (particularly bladder cancer) was found in patients with hematuria who took anticoagulants for atrial fibrillation than those who did not take anticoagulants (5,6). However, there was no significant difference in patients taking anticoagulants, such as vitamin K antagonists, aspirin, and clopidogrel (6).

Laboratory and radiological investigations are critical tools in diagnosing Intravesical blood clot retention. Basic laboratory tests, such as complete blood count, urinalysis, renal function test, liver function test, and routine hemostasis, are performed on patients with blood clot retention. Laboratory tests aim to look for causes of the bleeding (thrombocytopenia, prolonged hemostasis), risk factors /comorbidities, and preparation for patients with blood clot retention to undergo cystoscopy if necessary.

From all samples, 44 patients (45.5%) had a history of previous hematuria, and 68 (70%) had anemia with hb below 10 g/dl. We assumed that low hemoglobin values are closely related to the duration of the occurring hematuria and the volume of blood clots in the bladder, which led to blood loss. The average leukocyte levels were above normal values. Presumably, the intravesical blood clot retention is closely related to the urinary tract infection. Increased levels of leukocytes accompanied by fever and lower urinary tract symptoms are clinical manifestations of cystitis. One of the most common causes of microscopic hematuria is an infection of the bladder (1). Urine culture examinations are routinely performed on patients with clot retention in order to determine the appropriate antibiotic therapy to prevent urosepsis. Manual evacuation of the clot and bladder irrigation are suspected to be closely related to the ascending infection in the urinary tract of patients with clot retention. Further research is needed to examine the relationship between clot retention and urinary tract infections, as well as urosepsis.

Among the cases, 95% of blood clots in the bladder were diagnosed using ultrasound examination, and the other 5 % was using an Abdominal CT scan. Ultrasound can evaluate the size of the blood clot, mass in the bladder, presence/absence of blood flow (Doppler USG) on a suspected mass, bladder stones, and kidney stones (7). One advantage of ultrasound in diagnosing blood clot retention is that it can easily be used to evaluate residual blood clots in the bladder after the evacuation and manual irrigation using a catheter. So, it can determine the effectiveness of the evacuation procedure and determine whether the patient requires further endourological action.

Based on our report, manual evacuation of blood clots using catheters and irrigation with normal saline proved not to be able to clear all blood clots and stop bleeding in the bladder in the majority of cases. All blood clots in the bladder can be evacuated manually using a catheter only in 4 of the 97 patients. Those 4 patients consist of two male and female, they were diagnosed with ex-vacuo

hematuria and blood clot retention related to renal trauma. All of patient who were successfully treated conventionally had blood clot volume less than 100 cc. Evaluation of the bladder using USG was performed to make sure no residual clot left.

In our center, the cystoscopy sheath was connected to a conventional suction device, such as a Toomey syringe or Ellic's evacuator and a tube for irrigation fluids. The effectiveness of the two tools tends to be the same. In this study, Ellic's evacuator was used in 47 patients, and Toomey syringe in 42 patients. Recent publications regarding the tools used in the process of evacuating blood clots during cystoscopy are diversely increasing. The difficulty of using Toomey and Ellic's evacuator and the prolonged operating time during cystoscopy blood clot evacuation were the reasons behind those studies. In their study, Song Yu *et al.* used a large size catheter or chest tube connected to a suction tube to remove blood clots effectively and safely in 15 patients with an average blood clot volume of 200 ml (50-600 ml) (8). In the study, there were no significant complications, and the median operating time to evacuate the clot was 20 minutes.

A similar method was applied in the study from Wallad C *et al.*, with relatively similar results. The mean time of clot removal was 5 minutes 8 seconds, and the mean time for cystoscopy procedures was 20 minutes and 12 seconds. The estimated number of blood clots evacuated was 483 grams (3). The use of Venky's suction and 16 fr nelathon catheter was also reported to be effective and safe to use during cystoscopy blood clot evacuation (9). A case report from Bansal *et al.* presented an innovative use of a morcellator device to destroy solid blood clots and then removed it by suction tools (10). All of the above studies showed an easier process of evacuating blood clots when compared to the use of Toomey or Ellic's evacuator.

The diagnostic process in cystoscopy can be started when the bladder room is clear from the blood clot. Systematic cystoscopy is performed to evaluate the presence of mass, inflammation, lacerations, stones, foreign bodies, and prostate volume to assess the source of bleeding. Light bleeding can be treated with cauterization or fulguration, while bleeding from a bladder mucosal mass or due to benign/malignant enlargement of the prostate is treated with definitive surgery. If there is no particular source of bleeding found from cystoscopy, the retention of the blood clot is possibly coming from upper urinary tract bleeding or hematuria ex vacuo related to urinary retention.

The sources of bleeding in this research were dominated by urological malignancies. Not many other studies have mentioned the source of bleeding in intravesical blood clot retention. One study in Japan by Koichi M *et al.*, mentioned that the most consecutive bleeding sources came from bladder tumors, radiation cystitis, iatrogenic trauma, and prostate cancer (11). The Korean study stated that the etiologies of gross hematuria were hemorrhagic cystitis in seven patients, post-transurethral resection bleeding in four, bladder tumor bleeding in one, and pseudoaneurysm formation after percutaneous renal surgery in one patient. In the remaining two patients who were receiving anticoagulation therapy, gross hematuria was developed after urethral catheterization (8). Identification of bleeding source determines the next type of surgery that should be performed after blood clot evacuation is complete.

Unfortunately, there were four patients with intravesical

blood clot retention died before the cystoscopy procedure was able to be performed. Cystoscopy blood clot evacuation cannot be performed on several patients due to anesthesia risk or poor general condition. For this condition, there are several methods of treating intravesical blood clot retention that can be performed at the inpatient ward. A case report from Uguralp *et al.*, mentioned a successful treatment of clot retention using intravesical instillation of streptokinase. In the research, 100000 IU of streptokinase was dissolved in 100 ml of saline and irrigated into the bladder through a catheter whose opening was then closed and maintained for 60 minutes, followed by irrigating the bladder with 0.09% saline (12). This process was repeated five times at six hours intervals. There are no reports of complications from this technique, and several previous investigators have done it (12). Other therapeutic alternatives include instillation of 1% Aluminum ammonium sulfate (Alum solution), instillation of formalin solution, instillation of intravesical tromethamine carboprost, and irrigation with silver nitrate (13).

Back to this study, of the 14 patients who died, 10 of them died during postoperative care. The conditions of terminal cancer and sepsis were the cause of death for the patients. Even though the blood clot and bleeding in the urinary tract had been stopped, the patient's condition continued to worsen. All in all, In severe intravesical blood clot retention cases accompanied by many comorbidity

factors and complications, sufferers must be handled comprehensively involving multidiscipline team members. The limitation of this study was the retrospective design that might lead to information bias, also it did not specifically record the duration of the cystoscopy blood clot evacuation process in all patients who underwent surgery.

Managing intravesical blood clot retention with cystoscopy continued with definitive surgery in a one-step procedure is a good approach. Urological malignancy is the most frequent anatomical abnormality that causes intravesical blood clot retention. A comprehensive evaluation of microscopic and macroscopic hematuria is the key to prevent the incidence of intravesical blood clot retention. Researchers suggest the use of tools that have been proven to simplify and speed up the process of cystoscopy blood clots evacuation instead of using conventional tools such as Toomey and Ellick's evacuator.

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CONFLICT OF INTEREST

The authors report no conflict of interest in this work.

REFERENCES

1. Bolenz C, Schröppel B, Eisenhardt A, Schmitz-Dräger BJ, and Grimm MO. *The Investigation of Haematuria*. Deutsches Arzteblatt International. 2018;115(48):801–807.
2. Aydin C, Senturk AB, Akkoc A, Topaktas R, Aydin ZB, and Ekici M. *Clot Retention: Our Experiences with a Simple New Technique of Evacuation with a Thoracic Catheter*. Cureus. 2019; 11(3): 1–10.
3. Wallad CK, Santoso J, and Adi K. *Efikasi Penggunaan Nasogastric Tube Pada Evakuasi Bekuan Darah Saat Cystoscopy*. Indonesian Journal of Urology. 2016; 23(2): 118-121.
4. Kementerian Kesehatan Republik Indonesia. *Bunga Rampai Fakta Tembakau dan Permasalahannya di Indonesia Tahun*. Jakarta: Tobacco Control and Support Centre-IAKMI; 2015.
5. Wein AJ, Kavoussi LR, Partin AW, and Peters CA. *Campbell-Walsh Urology*. 11th edition. United States: Elsevier; 2015.
6. Yu HT, Kim TH, Uhm JS, *et al*. *Clinical Significance of Haematuria in Atrial Fibrillation with Oral Anticoagulation Therapy*. Circulation Journal. 2017; 81(2):158-164.
7. Yeoh M, Lai NK, Anderson D, and Appadurai V. *Macroscopic Haematuria A Urological Approach*. Australian Family Physician. 2013; 42(3): 123-126.
8. Yu HS, Ham WS, Hah YS, Lees CK, Jang WS, and Cho KS. *Simple, Safe, and Successful Evacuation of Severe Organized Clot Retention Using a Catheter Connected with Wall Suction: Suction and Fishing Method*. Urology. 2011; 78(5): 1199-1202.
9. Babu BS, Haritha B, Daasaradhi B, and Ramana BR. *Clot Retention - A Simple New Method of Evacuation with Out Toomey's or Ellick's: A Clinical Study*. International Journal of Clinical Study. 2015;3(8):45-47.
10. Bansal A, Jhanwar A, Prakash G, and Sankhwar S. *Chylous Clot Removal Using Morecellator: A Novel Method*. SM Journal of Urology. 2017; 3(1): 1-2.
11. Miyamae K, Otsuka T, Otsuka Y, Nagayoshi M, and Hamada Y. *Clinical Study of Bladder Tamponade Resulting from Clots of Blood*. Nihon Hinyōkika Gakkai zasshi. The Japanese Journal of Urology. 2006; 97(5): 743-747.
12. Uğuralp S, Gürbüz N, and Baysal T. *Treatment of Clot Retention with Intravesical Streptokinase Instillation: A Case Report*. Turkish Journal of Medical Science. 2003; 33(3): 187-189.
13. Thevarajah A. *Massive Haematuria with Clot Retention: Management Options*. The Sri Lanka Journal of Surgery. 2012; 30(2): 18-19