ORIGINAL RESEARCH

The role of training of general surgeons in the emergency management of the surgical neonates in Nigeria

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Abstract

Background
Congenital anomalies are one of the major causes of hospital admissions in children in many parts of Africa, adequate knowledge of the presentations and management of these anomalies is essential to achieving good outcome. This study aimed at examining the role of training of general surgeons and anaesthetists in the emergency management of the surgical neonates in Nigeria.

Methods
A 10-year retrospective study of 226 neonates who had emergency surgical procedures performed. Retrieved from their clinical records were information about the neonatal demography, clinical presentation, clinical diagnosis, operative and anaesthetic management as well as the outcome.

Results
The mean age and weight of the neonates were 1.60±0.839 days and 2.79±0.636kg respectively. Congenital anomalies involving the gastrointestinal tract, anterior abdominal wall defects and the genitourinary system were the commonest causes of emergency presentations. The mortality rate was 6.6% but the management outcome was not significantly related to ASA physical status classification ($\chi 2=2.98$, $p=0.395$), the cadre of Surgeons ($\chi 2=0.513$, $p=0.474$) and the cadre of anaesthetists ($\chi 2=0.081$, $p=0.776$).

Conclusions
Adequate and proper training of requisite health care personnel who can work within the limit of the available resources will help in providing safe and accessible emergency neonatal surgical services in these countries.

Keywords: developing countries, emergency surgery, health personnel, neonates, training

Introduction

Providing safe surgery for newborn infants is a serious challenge encountered by the stakeholders involved in the perioperative management of neonates with surgical diseases. In many parts of sub Saharan Africa, various factors have been identified to contribute to the very poor outcome observed in neonatal surgical management. These factors ranged from poor obstetric services, poor awareness, late presentation, poor transportation, lack of requisite equipment/facilities and inadequate personnel among others[1,2]. The challenges of neonatal surgical management become more daunting with the added problems of low birth weight, prematurity and increased susceptibility of the surgical neonate to sepsis. In the developed countries, neonatal surgical management outcome has improved greatly; this is attributed to improvements in neonatal intensive care, neonatal anaesthesia, surgical techniques, improved obstetric care and well-organized inter-hospital transport system[1]. Poor remuneration and shortage of manpower in Africa has been attributed to the lack of well-trained Paediatric Surgeons, neonatal anaesthetists and intensivists. These however, have placed the care of the surgical neonates on the lap of General Surgeons whose training in this specialized field is grossly deficient as the few paediatric surgeons may not be able to cope with the heavy work load occasioned by the care of these children[3]. Congenital malformations are largely the major causes of hospital admissions in children in many parts of Africa ranging from 24% to 40%[4,5]. In the neonates, congenital anomalies often present as emergencies[5]. Therefore, adequate knowledge of these anomalies, the preoperative stabilization and optimization of the surgical neonates presenting with these anomalies is essential to achieving good outcome[6]. These can only be achieved through adequate and proper training

Table 1. Demographic characteristics of the neonates at presentation

Age range (days)	Male	Female	Total
1-10	88	55	143 (63.3%)
11-20	29	19	48 (21.2%)
21-30	22	13	35 (15.5%)
Total	**139 (61.5%)**	**87 (38.5%)**	**226 (100%)**

Table 2. Diagnosis and admission outcomes

Diagnosis	Admission outcome		
	Alive	Dead	Total
Anterior abdominal wall defect			
Exomphalos	36	3	39
Gastroschisis	18	1	29
Ruptured Omphalitis	2	0	2
Gastrointestinal Tract			
OA + TOF	24	2	26
IHPS	3	0	3
Duodenal Atresia	18	0	18
Intestinal Atresia	23	1	24
Malrotation	1	0	1
Necrotising Enterocolitis	2	1	3
Hirschsprung's disease	6	1	7
Anorectal Malformations	40	3	43
Meconium Plug Syndrome	1	1	2
Genitourinary System			
Inguinal Hernia	19	0	19
Bladder Exstrophy	6	1	7
Posterior Urethral Valve	4	0	4
Swellings			
Sacrococcygeal teratoma	3	1	4
Cystic Hygroma	5	0	5

OA + TOF = Oesophageal Atresia + Tracheo-Oesophageal Fistula; IHPS = Infantile Hypertrophic Pyloric Stenosis

of the relevant health workers. We report emergency management of the surgical neonate and the importance of specialized training of paediatric surgeons towards improving the management outcomes of neonatal surgical patients in Nigeria.

Methods

A retrospective review of 226 neonates who had emergency surgical procedures performed on them in the Division of Paediatric Surgery, Department of Surgery, University College Hospital, Ibadan, Nigeria from January 2006 to December 2015 was conducted. In our centre, the peri – operative

Table 3. Comparison of neonatal parameters with similar studies

Study	Mean age	Sex ratio (M:F)	Mean weight (kg)	Mortality (%)
Sowande et al, 2007	6.62±7.14 days	2:1	2.62±0.53	53.6
Ugwu et al, 2013	120.29±146.7 hrs	1.4:1	2.90±2.2	42.6
Abdalla et al, 2014	11.61±8.81 days	1.36:1	–	12.4
Ilori et al, 2013	47.5±44.4 hrs	1.7:1	2.65±0.61	–
Osifo et al, 2009	8.3±2.7 days	1.5:1	2.3±1.7	35.8
Present study	**1.6±0.84 days**	**1.6:1**	**2.79±0.63**	**6.6**

management of the surgical neonate is basically performed by the Paediatric Surgeon, the surgical trainees are not allowed to handle neonatal surgical cases without adequate supervision until the fifth year of their training when they would have had adequate understanding of the management strategies of the surgical neonate. The anaesthetic and surgical procedures were, therefore, performed by the Consultants and the trainee registrars under supervision. Post-operatively, neonates with major anterior abdominal wall defects, intestinal atresias and enterocolitis were managed in the intensive care unit of the hospital. Information about neonatal demography, clinical presentation, clinical diagnosis, operative and anaesthetic management as well as the outcome were obtained from their medical records. The management outcome was taken to be discharge or death after management. The data obtained were analysed using IBM Statistical Package for Social Sciences Software Version 19.0 (SPSS Inc., Chicago, IL, USA). Summaries of categorical data were expressed as absolute values (percentage) and Chi-square test was performed to test the association between management outcome and American Society of Anesthesiologists (ASA) physical status classification, the cadres of Surgeons and anaesthetists involved with the management of these neonates with *P* values < 0.05 regarded as significant.

Results

The mean age of the neonates was 1.60 ± 0.839 days with 59.5% presenting within the first week of life and the mean weight at presentation was 2.79 ± 0.636kg. There were 139 boys (61.5%) and 87 girls (38.5%) with a male to female ratio of 1.6:1 (Table 1). All the neonates presented with congenital anomalies involving the gastrointestinal tract (GIT), anterior abdominal wall defects, genitourinary system (GUS) and swellings (in decreasing order of frequency) whereas 2 neonates (0.9%) presented with an acquired problem (ruptured omphalitis). Of the GIT anomalies, anorectal malformations (ARM) were observed in 43 neonates (19.0%), oesophageal atresia with tracheoesophageal fistula in 26 (11.5%), intestinal atresias in 24 (10.6%) and duodenal atresia in 18 (8%). Of the anterior abdominal wall defects, exomphalos was observed in 39 (17.3%) neonates and gastroschisis in 19 (8.4%). Inguinoscrotal hernia was the commonest anomaly of the GUS observed in 19 (8.4%) neonates (Table 2) Majority of the neonates had ASA physical status classifications II (33.2%) and III (34.8%) whereas ASA physical status classification I and IV were observed in 22.3% and 9.7% of the neonates respectively. Anaesthesia was administered on 101 (44.7%) neonates by Consultant Anaesthetists whereas, trainee registrars in Anaesthesia administered anaesthesia on 125 (55.3%) neonates. Consultant Paediatric Surgeons were the lead surgeons in procedures involving 158 (69.9%) neonates and trainee registrars on 68 (30.1%) neonates with supervision by the consultants. Fourteen neonates died perioperatively with a mortality rate of (6.6%). The management outcome was not significantly related to ASA physical status classification ($\chi^2 = 2.98$, $p = 0.395$), the cadre of Surgeon that operated on the neonates ($\chi^2 = 0.513$, $p = 0.474$) and the cadre of anaesthetist ($\chi^2 = 0.081$, $p = 0.776$).

Discussion

Early presentation and intervention are important factors in producing good post-operative outcome of emergency management of the surgical neonate. Thus, the outcome should be better when a baby is born in a hospital that accommodates a paediatric surgical centre compared to those referred from other hospitals where prompt diagnosis and presentation may be delayed. Our patients presented early with a mean age of 1.60 ± 0.84 days in comparison with previous reports[6-10] suggesting that majority of the patients might have been delivered in our hospital. The referred patients came from within an average of 50km radius of our hospital as the number of paediatric surgical centres has increased from two to ten in the southwestern part of the country. These centres opened up following efforts by the government to make paediatric surgical services available and accessible to the people by encouraging training of healthcare personnel in various fields in order to meet their healthcare needs. Also, this early presentation observed may be significantly related to the relatively lower mortality reported in this study in comparison with previous reports. Other patients' characteristics are, however, similar to the findings in previous reports[6-10]. Reported prevalence rate of neonatal surgical admissions in Nigeria varies from 6.2% - 8.9%, of these 88.7% were admitted for congenital anomalies[7,11]. The typical findings of gastrointestinal anomalies being the commonest presentations in most reports with causes of lower gastrointestinal tract obstruction especially anorectal malformations predominating may explain the characteristic emergency

nature of surgical presentations in the newborn period[6,7]. Although the neonates presented as emergencies, prompt and adequate resuscitation was jointly performed on them with the anaesthetists within the limit of the facilities at our disposal in our centre. Sowande et al[6] reported that preoperative stabilization of neonates requiring emergency surgery before referral is lacking in most developing countries, thus contributing to the relatively high morbidity and mortality associated with their management. The fact that majority of the neonates had ASA physical status classification II and III before surgery may be attributed to early presentation and the adequacy of stabilization measures adopted before they were operated upon.

The practice of neonatal surgery in Nigeria and indeed many countries in sub Saharan Africa (SSA) is bedeviled by so many challenges which include but not limited to the following: late presentation and referral, inadequate neonatal intensive care facilities, delivery outside a hospital facility, poverty on the part of the family, malnutrition, presence of multiple congenital anomalies and paucity of paediatric surgical manpower[1,2,6,10,12,13]. These challenges are responsible for the high morbidity and mortality associated with neonatal surgery which averaged 20 – 30% in many centres in these countries[2]. However, the specialty of paediatric surgery has witnessed considerable development in many countries of SSA through concerted efforts of various national governments and regional groups with the aim of improving the outcomes of treatment of children with surgical diseases in the last two decades[14]. These efforts were directed towards increasing awareness through research and media advocacy, early referral, provision of safe anaesthesia, provision of safe perinatal care, provision of requisite equipment and facilities, proper health care planning and financing and providing good training opportunity in paediatric surgery[1,2]. Providing solutions to these problems is daunting because many of the countries in SSA are poor and they belong to the low and medium income countries (LMIC) that depend on aids from the high income countries and funding agencies like international organizations, international donors and non-governmental organizations (NGO) to fund their healthcare delivery system. In many centres, there are no requisite equipment to work with and when they are available, the equipment are often outdated and poorly maintained. Therefore, government can only work with relevant stakeholders like NGOs and the international organisations to encourage manpower supply in order to make paediatric surgical services available to her citizens.

Ensuring proper training is the responsibility of the various supervising postgraduate medical colleges and the paediatric surgical associations through their members. Training in paediatric surgery is increasingly getting well organized and more structured in Nigeria. This is attributed to the co-ordinating efforts of the two Postgraduate Medical Colleges (The National Postgraduate Medical College of Nigeria and the West African College of Surgeons) through their respective training programmes in paediatric surgery[15]. Both training institutions require paediatric surgical trainees to spend an average of six years (inclusive of an initial two years of training in general surgery) in training in all the training centres in the country. Considering the myriad of challenges facing neonatal surgical care in Nigeria and many parts of sub Saharan Africa, the trainees in our centre are not allowed to handle neonatal surgical cases without adequate supervision until the fifth year of their training when they would have had adequate understanding of the management strategies of the surgical neonate. Similarly, all the anaesthetists involved in the management of these neonates were physician anaesthetists supervising their trainees with a clear departure from the use of non-physician anaesthetists as reported by Ameh et al[14]. The Consultants have also undergone extra training in neonatal anaesthesia and are dedicated only to the super specialty of neonatal anaesthesia. Thus, we did not observe a significant difference in the management outcome and the cadres of surgeons and anaesthetists involved in the emergency surgical management of these neonates, suggesting that adequate manpower training helped to provide safer anaesthesia and improved management outcome of neonatal surgery despite the persistence of some of the other challenges mentioned earlier facing neonatal surgery in our centre.

Conclusions

The field of neonatal surgery is a super specialization that demands adequate training in the field of paediatric surgery and anaesthesia. Training of specialists in these areas to cater for neonatal surgical problems is expected to be the starting point towards providing solutions to the challenges facing neonatal surgical care. Majority of these challenges may be with us in SSA for some time but provision of safe and accessible emergency neonatal surgical services in Nigeria and other countries in SSA can still be made possible with adequate and proper training of requisite health care personnel who can work within the limit of the meagre resources available to them.

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