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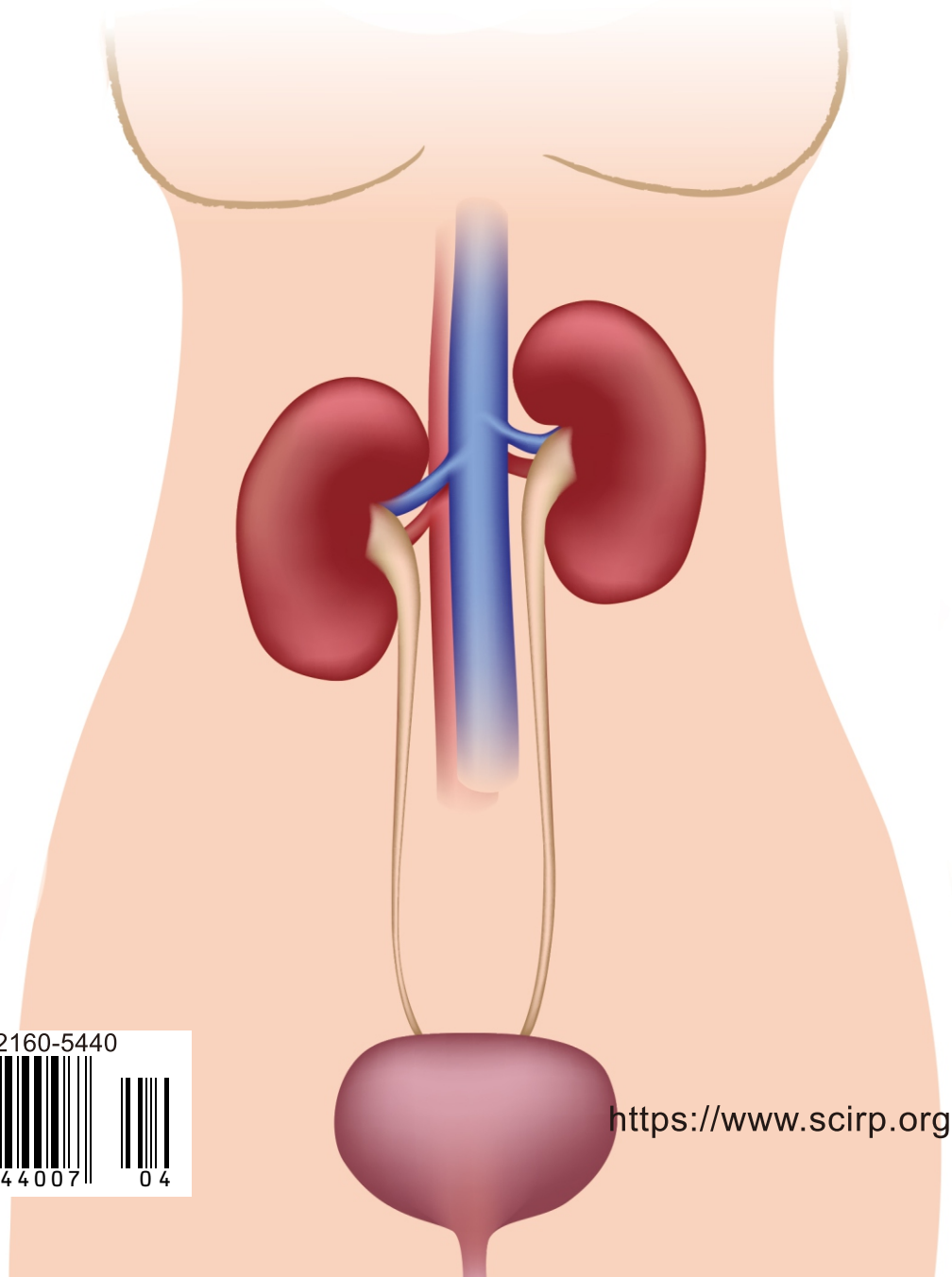

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A Traumatic Case of the Scrotum by Firearm and with a Dramatic Evolution

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Abstract

Gunshot wound is rare on the testicles and involves the patient's reproductive function. The authors report a case of open gunshot wound trauma to the testicles in a 45-year-old patient with no particular information, except, living with two women and eight children. Emergency sharing noted a fracture of the right testicle with damage of the cord components. After the surgery, the left testicle was necrotic, so a left orchiectomy was performed. The aftermaths of this second surgery were simple. However, the management of this hunting accident resulted in castration, which poses the problem of the patient's sexuality.

Keywords

Bursa Trauma, Orchiectomy, Testicular Necrosis

1. Introduction

Gunshot wounds, defined as any wound produced on the human body by the approach or impact of a firearm, are generally rare, whether they are wounds caused by weapons of war or projectiles in a civilian context [1]. Such gunshot wounds are much rarer on the testicle and involve the patient's reproductive function [2].

This is a report of gunshot wound to the testicles.

2. Observation

He is a 45-year-old patient, a hunter, with no particular information, except, living with 2 women and 8 children all alive and in apparent good health. He

was admitted to the surgical emergency room of Bouaké University Hospital Center for open gun trauma after a hunting accident that occurred six hours before his arrival in our center.

The patient had inadvertently pulled the trigger of his shotgun while using a buckshot. Physical examination had shown a dilapidated and hemorrhagic wound of the scrotum exposing the fractured right testicle with no exit orifice (**Figure 1**), the contralateral testicle was difficult to examine. There was swelling of the penis (**Figure 2**). There was no urethroorrhage, urine retention, or hematuria.

Radiography of the pelvis had shown numerous rounded foreign bodies reminiscent of buckshot on the testicles with dispersion of some projectiles in the surrounding tissues. The bony frame was free of any fracture lesions. Surgical exploration had noted the presence of foreign bodies (**Figure 3** and **Figure 4**), the right testicle fractured with lesion of the spermatic cord vessels, the contralateral testicle was macroscopically healthy. It was trimmed with a right orchiectomy.

Figure 1. Deteriorating scrotal wound exposing the right testicle.

Figure 2. Voluminous swelling of the penis.

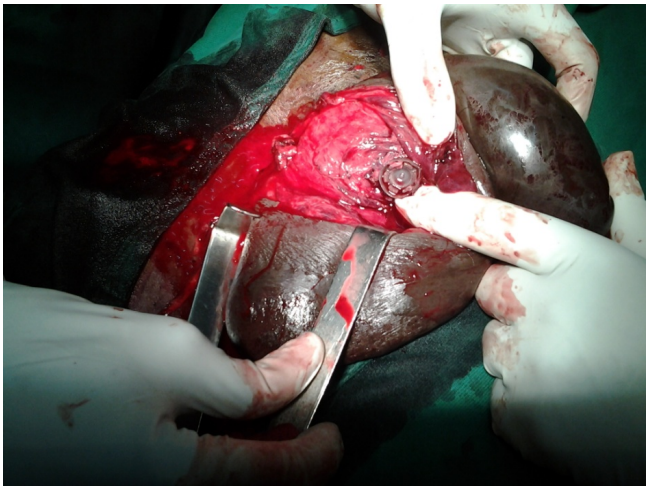

Figure 3. Intraoperative view of the foreign body.

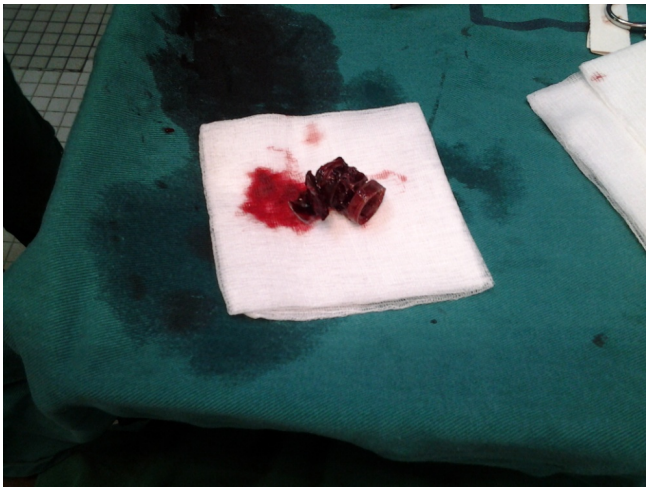

Figure 4. The foreign body after removal.

Antibiotics and anti-inflammatory medicines were introduced postoperatively. The postoperative period was marked by necrosis of the remaining testicles even (7) days after the first orchidectomy which was treated by a left orchidectomy. After a 4-month follow-up, the patient did not have an erection.

3. Discussion

Gunshot wound trauma on testicles is an uncommon accident. The different series of publications concern a small number of patients; case [3] reports the largest series (64 cases in 20 years) and Barthelemy (33 cases in 10 years) [4]. Other publications concern a certain number of patients, between 6 cases for Mac Dermott [5] and 53 cases for Altarac [6]. Traumas are even rarer than when they are caused by firearms [7]. This rarity has been noted by Bah *et al.* (6 cases in 4 years) [8], Odzébe *et al.* (2 cases in 6 years) [9], Dekou *et al.* (8 cases in 6 years) [10].

Our only case observed in 4 years confirms this extremely rare cause of testicle

trauma.

The mechanism of injury in firearm wounds makes it possible to distinguish between civilian practice wounds, and war injured which are more severe and extended [11]. In this case, the wound was in a civilian context. These accidents are due to a lack of control over weapons and their ammunitions, either through acts of torture or revenge in the case of Mianne *et al.* [7].

We can explain the occurrence of trauma in our patient by the fact that in our regions and villages, hunting weapons are not conventional, because they are manufactured by the owner himself. The average age of the traumas of the testicles varies between 10 and 37 years [4] [8] [9] [10] [12]. For these authors, this young age is explained by the fact that this is the active layer of the population, and therefore more exposed to trauma. In our case, the patient is 45-year-old and in addition to the reasons reported in the literature review, his profession could also expose him to these types of trauma.

For some authors, patients consult early for open trauma (2) and this could be explained by the spectacular appearance of the lesions. However, despite the open trauma noted in our case, the patient consulted more than six hours after the trauma.

This delay in consultation could be explained by the fact that the accident occurred while hunting at night. The lack of transportation from countryside to the city at late hours is a factor lengthens the consultation time.

From a therapeutic point of view, the treatment of external genital lesions with firearm poses several problems: 1) forensic matters, because testicular lesions involve the prognosis of the patient's reproduction, 2) the urethral lesions that may be complicated by shrinkage, and 3) in some cases, sexual impotence due to damage of erectile nerves [13]. In addition to these three problems, there are all the complications of open trauma, in this case infections. To deal with infectious complications, emergency wound trimming is the first stage of treatment. It allows a precise inventory of the lesions to be made, a complete excision of the necrotic tissue and an abundant washing of the remaining tissue [7] [11].

Testicular injuries should be managed according to the Organ injury scaling committee (OIS) of the American association for the surgery of trauma (AAST) [14]. It recommends orchiectomy for grade V, conservative treatment for large I and III, and finally surgical surveillance or exploration for large I. In our case the attitude we have adopted is in line with that recommended in the literature. However, the postoperative period was complicated by the necrosis of the contralateral testicle. These could be explained on the one hand by microscopic lesions of the elements of the cord of the left testicle which would have led to ischemia and then testicular necrosis. It is therefore advisable to inform any patient with open trauma to the scrotum of the risks of possible castration and the resulting consequences. To this end, the possibility of sperm storage should be discussed with the patient according to Bah *et al.* [8].

For our patient this option had been proposed to him, but he did not consider

it opportune, as he was already a father of 8 children, the possibility of sperm conservation for medically assisted procreation was of less importance.

4. Conclusion

Gunshot wounds are rare. They are severe and are prognostic for reproduction. The patient must therefore be warned of possible castration and the consequences of this.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Application of Nursing Quality Index Management in Reducing the Infection of Tunnel-Cuffed Hemodialysis Catheter

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Abstract

Objective: To explore how the nursing quality management reduces the infection of tunneled-cuffed hemodialysis catheter (TCC). **Methods**: The TCC infection rate from January 1st to December 31th was used as the baseline data, and the TCC infection rate from January 2014 to December 2017 was used for annual comparison. Through the nursing quality index management mode, the TCC infection rate was compared quarterly, annually and year by year by taking the measures of joint ward checking, optimizing nursing process, analyzing the root cause of infection cases and formulating countermeasures. **Results:** The Centre has been implementing the management of nursing quality indicators since 2014. TCC infection rate is an important part of Quality of Nursing Index Management. The comparison between 2013 and 2014 ($X^2 = 4.20$, $P = 0.04$) was $P < 0.05$, which was statistically significant. TCC infection rate dropped from 1.19‰ in 2013 to 0.51‰ in 2017. The number of TCC patients and indwelling catheter days increased year by year from 2013 to 2017, but the rate of TCC infection decreased year by year. **Conclusion**: The nursing quality index management can effectively reduce the incidence of TCC infection.

Keywords

Nursing Quality Index, Hemodialysis, Catheter-Associated Infection, CRI

1. Introduction

In China, the number of maintenance hemodialysis (MHD) patients has increased dramatically. According to the statistics of the National Blood Purifica-

tion Case Information Registration System, the growth rate of MHD patients in China from 2011 to 2014 was as high as 44.9%, ranking the second in the world and the fastest in the world [1]. Vascular access is the lifeline of MHD patients. Central venous catheter as a vascular access is widely used in clinical dialysis, but catheter related infection (CRI) is one of the main complications and the main causes of the catheter dysfunction [2]. It has serious influence to patients with hemodialysis, resulting in patients extending the hospitalization. Severe cases can cause deaths [3]. In order to reduce the occurrence of CRI and reduce the pain and economic burden of patients, the center applied the nursing quality index management to the management of CRI and achieved better results. The nursing quality index is the quantitative measurement of nursing quality, the tool for evaluating clinical care quality and care activities. Being quantitative, effective and objective is the basic characteristic of the nursing quality Index [4]. A domestic study has shown that the management of nursing quality index can improve the quality of hemodialysis. But on the CRI, only two quarters of data were compared. It was not statistically significant, however, the indicators fell significantly. The research time is short and there are some limitations [5].

2. Materials and Methods

2.1. General Information

All the cases were selected from hemodialysis patients using TCC in our center from 2013 to 2017. There were a total of 434 cases, aged from 6 to 93 years old. The primary diseases were hypertensive nephropathy, diabetic nephropathy, chronic glomerulonephritis, cystic nephropathy, obstructive nephropathy and so on. The TCC detention period was from 2 months to 7 years. Catheterization was performed in 426 cases of the right internal jugular vein, 7 cases of the left internal jugular vein and 1 case of the right femoral vein. Hemodialysis was performed three times a week for 4 hours each time.

2.2. General Information of the 434 Patients

The basic information of the 434 patients was as follows: 217 males and 217 females, with an average age of 61.47 ± 16.56. The original diseases - there were 141 cases of hypertensive nephropathy (32.5%), 105 cases of diabetic nephropathy (24.2%), 56 cases of chronic glomerulonephritis (12.9%), 27 cases of cystic nephropathy (6.2%), 63 cases of obstructive nephropathy (14.5%), 13 cases of nephrotic syndrome (3.0%), 4 cases of acute kidney injury (0.9%), and 25 cases of other primary diseases (5.8%). The average catheter detention days were 180 ± 325.077. See **Table 1**.

2.3. Basis for Definitions of Catheter-Related Infection

1) Catheter outlet infection: infection within 2 cm of catheter outlet. 2) Duct tunnel infection: Infection within the subcutaneous tunnel of the catheter more than 2 cm away from the outlet. 3) Catheter related blood stream infection

Table 1. Basic information of patients (N = 434).

Project	Value (N = 434)
Age (years old)	61.47 ± 16.56
Gender	
Male	217 (50%)
Female	217 (50%)
Original diseases	
Hypertensive nephropathy	141 (32.5%)
Diabetic Nephropathy	105 (24.2%)
Chronic glomerulonephritis	56 (12.9%)
Cystic nephropathy	27 (6.2%)
Obstructive nephropathy	63 (14.5%)
Nephrotic syndrome	13 (3.0%)
Acute kidney injury	4 (0.9%)
Others*	25 (5.8%)
Catheter Detention (days)	180 ± 325.077

Note: *Others include drug-induced renal damage, membranous nephropathy, multiple myeloma, lupus nephritis, hemolytic uremic syndrome, ANCA-associated vasculitis, hepatitis b-associated nephritis, and purpura nephritis.

(CRBSI): Bacteremia or septicemia caused by a partial infection in the lumen or blood vessel that spreads into the blood stream [6].

2.4. Two Methods Were Used to Calculate the Annual TCC Infection Rate

1) The internationally accepted 1000-day rate of infection was calculated as = infection cases/catheter days × 1000. 2) The catheter infection rate was calculated by comparing the number of infections with the total number of patients = infections/patients ×100.

2.5. Research Methods

Application of Quality of Nursing Index Management

1) The quality index management was implemented in the first quarter of 2014, and establishment of a Quality Management Team, with the head nurse as the group leader and the nursing core staff as the team members. TCC experts in the group are responsible for statistics and analysis of infection rates in 2013.

2) TCC registration forms were developed from 2014. The nurses in each shift recorded and transferred the abnormal situation of TCC in the shift. The TCC specialist executed timely integrated medical checking to TCC infection cases. They developed and implemented treatment and nursing plan together. TCC specialist collected data every quarter, controlled the nursing quality of the TCC, analyzed the problems existing in the record, and found out the root cause of the infection (from people, machine, material, method or checking). The specialist

would also personalize solutions to problems, train the nurse how to solve common problems, optimize the procedure and supervise the implementation.

3) Studies have shown that catheter infection is related to catheter interface contamination, skin bacterial transitional contamination of puncture site, hemoperfusion contamination, catheter material, bacterial biofilm, internal characteristics of pathogens and other factors [7] [8]. Studies have shown that cluster nursing can effectively reduce the incidence of catheter infection [9]. Since 2014, our department has continuously revised and optimized the guidelines for catheter opening and sealing and catheter dressing change, implemented personalized dressing change procedures for patients with different conditions, bound them into books and organized medical staff in the department to conduct training and learning.

4) For TCC patients, guidance was offered to them on infect control at home. They could choose to wrap plastic wrap around the shoulder of the catheter during shower to cover the entire catheter or clean the covered area after shower or put the external part of the catheter into the anal bag, with the adhesive layer of the anal bag around the catheter mouth, remove the disposable anal bag after shower, and then re-fix the exposed part of the catheter in front of the chest wall. Lectures on catheter maintenance were given to patients no less than twice a year, and special guidance was given by the nurse in charge of each dialysis.

5) Training of nursing personnel: all the new and advanced nurses received the theoretical and operational training of dialysis catheter opening, dressing changing and sealing, and shall not conduct the above operations independently before passing the examination of operation and theory. Unnecessary opening times of catheter ports during dialysis were avoided. For poor catheter flow and reverse connection of arteriovenous ports, nurses were required to perform hand hygiene, wear sterile gloves to separate catheter and blood line catheter, and reduce exposure time of catheter ports. There would be blood scab formation at the thread of the catheter after the reverse connection. It was required that the nurse should use disinfectant gauze to clean the blood scab when getting off. After there was no blood scab left, the sterile disinfection process should be carried out. They had to put the sterile plug to protect the catheter port, preventing blood scabs from entering the catheter and reducing the risk of infection.

6) To find out the regularity or seasonality of TCC infection. From statistical records, we found that each year in the 3rd quarter TCC infection rate had a rising trend. Through the integration of medical ward inspection, analysis and discussion, we found that the third quarter in Guangzhou (7 September) was usually hot and the stay-home patients would easily sweat. Guangzhou people like to take shower, and the catheter dressing exposed to water. We selected different dressings for different patients. For patients with a certain level of knowledge and good learning ability, we guided them to change the dressing for the catheter at home, and the catheter infection was better controlled.

7) Nursing quality indicator management not implemented in 2013. Accor-

dingly, following the implementation of improvement measures in 2014, The TCC infection rate in 2013 was used as the baseline data and compared with the annual TCC infection rate from 2014 to 2017. From 2013, pairwise comparison was conducted for the infection rate every two years. TCC experts are responsible for this statistical work.

2.6. Statistical Methods

SPSS 23.0 Software was used for statistical analysis of the data, and the counting data were expressed as rate. X^2 test was used, and $P < 0.05$ was considered as statistically significant.

3. Results

3.1. Distribution of Pathogenic Bacteria

From 2013 to 2017, there were 60 cases of catheterization infection in TCC patients, among which pathogenic bacteria were detected in 13 patients, with a positive detection rate of 21.67%. Among them, there were 5 cases of Staphylococcus aureus, 1 case of staphylococcus epidermidis, 1 case of gram-positive cocci, 1 case of staphylococcus vorchii, 1 case of acinetobacter baumannii, 1 case of colorobacillus denitrifying, 1 case of sarrella mucilis, 1 case of staphylococcus cephalus and 1 case of pseudomonas aeruginosa. This result is similar as the report of Yuhong Pang and Jun Wang et al. in China, as well as the reports abroad [10] [11] [12]. Staphylococcus aureus remains the most common infectious pathogen.

3.2. Statistical Results

The number of TCC patients and indwelling catheter days increased year by year from 2013 to 2017, while the total infection rate decreased, as shown in **Table 2**. As shown in **Table 2**, after comparison, the infection rate of TCC showed a decreasing trend ($X^2 = 11.34$, $P = 0.023$). From 2013, pairwise comparison was conducted for the infection rate every two years. The comparison between 2013 and 2014 ($X^2 = 4.20$, $P = 0.04$) was $P < 0.05$, which was statistically significant. Compare the other years in pairs. The comparison between 2014 and 2015 ($X^2 = 0.00$, $P = 0.10$), 2015 and 2016 ($X^2 = 0.03$, $P = 0.85$), 2016 and 2017 ($X^2 = 1.35$, $P = 0.25$) result was $P > 0.05$, which was not statistically significant.

4. Discussion

TCC infection rate is one of the important indicators to measure the quality of hemodialysis, and the incidence of CRBSI has been reported to be on the rise, which is one of the common complications of maintenance hemodialysis patients [13]. There have been many clinical reports on the use of antimicrobial agents to seal tubes to prevent catheter-related infections, but it is easy to cause bacterial resistance, increase the risk of fungal infection, and increase the economic burden of patients [14] [15]. Non-antimicrobial agents have also been

Table 2. The infection of TCC patients in this center.

Year	Patient Cases	Detention days	Total infection		Catheter outlet infection		Duct tunnel infection		CRBSI	
			Infection cases n (%)	1000-day rate of infection (‰)	Infection cases n (%)	1000-day rate of infection (‰)	Infection cases n (%)	1000-day rate of infection (‰)	Infection cases n (%)	1000-day rate of infection (‰)
2013	41	7553	9 (21.95)	1.19	7 (77.78)	0.93	0 (0.00)	0.00	2 (22.22)	0.26
2014	101	10314	8 (7.92)	0.78	7 (87.50)	0.68	0 (0.00)	0.00	1 (12.50)	0.10
2015	189	16110	15 (7.94)	0.93	10 (66.67)	0.62	0 (0.00)	0.00	5 (33.33)	0.31
2016	215	21123	16 (7.44)	0.76	10 (62.50)	0.47	1 (6.25)	0.05	5 (31.25)	0.24
2017	247	23408	12 (4.86)	0.51	9 (75.00)	0.38	1 (8.33)	0.04	2 (16.67)	0.09

used to seal catheters to control catheter-related bacteremia [16]. Since the implementation of quality index management of hemodialysis nursing in our dialysis center, root cause analysis has been conducted for TCC infection cases. Sensitive antibiotics have been selected for sealing for more than 3 weeks for CRBSI patients according to etiological data, and the compatibility of antibiotics and heparin has been noted. It has been reported in the literature that the extending for the prophylaxis of antibiotic sealing tube to 1 - 2 weeks can consolidate the curative effect, and prophylactic antibiotic sealing tube is not recommended [17].

Hypertensive nephropathy has occupied the first place in the primary disease in our center. Foreign studies have shown that hypertension is an independent risk factor for catheter infection, and the related reasons are as follows: hypertension is often associated with diabetes or atherosclerosis, increasing the risk of infection [18]; some antihypertensive drugs may help to increase the risk of infection [19]; hypertension affects capillaries in the skin and increases bacterial colonization of catheters [20]. Therefore, the joint management of hypertension and its complications has become a top priority. For patients with hypertension, the focus of nursing in dialysis is to monitor the changes of blood pressure on time and focus on the changes of patients' mental state; strengthen home blood pressure health education for patients; distribute home blood pressure monitoring record books; teach patients to measure blood pressure correctly, record accurately, take medicine on time, control blood pressure within the ideal range; delay the occurrence or development of complications, in order to reduce the incidence of catheterization infection. The patient was taught to observe the dressing in the catheterization place and the surrounding skin condition correctly at home, find the abnormal situation in time, and seek medical advice in time.

The prevention of catheter-related infections is not only a nursing problem, but also a joint effort of three parties. Studies have shown that in Nursing Quality Index Management, certain effects have been achieved in reducing the rate of catheter infection [21]. CRBSI is closely related to aseptic technique operation, disinfection isolation and hand hygiene of medical staff in hemodialysis room

[22]. The first is aseptic operation during catheterization by the physician, followed by catheter nursing during each dialysis session, and then catheter nursing at home for the patient. TCC catheterization was performed in a sterile operating room, so the emphasis was on catheter nursing during each dialysis session and patient nursing at home. Each dialysis nursing is influenced by three factors: environment, process and nurse operation. In the case of poor indoor ventilation and crowded personnel, if there are diseased primary microorganisms in the air, the pathogens can be ejected along with the droplets through conversation, cough and sneeze, so as to cause infection in susceptible people [23]. Therefore, the center does not leave accompanying people on, off, and when opening or sealing the tube, and patients with catheters must wear disposable masks. Clearing the field between the two classes of patients, opening the window for ventilation and reducing the number and activity of indoor staff, reduces the concentration of pathogens in the air, and thus reduces the infection rate. The most difficult factor to control in these three aspects is the patient side, so we value proper in-home catheter nursing for patients. If patients do not know self-protection and self-management, catheter infection will be difficult to effectively control.

This study has some limitations. The number of single center cases is less. Target management of indicators lacking universally accepted regional standards. This study shows that, TCC infection is difficult to avoid, implement quality index management, find out the root cause of infection, constantly optimize the catheter nursing process, train nurses and patients, the infection rate of TCC can be controlled. In this study, the types of pathogenic bacteria are similar to the results of domestic and foreign studies, but the detection rate of pathogenic bacteria is not high, this part needs to be further studied.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Analysis of Adult Nephrectomies at the Komfo Anokye Teaching Hospital, Kumasi, Ghana

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Abstract

Objective: To evaluate open nephrectomies performed in adults over a five year period at the Komfo Anokye Teaching Hospital (KATH) and to compare our experience with findings in the literature. **Materials and Methods:** This was a prospective, cross-sectional, hospital based study of all adults undergoing nephrectomy from October 2012 to September 2017 at KATH. We obtained data on patient demographics, clinical presentation, laboratory and imaging results, laterality of the disease, and indication for nephrectomy, complications and histopathology of nephrectomy specimen. The data was analyzed using PASW Statistics for Windows, Version 19.0. Chicago: SPSS Inc. **Results:** Thirty three (33) adult nephrectomies were performed over the study period. There were 18 males (54.50%) and 15 females (45.50%) with an age range of 16 years to 80 years. The modal age range for renal malignancies was 31 - 40 years accounting for 36.40% of adult nephrectomies. Flank pain (75.80%), haematuria (54.60%) and flank mass (51.50%) were the predominant presenting complaints. Malignant renal tumours accounted for 22 (66.70%) of the nephrectomies followed by neglected Pelvi-Ureteric Junction Obstruction (PUJO)—7 (21.20%); two (6.10%) nephrectomies were due to trauma and one (3.00%) for emphysematous pyelonephritis. **Conclusion:** Renal cell carcinoma constitutes the main indication for adult nephrectomy at KATH followed by neglected PUJO. Most of the patients with renal tumours were young and also presented late.

Keywords

Adult, Nephrectomy, Renal Cell Carcinoma, Kidney, Komfo Anokye

Teaching Hospital

1. Introduction

Nephrectomy forms an important part of the workload of the urologist; it may be simple or radical. A simple nephrectomy is indicated in patients with symptomatic benign non-functioning kidney and trauma. Radical nephrectomy is the gold standard for treating resectable renal malignancies [1] [2].

Incidental detection of renal tumours has increased in asymptomatic patients in the advanced countries due to the routine use of ultrasonography and Computed Tomography (CT) scan for abdominal and chest complaints [3] whereas patients continue to present with late disease in developing countries [4].

The indications for nephrectomy vary from place to place and so too does the surgical technique employed [5]. In developed countries, nephrectomy is mainly carried out laparoscopically or is robot assisted [6]. This offers early recovery and return to work, however, its use is associated with higher costs [6]. In Sub-Saharan Africa, open nephrectomy still remains the main surgical approach [7]. This offers complete resection even for bulky tumours and can be carried out in any resource limited facility. It is however associated with increased postoperative pain, morbidity and poor cosmesis [8].

Complications following nephrectomy are not uncommon and may differ based on indications and surgical technique used. Nephrectomies for malignant conditions are associated with more complications than nephrectomies performed for benign renal conditions [9] [10].

The Komfo Anokye Teaching Hospital (KATH) is a major referral center serving the middle and northern belts of Ghana. Although open nephrectomy is routinely carried out in the hospital, no formal data has been reported from the institution.

The purpose of this study is to describe the clinico-pathological features of adult patients who had open nephrectomy, the indications, complications and the short term outcomes at KATH over a five-year period and to compare our experience with findings in the literature.

2. Materials and Methods

This was a prospective, cross sectional, hospital based study of all consenting adults undergoing nephrectomy from October 2012 to September 2017 at KATH.

Over the five year period, a total of 33 adult open nephrectomies were carried out at the Urology Unit of the Komfo Anokye Teaching Hospital. Data collected included patients' age, gender, clinical presentation, results of laboratory and imaging investigations, laterality of the disease and indications for nephrectomy. It also involved the record of complications including peri-operative mortality and histopathology results for all the patients. The patients were radiologically evaluated using abdominal ultrasonography, intravenous pyelogram, contrast enhanced CT scan and radioisotope renal scan to assess differential renal func-

tion where necessary. Simple nephrectomy was carried out for patients with benign renal disease whilst radical nephrectomy and nephroureterectomy were carried out for those with malignant renal tumours and urothelial tumours of the renal pelvis respectively. All patients were followed up for a minimum duration of one year.

The data was analyzed using PASW Statistics for Windows, Version 19.0. Chicago: SPSS Inc.

Patients aged 16 years and above who had nephrectomy done during the study period were eligible for the study. Ethical approval was obtained from the Committee for Human Research and Publication Ethics of the Kwame Nkrumah University of Science and Technology and the Komfo Anokye Teaching Hospital.

3. Results

During the study period, a total of 33 adult open nephrectomies were performed. There were 18 males (54.50%) and 15 females (45.50%) giving a male to female ratio of 1.2:1.

The age range was from 16 years to 80 years with the modal age group being 31 - 40 years (24.24%).

Out of the 33 patients, malignant renal tumours accounted for 22 (66.70%) of the nephrectomies; this was followed by benign non-functioning kidneys as a result of neglected Pelvi-Ureteric Junction Obstruction (PUJO) 21.21%; and trauma 6.90% (Table 1).

The malignant renal tumors were equally distributed in a ratio of 1:1 amongst the sexes.

The modal age range for renal malignancies was 31 - 40 years which accounted for 36.36% of nephrectomies done for renal malignancies (Table 2).

Table 1. Indications for nephrectomy.

Indication	Frequency	% frequency
Malignant tumours	22	66.67
Neglected PUJO	7	21.21
Trauma	2	6.06
Benign Tumours	1	3.03
Emphysematous pyelonephritis	1	3.03

Table 2. Age distribution for renal malignancies.

Age distribution for renal malignancies	Frequency	% Frequency
<21	2	9.09
21 - 30	2	9.09
31 - 40	8	36.36
41 - 50	5	22.73
51 - 60	4	18.18
61 - 70	1	4.55

Flank pain, occurring in 75.76% of the patients, haematuria—54.55% and flank mass—51.50% were the predominant presenting complaints (Table 3, Figure 1).

3.1. Laterality of Nephrectomies

A total of 19 (57.58%) left and 14 (42.42%) right nephrectomies were performed. There were 11 each of left and right nephrectomies for renal malignancies. For benign renal lesions and trauma to the kidneys, there were more left-sided nephrectomies carried out than were performed on the right—8 versus 3.

3.2. Complications

Peri-operative complications of the surgery included avulsion of renal artery with massive hemorrhage—1 (3.0%), laceration of inferior vena cava (IVC)—1 (3%), bowel injury—1 (3.0%), and superficial surgical site infections—3 (9.0%). There was 1 (3.0%) post-operative mortality.

3.3. Histology of the Tumours

Renal cell carcinoma (RCC) accounted for 17 (73.91%) of the tumours and all were of the clear cell subtype. This was followed by transitional cell carcinoma of the renal pelvis 3 (13.04%), Wilm's tumour 2 (8.70%) and oncocytoma 1 (4.35%) (Table 4). Of the two Wilm's tumour cases, one was a 16 year old male and the other, a 19 year old female.

Table 3. Clinical presentation.

CLINICAL PRESENTATION	Number (%)
Flank pain	25 (75.76)
Flank mass	17 (51.50)
Hematuria	18 (54.55)
Varicocele	2 (6.06)
Incidental finding	1 (3.03)

Figure 1. Patient with flank mass (Big Arrow) from left renal tumour and left varicocele (Small arrow) being prepared for nephrectomy.

Table 4. Histology of the tumours.

Histology	Frequency	% Frequency
Renal cell carcinoma	17	73.91
Transitional cell	3	13.04
Wilms Tumour	2	8.70
Oncocytoma	1	4.35

4. Discussion

Globally, the indications for nephrectomy vary from place to place [11]. The predominant indication for nephrectomy in this study was for renal tumours. Renal malignancies accounted for 66.70% of all indications (**Table 1**). This is consistent with studies from Nigeria and Norway where renal malignancies accounted for 67.30% and 68.00% of all nephrectomies respectively [4] [9].

In a similar study in Accra, Ghana, by Kyei *et al*., renal malignancy accounted for 54% of all nephrectomies [1]. However, this study contrasts with findings from India, Pakistan and Jordan where benign conditions of the kidney accounted for the majority of nephrectomies [5] [11] [12].

In the case of Pakistan, Rafique *et al*. found that the major indication for nephrectomy was for non-functioning kidneys from renal stone disease 53.30%, chronic pyelonephritis 20.00%, neglected PUJO 16.00% and 7.60% for renal tuberculosis. Only 23.00% were as a result of renal malignancy [5].

Similarly in India, Biswajit *et al*. found that 62.50% of nephrectomies were performed for benign conditions including neglected PUJO and renal stone disease. Malignant renal disease accounted for 37.50% of nephrectomies in their series [11].

Renal cell carcinoma is primarily a disease of the aged, typically occurring in the sixth and seventh decades of life [13] [14]. In this study however, the modal age range for renal malignancies was 31 - 40 years which accounted for 36.36% of nephrectomies performed for renal malignancies (**Table 2**) with the mean age being 43.80 years. Malignant renal tumours occurred in females at an earlier age of 39.00 years compared to 43.60 years in males. This is similar to a study in Nigeria by Ahmed *et al*. [15].

The male to female ratio for renal malignancies was 1:1 consistent with findings from Accra [1]. However in sub-Saharan Africa, there is a preponderance of renal tumours in females [16].

On the other hand, in most other studies from elsewhere, there was a male preponderance [7] [17] [18].

In our part of the world, renal tumours present in the advanced stage with flank mass, flank pain and haematuria or a combination of the above symptoms (**Table 3**). In this study, 35% of the patients with renal tumours presented with the triad of haematuria, flank pain and flank mass similar to the 36% by Tijani *et al*. [19].

In addition to this triad, one male patient with left renal tumour presented with a left varicocele (**Figure 1**). These findings are similar to studies in other developing countries [7] [20].

In contrast, in the developed world, most renal tumours are picked incidentally [21].

Renal cell carcinoma accounted for 17 (73.91%) of the malignant tumours followed by transitional cell carcinoma of the renal pelvis 3 (13.04%) (**Table 4**).

The predominant histologic subtype of the Renal Cell Carcinomas (RCC) in this study was the clear cell variant. Clear cell RCC is the most common adult RCC, representing 70% of all RCCs [13].

There were 2 (8.70%) cases of Wilm's tumour which were unexpected due to the rarity of adult Wilm's tumour [22] and its mainly reported on as case reports in literature.

The next commonest indication for nephrectomy in our center was non-functioning kidney as a result of neglected PUJO (**Table 1**) which accounted for 24.10% of all nephrectomies. This is similar to findings from rural India where 25.30% of nephrectomies were on account of neglected PUJO (8). However, this contrasts with findings from Eastern Africa where the predominant benign indication for nephrectomy was non- functioning kidney due to stone disease [17] and in Accra where the most predominant benign indication for nephrectomy was renal cystic disease (1).

In Nigeria 6.7% of nephrectomies were performed on account of trauma (5). In our study, a similar percentage (6.9%) of nephrectomies were due to trauma (**Table 1**).

One person in the present study had nephrectomy on account of left emphysematous pyelonephritis (**Table 1**) but died in the immediate post-operative period from overwhelming sepsis. The mortality rate for emphysematous pyelonephritis has been estimated to be above 40.00%, primarily owing to septic complications [23].

All nephrectomies in this series were done with the open approach. This is the mainstay of treatment in our sub region [16]. None of our patients with renal tumours had partial nephrectomy performed as is done in many endowed centers [21]

This study recorded a mortality rate of 3.00%. This is equivalent to the 0.6% to 3.6% mortality rate recorded in literature for nephrectomy for localised disease [24].

5. Conclusion

The major indication for adult nephrectomy was renal cell carcinoma followed by neglected PUJO. Most of the patients with renal tumours were young and also presented late. Histological examination of nephrectomy specimens confirmed renal cell carcinoma as the commonest renal malignant tumour. We recommend further studies to elucidate the cause(s) for the relatively younger age of patients

with renal cell carcinoma in our center.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Abbreviations

KATH—Komfo Anokye Teaching Hospital
PUJO—Pelvi-Ureteric Junction Obstruction
RCC—Renal Cell Carcinoma

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Male Urethral Strictures in Ouagadougou (Burkina Faso): Epidemiological Diagnostic and Therapeutic Aspects

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Abstract

Purpose: To conduct a study of epidemiological, diagnostic and therapeutic aspects of urethral strictures at Yalgado Ouedraogo University Teaching Hospital. **Patients and methods:** It was about a retrospective and descriptive study conducted in the urology division of Yalgado Ouedraogo Hospital from October 1st 2009 to September 30th 2014. All the patients, included in this study, had a urethral stricture confirmed by the voiding retrograde cystourethrogram (VCUG) or during surgical intervention with useful surgical report and medical file. **Results**: During the period of study, 127 complete medical records were found. The hospital prevalence was 10.1%. The average age of the patients was 50.5 (from 3 to 80 years). 55.6% of the patients were from rural areas. Dysuria and urinary retention were the major causes of consultation with respectively 66.7% and 33.3%. The aetiology of urethral stricture was infectious in 71.4% of the cases. The VCUG permitted to objectify the characteristics of the stenosis. The urethral stenoses were single in the majority of the cases, about 88.8% of cases. The bulbar urethral stricture was the major location. *Escherichia coli* was isolated in 77.7% of the urinary infections. The majority of patients (61.9%) had undergone open surgery including 39.7% end to end anastomosis. No endoscopic treatment was recorded. **Conclusion**: The urethral stenosis is frequent in our division. Its major aetiology is infectious. The treatment is dominated by open surgery in our context.

Keywords

Stricture, Urethra, Treatment, Epidemiology

1. Introduction

The urethral stenosis is a permanent diminution of lumen, or even the complete, more or less extensive obliteration of the canal that hinders the free flow of urine from the bladder outside regardless of its location and aetiology [1]. The symptomatology is univocal and is represented by the difficulty in evacuating urine. While infectious forms are declining in developed countries in favour of post-traumatic and iatrogenic forms, this does not seem to be the case in our context, despite the lack of epidemiological studies. This study was conducted in order to take stock of the management of urethral stricture.

2. Patients and Methods

This was a retrospective and descriptive study conducted in the urology division of Yalgado Ouedraogo University teaching Hospital from October 1st 2009 to September 30th 2014. In this study, all the patients with a urethral stricture confirmed by VCUG during the surgical intervention with a surgery report and a complete medical record were included. During the study, with 1,507 hospitalized patients, 127 complete medical records out of 153 urethral strictures were found. The variables studied were frequency and age of patients, characteristics and aetiology of the stenosis, therapeutic means and the management. Data analysis was performed using Epi-info software version 7.0.8.

3. Results

1. Frequency

The hospital prevalence of these strictures among the hospitalizations in the urology division was 10.15%

2. Age

The average age of patients was 48.27 years with 3 and 95 years extremes. Figure 1 shows the age distribution of patients.

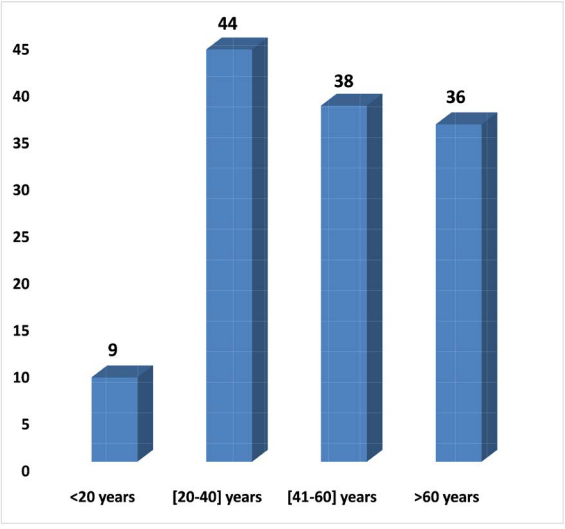

Figure 1. Age distribution of the population.

3. Occupations of the patients

Farmers coming from rural areas were the most represented in 44.88% of the cases. The patients consulted on average after about 6 months (Table 1).

4. Clinical signs

Dysuria and urinary retention were the major complaints with respectively 48.03% and 47.24% of cases (Table 2).

On the physical examination the scars of cystostoma with 42.98% and the bladder globes with 17.35% dominated the table (Table 3).

In Table 4 BPH was the most encountered associated pathology in 58.33% of the cases.

5. Paraclinical signs

The VCUG was asked to all the patients and they did it.

- **The location of urethral stricture**

There were 68 cases (53.54%) of anterior localisation 46 (36.22%) of posterior localization and 13 (10.24%) mixt membranous bulb (Figure 2).

Table 1. Patients distribution according to their occupations.

Occupations	Number(n)	Percentages (%)
Farmers	**57**	**44.88**
Traders	18	14.17
Informal sector	16	12.59
Civil cervants	13	10.24
Retired	13	10.24
Pupil/Student	5	3.94
The jobless	5	3.94
Total	**127**	**100**

Table 2. Distribution of patients according to reasons of consultations.

Reasons of consultations	Number	Percentage (%)
Dysuria	61	48.03
Acute urinary retention	60	47.24
Urinary burns	23	18.11
Pollakiuria	10	7.87
Uretrorragia	9	7.09
Hematuria	5	3.94
Pyuria	4	3.15
Urinary leaks	3	2.36
Erectile dysfunction	1	0.79
Total	**176**	**100**

Table 3. Distribution according to physical signs.

Physical Signs	Number	Percentage (%)
Scars of cystotomy	52	42.98
Bladder globe	21	17.35
Periurethral gangue	17	14.05
Enlarged prostate volume	14	11.57
Purulent urethral flow	11	9.09
Cutaneous urethral fistula	6	4.96
Total	**121**	**100**

Table 4. Distribution of associated pathologies.

Associated pathologies/complications	Number	Percentage (%)
BPH	14	58.33
Orchiepididymitis	6	25
Vaginal hydrocele	2	8.33
Inguinal hernia	1	4.17
Varicocele	1	4.17
Total	**24**	**100**

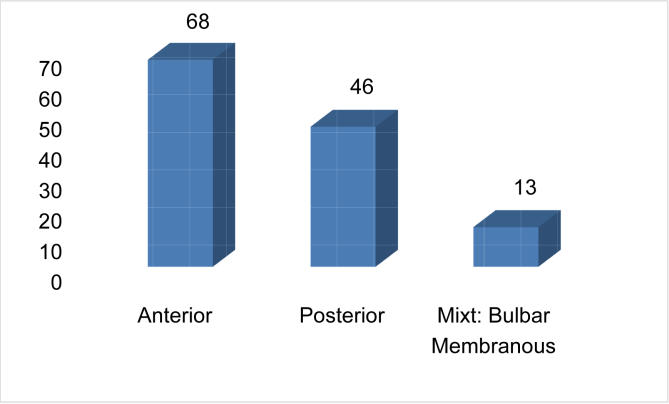

Figure 2. Distribution according to the urethral stenosis location.

- **Number of stenoses**

The urethral stenoses in our series were unique in 80.31% of cases and multiple in 19.69% of the cases (n: 25).

- **The length of stricture**

The range of less than 1cm was more common with 81 cases or 63.77%. The average length of urethral strictures was 1.24 cm with 0.5 to 9 cm extremes (**Figure 3**).

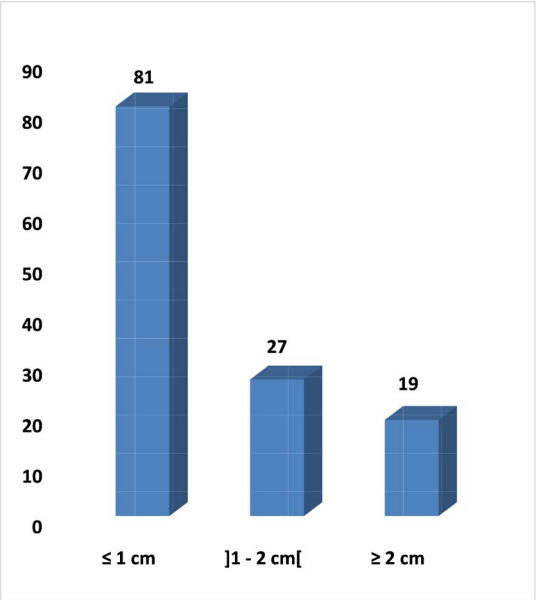

Figure 3. Distribution according to the length of the urethral stricture.

6. Aetiology

The aetiology of urethral stricture was infectious in 44.31% of the cases, followed by traumatic and iatrogenic cases with 37.79% and 18.90% of the cases respectively. The urine analysis in 91.34% of the patients had an objective urinary tract infection in 75.86% of the cases and isolated *E. coli* in 70.45% of cases, as shown in Table 5.

7. Management

In an emergency, 77 patients underwent a suprapubic urinary bypass of which 75 by cystostomy and 2 by suprapubic catheterism. Forty-nine patients or 38.58% had initially received an end to end anastomosis, 49 others or 38.58% received an instrumental treatment by instrumental dilatation and 9.47% by urethroplasty according to Milkalowsky.

Table 6 showed the distribution of patients according to their first treatment.

No endoscopic treatment was recorded. The average duration of the urethral catheter placement for all the procedures was 21.8 days with extremes of 1 and 45 days. The average hospitalization duration had been 13.8 days.

Table 7 shows the distribution of results according to the type of initial treatment. At the removal of the catheter we recorded a total success but over time the rates were: 87% of success after 6 months, 89.7% of success after 12 months, and 85% of success after 18 months.

4. Discussion

During the study period, the hospital prevalence of urethral stricture was 10.15% in the division. Fall *et al.* [2] reported a similar prevalence to ours of 6.5%. We

Table 5. Distribution of identified germs.

Urine Analysis	Number	Percentage (%)
Escherichia coli	**62**	**70.45**
Klebsiella sp	9	10.23
Pseudomonas aeruginosa	4	4.54
Staphylococcus saprophyticus	4	4.54
Enterobacter sp	3	3.41
Neisseria gonorrhae	3	3.41
Candida ablicans	1	1.14
Proteus mirabilis	1	1.14
Citrobacter	1	1.14
Total	**88**	**100**

Table 6. Distribution of patients according to surgical treatment.

Types of treatment	Number	Percentage (%)
End to end Anastomosis	49	38.58
Instrumental dilatation	49	38.58
Mikalowsky repair technique	12	09.47
Pediculated penile flap	10	7.87
Bengt Johansen technique	03	2.36
Meatotomy	02	1.57
Definitive Cystostomy	02	1.57
Total	**127**	**100**

Table 7. Results according to the type of treatment.

Type \ Results	Good results	Recurrence	Lost to follow up	Total
End to end Anastomosis	**44**	3	2	49
Instrumental dilatation	**30**	12	7	49
Mikalowsky repair technique	8	2	2	12
Pediculated penile flap	7	2	1	10
Bengt Johansen technique	1	1	1	3
Meatotomy	**2**	-	-	2
Definitive Cystostomy	-	2	-	2
Totals	94	22	11	127

can note that the urethral stricture was included in the main reasons of hospitalizations in the urology divisions in Africa.

In Europe, Lumen N *et al*. [3] as well as Palminteri *et al*. [4] had reported higher rates respectively 60.9% and 77.4% of urethral stricture. The urethral

stricture is a pathology of young adults. The average age in our study was in the same vein of 48.27 years with age groups of 41 - 60 years (29.92%) and 21 - 40 years (34.64) who were the most affected. The average age of our patients was similar to those of Zango B. *et al*. [5], and Guirassy *et al*. [6] who had reported an average age of 47.8 years and 51.4 years respectively. Heyns *et al*. [7] in a comparative study had also reported averages of age of 49.9 and 50.9 years. These results confirm that urethral stricture is an affection of the young adult especially in Sub-Saharan Africa where STD and urethritis are frequent in young people. The higher average age in developed countries as well as the peaks at advanced ages could be related to a high frequency of endourology therapies at these ages. In our study, dysuria and acute urinary retention were the most frequent reasons for consultation with respectively 32.4% and 42.2%. Zango *et al*. [5] on the 70 patients, 46 (65.7%) were seen with complications including 34 acute urinary retention, seven penoscrotal fistulas and five external genitaliacellulitis.

In Gabon, Falandry [8] reported 29.8% fistulas from stenosis and 50% of upper urinary tract stricture.

The bulbar localization was the most frequent in our series. We found 29 cases (46.4%) of bulbar stenoses. In the sub-region Akpo *et al*. [9] reported rates of bulbar stenoses close to ours with respectively 47.3 %. Lumen N *et al*. [3] as well as Palminteri *et al*. [4] also reported similar rates with respectively 48.1%, 46.9% of bulbar stenosis. Bulbar localization, although reported at different rates by the different authors came in the first place in the localization of urethral stricture both in developed and developing countries. This high frequency of localization to the bulbar urethra could be related to the fact that the anatomical bulbar portion is propitious to the multiplication of germs cause of the majority of urethral strictures. In our series, 80.31% of the urethral strictures were unique and multiple in 19.69% of cases similar to the results of Lumen N *et al*. [3] who reported 13.4% of multiple urethral stricture. This high proportion of multiple urethral stricture could be explained by the types of aetiology encountered, notably infectious and iatrogenic that provide long and/ multiple US [4] [9]. The average length of urethral stricture was 1.24 cm with extremes of 0.5 and 9 cm. 63.77% (n = 81) of the patients had a short stricture (≤1 cm), 21.26 (n = 27) of the mean strictures ([1 - 2 cm]) and 14.97% (n = 19) of long strictures (>2 cm). But Fenton *et al*. [10] in a study on the anterior urethra noted an average length of urethral stricture greater than ours of 4.1 cm. palminteri *et al*. [4] reported an average length of 4.15 cm. From these results it was clear that an important amount of the urethral strictures were mean and or long. The length of the stenosis was one of the criteria for choosing the therapeutic method. Stenoses of less than one centimetre in length are most often treated by internal urethrotomy or instrumental dilatation treatment. Whereas between one and two centimetre in length, a segmental urethrectomy followed by a terminal-terminal anastomosis are necessary. We identified 3 groups of aetiology in our series: infectious, iatrogenic and traumatic. Our study showed a dominance of infectious aetiologies (43.31%)

followed by traumatic causes (37.79%). Iatrogenic aetiology represented 18.89%. In our regions, the main aetiologies of the urethral stenoses are infectious. In Gabon Falandry [8] found an infectious origin in 52% of the cases. Apko *et al*. [9] and Fall *et al*. [2] noticed the predominance of infectious causes through respective rates of 54.3% and 63%. However, in the developed countries urethral stenoses are rather of iatrogenic origin [6]. The responsible infections are usually the acute gonococcus urethritis or C*hlamydia trachomatis urethritis.* There were three cases of gonococcis among the infectious causes. Twelve patients had a history of bilharziozis. Urogenital endemic tuberculosis in our country has not been identified as an aetiology in our patients. In the series of Ouattara [11], the urethral stricture was found in 39 who formerly suffered frombilharziozis. Chatelain *et al*. [12] reported a scarce urethral stricture of bilharzia origin in a study conducted in France. The US of infectious origin are decreasing in African series in general but remains one of the frequent causes of urethral strictures despite the existence and availability of antibiotics and the means of sexual transmitted infections prevention. *E. coli* is the most found germ [2] [6] [9].

The iatrogenic aetiology represented 18.89% of the aetiologies of urethral strictures in our series. In developed countries, the urethral stenoses are rather of iatrogenic origin and could be explained by the fact that the urinary endoscopy is a common practice in their context [10]. In our series, the rate of iatrogenic aetiology could be related to the more and more common and abusive practice of urethral catheterismin very doubtful asepsis conditions. In our regions, open surgery is the most commonly used in the therapeutic management of urethral steneoses. The second most used method after uretroplasty in our study was dilatation. Thirty-eight and half percent of the patients had benefited of a treatment by instrumental dilatation. These results showed a relative decrease in the rate of patients who had benefited of an anterior treatment with instrumental dilatation but this rate remains high because our patients treated with by urethroplasty may have received an anterior dilatation. No incident nor accident were observed and we didn't record any per or immediate post-operative death. However, at a mean decline of 12 months 10.3% of the patients did not have good results or 89.7% of success. Ibrahim A. G. *et al* [13] reported rate inferior to ours at 84.6% of good results in series on the urethroplasties. This difference could be explained by the diversity of follow-up time. All the patients with up to 1cm longer stenoses got good results after 6 months of follow-up compared to 85.7% for the urethral strictures of]1 - 2 cm] and 66.6% for US of more than 2cm. however our results remain superior to those of Guirassy *et al*. [6] who reported 81.6% of success for US between 0.5 and 1 cm and only 18.20% of success for US superior to 2.5 cm. from these results it was clear from the diversity of success rates that short US reported more good results than the long US after treatment. Thus the therapeutic success is influenced by the length of the urethral stricture. The weaknesses of our study are the retrospective nature of the study, patients lost to follow-up and the absence of debimetry. Despite these li-

mitations, these comments and discussions could be carried out.

5. Conclusion

Urethral stricture is a common pathology in the urology division of Yalgado Ouedraogo University Teaching Hospital with a predilection for young people. The diagnosis remains based on the VCUG and the therapeutic choice is according to the location, to the number and the extent of the stricture. The treatment of urethral stricture is open surgery in our context.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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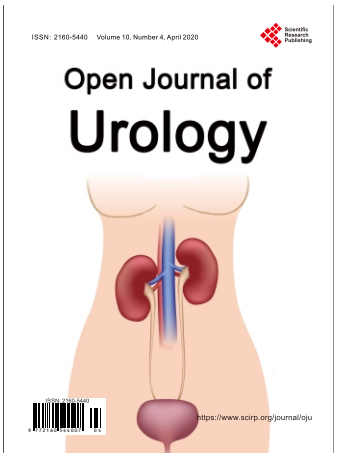

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