

# Surgical Haematuria: An Analysis of Causes in a Southern Nigerian State

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**How to cite this paper:** Ofuru, V.O. and Abhulimen, V. (2022) Surgical Haematuria: An Analysis of Causes in a Southern Nigerian State. *Open Journal of Urology*, 12, 401-409. <https://doi.org/10.4236/oju.2022.127039>

**Received:** June 14, 2022

**Accepted:** July 15, 2022

**Published:** July 18, 2022

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## Abstract

**Background:** Surgical haematuria is not very common but ominous when it occurs. Knowledge of the causes will help in the adequate management of the disease. **Aim:** To evaluate the causes of surgical haematuria in Port Harcourt, Nigeria. **Materials and Method:** This is 10 years retrospective study of patients who presented at the University of Port Harcourt Teaching Hospital and 4 other private urology centres in Port Harcourt with haematuria of surgical aetiology between January 2012 and December 2021. Their history, examination findings and investigations were evaluated. Patients with medical haematuria and incomplete records were excluded from the study. **Results:** Three hundred and forty-six patients were evaluated. The mean age was  $58.12 \pm 5.1$ . Two hundred and sixty-four (76.3%) were men and eighty-two (23.7%) were females. The three commonest causes of haematuria were Benign prostatic enlargement, prostate cancer and urolithiasis with a frequency of 126 (36.41%), 66 (19.08%) and 40 (11.56%) respectively. The cause of haematuria was benign in 232 (67.06%) subjects and malignant in 114 (32.94%). **Conclusion:** The commonest causes of haematuria are of prostatic origin, mainly benign although malignancy is a significant cause.

## Keywords

Haematuria, Surgical, Benign Prostatic Enlargement, Prostate Cancer

## 1. Introduction

Haematuria is derived from the Greek words haima “blood” and ouron “urine” [1]. It simply implies the presence of blood in the urine. Haematuria can be due to a lesion in any part of the urinary tract from the kidneys to the urethral meatus. Haematuria can affect men, women, young and elderly.

Haematuria may also present with symptoms (symptomatic haematuria) or present without symptoms (asymptomatic haematuria). It can be persistent or transient. Common causes of transient haematuria include sexual intercourse and menstrual contamination. Haematuria can also be classified into visible (macroscopic, gross) and non-visible (microscopic) haematuria [2]. Visible haematuria is important as it may be a sign and symptom of urological malignancy [2] [3] [4] [5]. The term surgical haematuria is sometimes ascribed to visible haematuria. Visible haematuria can sometimes be frightening. Non-visible haematuria associated with proteinuria is usually caused by medical conditions (renal disease) and is sometimes termed medical haematuria [6] [7]. Common causes of haematuria include trauma, tumours, infections, strictures, calculi and even exercise [1].

It was believed that the commonest cause of haematuria in riverine communities in Africa is Schistosomiasis [8] [9]. However, diseases of the prostate especially benign prostatic enlargement have been identified as a common cause of haematuria in our environment in recent times [10] [11]. This study aims therefore to profile the different causes of surgical haematuria in Port Harcourt, a major city in the coastal Niger Delta area of Nigeria.

## 2. Materials and Methods

This was a retrospective study. Patients who presented to the hospital with haematuria between January 2012 and December 2021 were evaluated. The study was carried out at the Urology Unit of the University of Port Harcourt Teaching Hospital and four other privately owned urological centres in the Port Harcourt metropolis. Data was obtained from ward admission registers and theatre, accident and emergency and discharge records. The gotten information included history, duration of haematuria, examination findings at presentation and investigations done. Investigations included urinalysis, culture and sensitivity, full blood count, serum electrolyte and creatinine, genotype, ultrasound scan, intravenous urography, computerized tomography (CT) scan, cytology, rigid cystoscopy and biopsy.

Inclusion criteria were all cases of haematuria in all ages seen within the study duration. Exclusion criteria were patients with incomplete records, suspected cases of medical haematuria such as those with proteinuria on urinalysis, patients with known kidney disease, patients with poor corticomedullary differentiation on ultrasound scan or CT scan and patients with exercise induced haematuria. Patients who had proteinuria with haematuria were also excluded.

The data from the folders were collated and entered using Microsoft Excel 2016 version and transferred into the Statistical Package for Social Sciences (SPSS) for windows (version 20) (IBM SPSS Inc. Chicago, IL) for analysis. Categorical data was presented in the form of frequencies and percentages using tables. Continuous variables were presented in means and standard deviation. Results were presented in tables (**Tables 1-4**).

### 3. Results

A total of 405 patients presented with haematuria within the study period. However, only 346 patients had complete records and were included in the study. Fifty-nine patients who either did not have complete records or had medical haematuria were excluded.

**Table 1.** (a) Age distribution of respondents showing the number of patients with haematuria and the percentages. The 50 to 59 year age group was the commonest age group presenting with haematuria; (b) Measures of central tendencies.

(a)		
Age (years)	Frequency	Percentage
0 to 9	0	0
10 to 19	4	1.15
20 to 29	8	2.31
30 to 39	10	2.89
40 to 49	28	8.09
50 to 59	156	45.09
60 to 69	70	20.23
70 to 79	42	12.14
80 to 89	28	8.09
<b>TOTAL</b>	<b>346</b>	<b>100</b>
(b)		
<b>Mean age</b>	58.12	
<b>Standard deviation</b>	5.1	
<b>Youngest age</b>	18	
<b>Oldest age</b>	86	
<b>Range</b>	68	

**Table 2.** Sex distribution of patients and their percentages, males had the highest frequency.

Sex	Frequency
Male	264 (76.3%)
Female	82 (23.7%)
Total	346

**Table 3.** Aetiology of haematuria in respondents, BPE (36.41%), cancer of the prostate (19.08%), calculi (11.56%) and cancer of the bladder (8.09%) are the four commonest causes of haematuria.

Aetiology	Frequency	Percentage
BPE	126	36.41
Cancer of the prostate	66	19.08
Calculi	40	11.56
Ca bladder	28	8.09
Trauma	26	7.51
UTI	22	6.36
RCC	20	5.78
Unknown	14	4.05
Schistosomiasis	4	1.16
	<b>346</b>	<b>100</b>

**Table 4.** Distribution of malignant and benign causes of haematuria. Majority of patients presented with benign cases of haematuria.

Mode of presentation	Frequency	Percentage
Benign	232	67.05
Malignant	114	32.94
Total	346	100

#### 4. Discussion

The study revealed that the 50 to 59 year old age group had the highest frequency and the mean age of patients with haematuria was  $58.12 \pm 5.1$  as shown in **Table 1(b)**. The youngest patient in this study was 18 years and the oldest was 86 years. A prospective study conducted by Ogunjimi *et al.* [3] in Lagos, South West, Nigeria had a mean age of patients with haematuria as 54 years. Another prospective study carried out in Dibrugarh, India discovered that the 50 to 60 year age group had the highest frequency of patients with haematuria [5]. A similar study conducted in Malaysia had a mean age of 59 years [12]. The mean age in these studies is similar to the mean age in ours. Common neoplastic conditions that cause haematuria as shown in our study occur within this age group.

This study revealed that male subjects were 264 (76.3%) while female subjects were 82 (23.7%). This gives an approximate male, female ratio of 3:1. The study by Newme *et al.* [5] had a similar finding, with 79% of the patients being male and 20.93% being female. Another study in China by Wu *et al.* [13] found no significant differences in the prevalence of hematuria between sexes; they attributed the sex-related discrepancy to differences in lifestyle. Studies that focused more on surgical haematuria tend to have a male preponderance, [3] [5] this

may be the reason for the male preponderance in our study; the other reason for the male preponderance is because the commonest cause of haematuria in this study is BPE.

Benign prostatic enlargement is a disease of aging men, the progressively enlarging prostate gland causes lower urinary tract symptoms and lead to significant bother [14] [15]. The commonest aetiology of haematuria in this study was BPE which was present in 36.41% of respondents, followed by cancer of the prostate with 19.08% and urolithiasis in 11.56%. The studies conducted by Ogunjimi *et al.* [3] and Ng *et al.* [12] have benign prostatic hyperplasia as the commonest cause of haematuria. In Newme *et al.* study, BPE is the second most common cause after cancer of the bladder [5]. As the prostate gland enlarges it acquires new vessels which are in many cases friable and bruise easily, leading to haematuria [16] [17] [18] [19]. Furthermore, in some patients with BPE, prostatic obstruction can lead to obstructive nephropathy with associated uraemia [17] [18]. Urea impairs platelet aggregation via the formation of guanidinosuccinic acid and phenolic acid leading to haematuria [18]. The stasis of urine can also lead to bacterial proliferation further worsening the friability of the neovascularized prostate, thereby leading to haematuria [17].

Prostate cancer is the second most frequent cancer diagnosed in men (after cancer of the lungs) worldwide [20]. In Nigeria, prostate cancer is the most commonly diagnosed cancer among men [20] [21]. The second most common cause of haematuria in this study was cancer of the prostate. The pathophysiology of haematuria in patients with cancer of the prostate and its resulting anaemia has been described by Raphael *et al.* [17]. Metastatic Prostate cancer spreads to the bones [15], which is the site of blood cells production. Therefore, prostate cancer can lead to pancytopenia which can result in haematuria. Kafor *et al.* [19] in a retrospective study conducted in Owerri, South Eastern Nigeria also noted prostate cancer as a significant cause of haematuria. However, increased awareness and screening of prostate cancer has led to diagnosis at an early stage consequently reducing haematuria from prostate cancer disease.

Urolithiasis is a global problem and its incidence is on the increase. Previously, urolithiasis was reported as being relatively rare among Africans but recent data suggest otherwise [22]. Urolithiasis was the third most common cause of haematuria in this study. Change in diet to a more Westernized diet, sedentary life styles and hotter climate probably from Global warming (leading to decreased urine production) are probable reasons for the increase in urolithiasis [23]. Every patient with urolithiasis in this study presented with painful haematuria.

The kidneys are located in the lumbar region and protected by the bulk of flank muscles and the rib cage. However, in severe accidents, the kidneys or any part of the urinary tract can be injured resulting in haematuria. Aragona *et al.* [24] retrospectively studied renal trauma and noted trauma as an important cause of haematuria. Twenty-six subjects presented with traumatic haematuria in

this study. Among them, six had road traffic accident, 5 suffered gunshot wounds and fifteen had traumatic urethral catheterization.

Schistosomiasis, caused by *Schistosoma haematobium* is endemic in many African countries [25]. Humans are infected by cercariae when they are in contact with contaminated freshwater. The adult worms reside in the vesical plexuses, where the female lays its egg. The lesions in urinary schistosomiasis result from the granulomatous host response to the deposition of schistosome eggs in the tissues and it presents as terminal haematuria [25]. Only 4 (1.16%) subjects had haematuria secondary to schistosomiasis in our study, even though Port Harcourt is located in a riverine district, showing clearly that schistosomiasis is not a common cause of haematuria in this environment. None of the 4 subjects grew up in Rivers State. One of them grew up in Benin City and also had associated rectal cancer. Accounts of patients with Schistosomiasis presenting with rectal cancer have been reported [26] [27].

Carcinoma of the bladder is a common cause of painless haematuria. It was the 4<sup>th</sup> most common cause of haematuria in this study and was present in 8.09%. An observational study by Newme *et al.* [5] reported that carcinoma of the bladder was the commonest cause of haematuria. In areas where schistosomiasis is endemic and where fresh water streams abound schistosomiasis and bladder carcinoma are common. Schistosomiasis is not endemic in Port Harcourt, Rivers state.

RCC is the most common type of kidney cancer in adults, responsible for approximately 90% to 95% of cases [21] [28]. Renal cell carcinoma presents with haematuria, loin mass and loin pain in the advanced stage [29]. Renal cell carcinoma is associated with the elaboration of vascular endothelial growth factors. This results in neovascularization and consequent presentation with haematuria. In this study 5.78% of patients with haematuria had RCC. Ogunjimi *et al.* [3] had 5.1% and Newme *et al.* [5] had 2.32%. All our patients presented at an advanced stage of RCC. Studies by Atanda *et al.* [29] also reported late presentation of most patients.

There is an observed increase in the cases of haematuria attributable to malignancy. In this study, 114 (32.94%) patients presented with a malignant cause of haematuria and 232 (67.05%) presents with a benign cause of haematuria as shown in **Table 4**. Ogunjimi *et al.* [3] had a 22.02% percentage of malignant cases among another Nigerian population about a decade earlier. This difference may be due to the increasing awareness of cancers between 2011 when their study was published and 2022 [18]. A similar study in India had a higher percentage of cancer of 65.11% while benign cases were 34.89%. The higher percentage of cancers in their study may be due to increased screening and awareness and better radiological services when compared to the African population.

## 5. Limitation of the Study

This was a retrospective study and some clinical information sought were not

available and this limited the sample size as only patients with complete information were included in the surgery. Some patients' folder was completely missing, their names were on the admission records but their folders could not be found.

## 6. Conclusion

The commonest cause of haematuria in our study is from the prostate, with benign prostatic enlargement being the leading cause and then prostate cancer. There is an increase in the malignant causes. Prompt evaluation and treatment of haematuria are important as they can be life-threatening.

## Conflicts of Interest

The authors declare there was no conflict of interest in this study.

## Source of Funding

This study was self-funded by the authors.

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