

PATTERN OF PAEDIATRIC SURGICAL EMERGENCIES AND OUTCOME IN A TERTIARY HOSPITAL IN LAGOS, NIGERIA.

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ABSTRACT

Background: Paediatric surgical emergencies can be challenging especially in our environment with limited resources, causing considerable morbidity and mortality. This was a review of the pattern and outcome of paediatric surgical emergencies at the Lagos State University Teaching Hospital (LASUTH), Ikeja-Lagos, Nigeria.

Methods: A retrospective study of all paediatric patients aged 0-13 years who presented at the surgical emergency unit over a nine month period was conducted. Data obtained from patient's case notes included age, weight, types of surgery and anaesthesia, as well as outcome.

Results: There were 115 patients with a male to female ratio of 2:1, mean age of 3.5 ± 4.1 yrs (11 hours-13 yrs) and mean weight of 12.9 ± 10.1 kg. There were 36 (31.3%) neonates, 19 (16.5%) infants, 60 (52.2%) children, and most belonged to ASA categories III (53.0%) and IV (45.2%). Pathologies were congenital in neonates 32 (88.9%), intussusception in infants 11 (57.9%), while in the child, 23 (38.3%) were caused by infections and 19 (31.7%) by trauma. Surgical emergencies were mainly abdominal 85 (74.0%) and ophthalmological 15 (13.0%). The surgical procedures were mainly exploratory laparotomy 51 (44.3%) and herniotomy 14 (12.2%). General anaesthesia (GA) was offered in 110 (95.7%) and local anaesthesia (LA) in 5 (4.3%). Mean duration of hospital stay was 12.6 ± 15.4 days. Complications occurred in 27 (23.5%). Mortality rate of 12 (10.4%) was highest in neonates 8 (66.7%), and in all ages septicaemia 9 (75.0%) was the commonest cause of death.

Conclusion: Paediatric surgical emergencies were more of congenital pathologies in neonates, intussusception in infants and infection in children with most patients presenting with advanced illness. Exploratory laparotomy under general anaesthesia was the commonest procedure. Mortality was highest in neonates and in all ages septicaemia was the commonest cause.

Keywords: Paediatric surgical emergencies, Lagos, pattern, outcome

INTRODUCTION

Paediatric surgical emergencies are common in our environment and require rapid response in order to reduce operative risks and mortality^{1,2}. The paediatric patient which includes the neonate to the older child has peculiar characteristics and constitutes a high risk, which is worsened perioperatively in the acute ill patient. Therefore, skilled staff with a clear understanding of these peculiarities and management of the accompanying pathophysiological derangements will improve outcome^{3,4,5,6}. On the other hand, late presentation in addition to limited resources commonly seen in resource poor countries is associated with poor results^{1,7,8}. It is important to note that surgical emergencies in the paediatric age are not limited to the abdomen alone; as they commonly present with injuries

in other body regions such as the extremities, eyes, ear nose and throat (ENT) requiring other surgical specialties². Whatever the diagnosis, early management, skilled staff and specialized facilities are crucial to an improved outcome^{3,5,9}.

This preliminary study was therefore conducted to evaluate the pattern and contributory factors to outcome of paediatric surgical emergencies at our centre.

METHODS

A retrospective study of all paediatric patients between ages 0-13 years scheduled for various emergency surgical procedures over a nine month period was conducted. Data was obtained from patient's case notes,

as well as surgical and anaesthetic records. This included demographic and patient characteristics, surgical diagnosis, American Society of Anaesthesiologist's (ASA) risk category, types of anaesthesia and surgery, complications and outcome. The Statistical Package for Social Sciences (SPSS) v.17 software was used for statistical analysis and results were presented as frequencies and means \pm standard deviation.

RESULTS

A total of 115 paediatric patients with a M:F ratio of 2:1, mean age of 3.5 ± 4.1 yrs (11 hours-13 yrs) and mean weight of 12.9 ± 10.1 kg were operated during the period under review. Table 1 shows the patient and anaesthetic characteristics

The aetiological trends of surgical emergencies in different paediatric ages are shown in Table 2. Abdominal surgical emergencies were the most frequent 85(74.0%), followed by ophthalmological emergencies 15(13.0%)(Table 3). Others included tracheo-oesophageal fistula(TOF) 2, testicular torsion in an infant, urethral rupture and pleural effusion in the child category. From table 4 exploratory laparotomy 51(44.3%) and herniotomy 14(12.2%) were the most frequent abdominal surgical procedures and intestinal obstruction was the commonest indication for exploratory laparotomy. Overall, intestinal obstruction from various causes 18(15.7%), obstructed hernia 14(12.2%), typhoid perforation 12(10.4%) and intussusception 11(9.6%) were the commonest emergencies. Intestinal obstruction seen mainly in neonates 15(83.3) was caused by intestinal atresia 8(53.3), imperforate anus 4(26.7) and Hirschsprung's disease 3(20.0).

Complications seen in 27(23.5%) were septicaemia(14), fluid and electrolyte deficits(4), anaemia(3), pulmonary oedema(2) and burst abdomen(4). Mean duration of hospital stay was 12.6 ± 15.4 (1-114 days). Mortality rate was 12(10.4%), 8(66.7%) occurred in neonates and in all ages septicaemia 9(75.0%) was the commonest cause of death (Table 5). The mortalities were seen in patients with AAW defects(4), intestinal atresia(3), intussusception(3), TOF (1) and gangrenous forearm (1).

DISCUSSION

There was a wide range in the age of patients who presented during the study period with a male gender preponderance, surgery being conducted as early as day

1. The patients seen were mostly children above 1 year followed by neonates. Most patients also presented with incapacitating and life threatening diseases in the ASA risk categories III and IV, and with various complications especially septicaemia. These findings have been corroborated by other workers^{7,9}, while late presentation, a practice peculiar to our environment due to parental ignorance, poverty, injurious cultural beliefs and patronage of quacks among others have been highlighted as important causes of morbidity and mortality^{1,7,8}. Okaforet al⁵ however observed that early patient presentation in their study contributed to early resuscitation and fewer complications before surgery. Though diverse, the problems were either congenital, infective or traumatic in origin with a peculiar age distribution involving different surgical specialties, but abdominal surgical emergencies were commonest as found in previous studies^{6,7}.

The trends in the presentation of the common surgical emergencies were also similar to findings by other workers. In the neonates, congenital pathologies of various types associated with bowel obstruction and AAW defects^{9,10,11} such as gastroschisis and omphalocele were predominant, patients presenting within hours of birth. Intussusception was the commonest abnormality in infants and deserves special mention, being the commonest cause of intestinal obstruction from previous findings in babies less than 1 year^{2,7,8,10}. In the child, pathologies were mostly of infective origin, while a few in our study were associated with trauma or malignancy, findings similar to that by Abubakar and Ofoegbu⁷. Infections were mainly associated with typhoid perforation and appendicitis with or without rupture. Previous studies have also shown a prevalence of typhoid perforation in the same age group in developing countries, in association with poor sanitation, late presentation and severe complications^{7,10,12}. While cases of obstructed hernia necessitating emergency herniotomy presented in all ages (and only in the male gender), traumatic lesions were found only in children above 1 year involving the ophthalmology, otorhinolaryngology and orthopaedic teams, and have been linked with their playful and adventurous nature with vulnerability to harm¹³.

Surgeries were conducted mainly under GA as found in previous studies^{3,6,14}, and most patients were managed by anaesthetic registrars with more than two years training under consultant supervision. These factors were however not related to outcome. While such consultant

led practice with better outcomes has been documented⁵, reports from Ouro-Bang'na et al⁶ show that nonmedical anaesthetists with limited training and supervision, lacking common drugs and equipment, administer anaesthesia usually for emergency surgery, employing spontaneous or manually assisted ventilation in Togo. In our study, rapid sequence induction with endotracheal anaesthesia was commonly employed to protect the airway since most patients had full stomach; induction agent including ketamine, a favourable agent in haemodynamically unstable patients. Thereafter, manual ventilation with sole ketamine or halothane (readily available agents in our environment), or muscle relaxant technique employing pancuronium was offered. However, in some neonates with intestinal obstruction and a high risk to GA, supportive care in form of monitored anaesthetic care involving monitoring (including pulse oximetry), airway maintenance and supplemental oxygen therapy was offered, while the surgeon infiltrated locally with LA – techniques which have been reported earlier with variable outcome^{9,14}.

Overall, surgical outcome was related to patient's age, advanced illness and available supportive care. There were more neonatal deaths and most patients presented with advanced illness complicated by fluid deficits and septicaemia - findings documented in other studies^{9,12,15}. There was an intraoperative death in a patient following acute respiratory compromise and cardiopulmonary arrest during repair of severe gastroschisis. In some patient categories, there was need for close postoperative monitoring and organ support to reduce complications and improve outcome. Ventilatory support after closure of TOF or huge AAW defects can help prevent respiratory insufficiency and fatigue resulting from increased work of breathing and diaphragmatic splinting. Maintenance of fluid and electrolyte balance and nutritional therapy in form of parenteral nutrition (PEN) also have immense benefits^{10,16,17}, enhancing recovery. As highlighted by previous researchers^{9,14,16,18}, management of these life threatening sequelae is best offered in postoperative care

units such as paediatric or neonatal intensive care units (PICU/NICU). These however are not optimally functioning. A patient was referred due to lack of facilities for PEN after closure of enterocutaneous fistula, and another with omphalocele was discharged, both following voluntary request. Although duration of hospital stay was on the average, mortality was highest in neonates with AAW defects and in all ages deaths were mostly caused by septicaemia, though two cases of pulmonary oedema from fluid overload were recorded postoperatively.

While findings were similar to others in our environment^{6,9,10,15}, they differ from those in developed countries due to early presentation and availability of integrated facilities². Better outcomes have however been suggested through patient education which encourages early presentation, collaboration among specialists involved in childcare for generation of treatment protocols and improved postoperative care units^{7,18}.

CONCLUSION

Paediatric surgical emergencies presented with peculiar trends in different age categories, and abdominal emergencies necessitating exploratory laparotomy dominated, though cases of trauma requiring other specialties were seen. While mortality was highest in neonates, septicaemia was the commonest cause. Paediatric patients are indeed high risk due to their peculiar anatomy, physiology and pharmacology¹⁹. Surgical emergencies and anaesthesia pose additional challenges, but successful management depends on early presentation, skilled staff^{3,4,5} and adequately equipped facilities.^{9,11}

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Table 1. Patient and anaesthetic characteristics- n(%)

Age group				
Neonate		Infant	Child	Total
36(31.3)		19(16.5)	60(52.2)	115(100)
ASA class				
I	II	III	IV	Total
2(1.7)	0(0)	61(53.0)	52(45.2)	115(100)
Anaesthesia record				
Staff		Consultant	Registrar	Total
		29(25.2)	86(74.8)	115(100)
Techniques		GA	LA	Total
		110(95.7)	5(4.3)	115(100)

GA- general anaesthesia, LA- local anaesthesia

Table 2. Aetiologiological trends of surgical emergencies in different ages

	n(%)			
Aetiology	Neonate	Infant	Child	Total
Congenital	32(88.9)	6(31.5)	10(16.7)	48(41.7)
Infection	4(11.1)	0(0)	23(38.3)	27(23.5)
Trauma	0(0)	0(0)	19(31.7)	19(16.5)
Intussusception	0(0)	11(57.9)	0(0)	11(9.6)
Malignancies	0(0)	0(0)	4(6.7)	4(3.5)
Foreign bodies	0(0)	0(0)	3(5.0)	3(2.6)
Others	0(0)	2(10.5)	1(1.7)	3(2.6)

Table 3. Distribution of paediatric surgical emergencies

Surgical emergency	n (%)			
	Neonate	Infant	Child	Total
Abdominal	34(94.4)	18(94.7)	33(55.0)	85(74.0)
Ophthalmological	0(0)	0(0)	15(25.0)	15 (13.0)
Otorhinolaryngological	0(0)	0(0)	5(8.3)	5(4.3)
Orthopaedic	0(0)	0(0)	5(8.3)	5(4.3)
Others	2(5.6)	1(5.3)	2(3.3)	5(4.3)
Total	36(31.3)	19(16.5)	60(52.2)	115(100)

Table 4. Emergency surgical procedures and indications

Procedure	n(%)
Exploratory laparotomy	51(44.3)
intestinal obstruction	18
typhoid perforation	12
intussusception	11
AAW defects	8
umbilical mass	1
enterocutaneous fistula	1
Herniotomy	14(12.2)
Appendicectomy	9(7.8)
Ophthalmological surgery	15(13.0)
corneal repair	9
evisceration	4
paracentesis	2
Otorhinolaryngological surgery	5(4.3)
foreign body removal	3
septal haematoma drainage	2
Orthopaedic surgery	5(4.3)
amputation of gangrenous limb	4
debridement of foot ulcer	1
Others	16(14.0)
Total	115(100)

AAW-anterior abdominal wall

Table 5. Patient's outcome pattern - n(%)

	Neonate	Infant	Child	Total
Discharges	28	16	59	103
Deaths and causes (p < 0.5)				
Septicaemia	6	2	1	9(75.0)
pulmonary oedema	1	1	-	2(16.7)
DOT	1	-	-	1(8.3)
	8(66.7)	3(25.0)	1(8.3)	12

DOT-death on the table

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