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## RESEARCH ARTICLE

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# Urologic emergencies in neonates: A teaching hospital experience

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### ABSTRACT

**Background:** Urologic emergency refers to any urologic condition that requires urgent medical attention. These urogenital problems may present as urinary tract obstruction and/or urinary tract infection resulting in renal compromise and sepsis. The purpose of this study was to evaluate an experience in the pattern and management of urological emergencies in neonates.

**Materials and Methods:** This was a retrospective study of neonates who presented with urological emergencies between January 2015 and December 2019 at the pediatric surgery unit of Enugu State University Teaching Hospital (ESUTH) Enugu, Nigeria. Diagnosis of urological emergency was made based on clinical and investigative findings.

**Results:** A total of 255 neonatal surgical emergencies were seen during the study period; urological emergencies in neonates accounted for 102

(0.4%) of the cases. More males were affected and the mean age of the neonates was 7 days. Urinary retention and paraphimosis were the most and least common diagnosis in the patients respectively. Urethral catheterization was the most performed procedure and circumcision was the least performed. Urethrocutaneous fistula and wound infection accounted for most of the post-operative complications. Ninety-four (92.2%) neonates achieved full recovery and were discharged home. Six (5.8%) neonates required repeat surgery. There was no mortality.

**Discussion:** Neonatal urological emergencies represent an integral part of pediatric surgical practice and these emergencies are not uncommon. Neonatal urological emergency is a regular referral from peripheral hospitals to the tertiary hospitals.

**Conclusion:** Neonatal urological emergencies refer to problems of the urinary and genital system in neonates that require immediate intervention. Prompt and adequate treatment by well-trained providers minimizes complications and maximizes good outcome.

**Key Words:** *Catheterization, Emergency, neonate, Urogenital, Urinary retention.*

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### INTRODUCTION

Neonates are infants who are less than one month of age. Urologic emergency refers to any urologic condition that requires urgent medical attention. A number of urogenital emergencies may present in the neonatal period [1]. These urogenital problems may present as urinary tract obstruction and/or urinary tract infection resulting in renal compromise and sepsis [1]. A common presentation of urologic emergency is retention of urine and there may be geographical variations in the distribution of urological emergencies [2, 3]. These urologic problems can be detected prenatally [4]. Neonates who do not pass urine after birth may be at great danger; there may be an obstructing urinary lesion and the urinary system may be drained by nephrostomy, suprapubic cystostomy or urethral catheter [5]. Meticulous fluid and electrolyte management is critical in neonatology due to the effect on the cardiovascular, respiratory and gastrointestinal systems [6]. Obstruction of the bladder neck may result in patent urachus and in such cases the obstruction should be relieved before the urachus is closed. Neonates born with deficient abdominal musculature may present with full bladder and those with spinal dysraphism such as meningocele may present with neurogenic bladder.

Abdominal masses may be nephroblastoma or neuroblastoma. Masses presenting at the vulva may be prolapsing ureterocele or mucocolpos. Large teratomas attached at the perineum may cause urethral obstruction. Acute scrotum is another condition requiring prompt treatment in neonates. Use of imaging, prompt diagnosis and appropriate intervention of these urogenital anomalies are important to reduce morbidity and possible mortality [1]. There is paucity of data on urological problems in neonates, hence the need to evaluate the different urological emergencies in the neonates. The purpose of this study was to evaluate an experience in the pattern and management of urological emergencies in neonates.

### MATERIALS AND METHODS

This was a retrospective study of neonates, aged one month and below, who presented with urological emergencies between January 2015 and December 2019 at the pediatric surgery unit of Enugu State University Teaching Hospital (ESUTH) Enugu, Nigeria. Diagnosis of urological emergency was made based on clinical and investigative findings. Neonates with urological emergencies who were referred from peripheral hospital were included into the study. ESUTH is a tertiary hospital located in Enugu, South East Nigeria.

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The hospital serves the whole of Enugu State, which according to the 2016 estimates of the National Population Commission and Nigerian National Bureau of Statistics, has a population of about 4 million people and a population density of 616.0/km<sup>2</sup>. The hospital also receives referrals from its neighboring states. Information was extracted from the case notes, operation notes, and operation register and admission-discharge records. Information was extracted from the case notes, operation notes, and operation register and admission-discharge records. The information extracted included the age (in days), gender, clinical presenting, diagnosis, time interval between presentation and intervention, operative procedure performed, complications of treatment, duration of hospital stay and outcome of treatment. The follow-up period was 12 months. Ethical approval was obtained from the ethics and research committee of ESUTH and informed consent from the patients' caregivers was not required due to retrospective nature of the study. Statistical Package for Social Science (SPSS) version 21 (manufactured by IBM Corporation Chicago Illinois) was used for data entry and analysis. Data were expressed as percentages, mean, and range. . Statistical Package for Social Science (SPSS) version 21 (manufactured by IBM Corporation Chicago Illinois) was used for data entry and analysis. Data were expressed as percentages, mean, and range.

**RESULTS**

**Patients' demographics**

A total of 255 neonatal surgical emergencies were seen during the study period; urological emergencies in neonates accounted for 102 (40%) of the cases. Majority of the patients were males. Details of the patients' demographics are shown in Table 1.

**TABLE 1**  
**Demographic characteristics of the patients (n=102)**

Parameter	Value
Mean age of the neonates at presentation	7 days (1-27)
Gender	
• Male	77 (75.5%)
• Female	25 (24.5%)
Mean interval between presentation and intervention	24 hour (1-48)
Mean interval between presentation and surgery	2 days (1-3)
Mean duration of hospital stay	20 days (10-40)

**Presenting presentations and clinical diagnosis of the patients (n=102)**

The presentations and clinical diagnosis of the patients are shown in Table 2.

**TABLE 2**  
**Clinical presentations and their diagnosis (n=102)**

Presentation	Diagnosis	Number of patients (%)
Unable to pass urine	Urinary retention	39 (38.2)
Excessive bleeding following circumcision	Bleeding disorders	36 (35.3)
Scrotal discoloration	Testicular torsion	14 (13.7)
Injury to the genitalia	Genitourinary trauma	4 (3.9)
Bleeding per urethra	Gross hematuria	4 (3.9)
Part of penis cut of	Penile amputation	3 (2.9)
Failure to pull front the prepuce	Paraphimosis	2 (2.0)

**Procedure performed**

The procedures performed are reflected in Table 3.

**TABLE 3**  
**Procedure performed**

Procedure performed	Number of patients (%)
Urethral catheterization	27 (26.5)
Application of pressure	24 (23.5)
Suprapubic cystostomy	12 (11.8)
Vascular ligation	12 (11.8)
Orchidopexy	14 (13.7)
Wound care	4 (3.9)
Resuscitation with blood transfusion	4 (3.9)
Penile refashioning	3 (2.9)
Circumcision	2 (2.0)

**Complications of treatment**

The complications observed in the patients include urethrocutaneous fistula in 3 (2.9%), surgical site infection 3 (2.9%), urethral injury 2 (2.0%) and 1 (1.0%) patient each had penoglanular adhesion, meatal stenosis and testicular torsion.

**Treatment outcome**

Ninety-four (92.2%) neonates achieved full recovery and were discharged home. Six (5.8%) neonates required another surgery for the repair of the complications that arose during the course of treatment. The parents of two (2%) neonates signed out against medical advice. There was no mortality.

**DISCUSSION**

Neonatal urological emergencies represent an integral part of pediatric surgical practice and these emergencies are not uncommon. Neonatal urological emergency is a regular referral from peripheral hospitals to the tertiary hospitals [7]. Urological presentations at the neonatal age may be due to congenital anomalies or problems arising from the treatment of these neonates. Anxiety on the part of the parents necessitates presentation to the hospital. The spectrum of the neonatal urinary emergencies spans from urinary to genital pathologies. Neonatal urological emergency may not be immediately life threatening but significant morbidity may result, if not adequately treated. In the preoperative and post-operative care of neonates with urological emergencies, particular attention is paid to adequate and appropriate fluid management [7]. In the present study, most of the patients were males. This finding is consistent with the report of other series on urological emergencies [7, 8]. The exact reason for this gender difference is not known. However, differences in the anatomy of the male and female urogenital system may explain it. The mean age of our patients was 7 days. The fact that congenital urogenital anomalies may be observed at this time and most neonatal procedures such as circumcision are performed within the first one week of life may explain this mean age at presentation. Howbeit, urological emergency may present at any age. Delayed presentation of the patients is evident in the mean interval of 24 hours before presentation to the hospital. Parental poverty and low level of awareness may be responsible for the delayed presentation. Late presentation of urologic emergencies is associated with poor outcome [9]. The duration of hospitalization is dependent on the pathology and treatment rendered to the patients. For instance, a neonate with penile refashioning is more likely to stay longer in the hospital than a neonate with bleeding from circumcision. Urinary retention was the most common urologic emergency recorded in the present study. This finding is at variance with the report of Talreja et al [3].

The group of patients recruited into a study and the setting of the study may explain the differences in the frequencies of the urologic emergencies. The causes of the urinary retention in neonates include posterior urethral valve, congenital meatal stenosis, congenital urethral stricture and traumatic catheterization. Circumcision bleeding is significant cause of urological emergency especially in neonates because most circumcisions in Nigeria are performed at neonatal age. Excessive bleeding following circumcision can result from the frenular artery and cut edges of the skin [10]. Bleeding from circumcision can be massive and there are cases of mortality resulting from uncontrollable bleeding due to circumcision [11]. Testicular torsion in neonates is less common when compared with peripubertal boys. Neonatal testicular torsion is rare and occurs in 6.1 per 100,000 live births [12]. An emergent orchidopexy in neonatal testicular torsion is required to avoid testicular loss. Penile amputation is an uncommon complication of circumcision especially when the procedure is performed by untrained personnel. Penile glans reimplantation can be carried out in early presenter and penile refashioning is performed in late presenters at a later date [13].

Urethral catheterization was the most common performed procedure. One study conducted in Maine, USA, reported urethral catheterization for urinary retention as the most common intervention in urologic emergency [8]. However, when there is traumatic catheterization, a suprapubic cystostomy is performed. It is pertinent to state that faulty suprapubic cystostomy may result in small bowel obstruction [14]. A study from India documented hematuria from traumatic catheterization as the most common presentation among referred cases of urologic emergencies [3]. Hemostasis for circumcision bleeding accounted for a significant number of interventions performed in the neonates. Hemostasis was achieved by pressure application or ligation of the bleeding vessel. It is worthy to note that vascular ligation must be performed with great care to avoid urethral injury and subsequent urethrocutaneous fistula. Ikuerowo et al reported that hasty clamping of the urethral wall with the frenular vessels and inadvertent scalpel injury to the urethral wall as the etiologies of urethrocutaneous fistula [15]. In testicular torsion, bilateral orchidopexy was performed. The rationale for the bilateral orchidopexy is that what predisposed to the unilateral torsion is most always bilateral. In paraphimosis, a dorsal slit is made on the prepuce to relieve the pressure on the glans penis. Following the dorsal slit, the circumcision is completed due to parental unacceptable cosmetic appearance of the dorsal slit. Urethrocutaneous fistula and surgical site infection are the most common post-operative complications recorded in our patients. Urethral injury following attempts to control bleeding in the peripheral centers may account for the urethrocutaneous fistula. The septic environment of the peripheral health facilities and non-observance of asepsis during the procedure may explain the surgical site infection. Brook reported infectious complications of circumcision are more when the circumcision is performed by untrained healthcare providers. In fact, neonatal tetanus and meningitis have been reported as a complication of circumcision. Late presentation in cases of testicular torsion may account for the single case of testicular atrophy. The degree of the torsion (360° versus 180°) may also be responsible for the testicular atrophy. Some of the post-operative complications such as urethrocutaneous fistula required another surgery for their treatment. None of the studied neonates in the current series expired. The reason for the no mortality could be because there is no immediate threat to the life of the neonate in urologic emergencies.

Neonatal urologic emergencies may not be associated with immediate mortality but some morbidity is recorded.

## CONCLUSION

Neonatal urological emergencies refer to problems of the urinary and genital system in neonates that require immediate intervention. Urinary retention and passage of urethral catheter are the most common problem and interventions respectively. Prompt and adequate treatment by well-trained providers minimizes complications and maximizes good outcome. General outcome of treatment neonatal urological emergencies is good.

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