

# Challenges and Outcome of Neonatal Surgery at the Abia State University Teaching Hospital Aba Nigeria

Samuel Chidi Ekpemo<sup>1,\*</sup>, Ndubuisi Eleweke<sup>1</sup>, Nneka Okoronkwo<sup>2</sup>, Chapp-Jumbo Assumpta<sup>2</sup>

<sup>1</sup>Department of Surgery, Abia State University, Aba, Nigeria

<sup>2</sup>Department of Paediatrics, Abia State University, Aba, Nigeria

## Email address:

chidisamuelekpemo@gmail.com (S. C. Ekpemo)

\*Corresponding author

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**Abstract:** Background: Neonatal surgery is still a challenge in developing country due to lack of appropriate equipment, inadequate work force and lack of political will by hospital management. However, there has been significant improvement in outcome over the last century. Objective: This study evaluates neonatal surgery in commercial city of Aba South East Nigeria with emphasis on challenges and management outcome. Methods: Prospective analysis of sixty neonates who had operative treatment at Abia State University Teaching Hospital Aba from October 2016 to July 2018. Proforma was opened for sex, weight, prenatal care, age at presentation, duration of symptoms prior to presentation, surgical pathology, treatment offered, associated congenital anomaly, evidence of prenatal diagnosis, complications and outcome. Results: There were 40 males and 20 females, male to female ratio of 2:1. The mean weight of the neonates was 2.5kg (range 1.1-4.3kg). The average age at operation was 3 days (1-15days), the mean duration of symptoms before presentation was 3.5days. The major indication for operation was anorectal malformation 32 patients {53.3%}, anterior abdominal wall defect 8 patients {13.3%}, Intestinal atresia 8 patients {13.3%}, intestinal perforation 8 patients {13.3%}, obstructed hernia 4 patient {6.6%}/There was associated congenital abnormality in 5 patients {8.3%} and prenatal diagnoses was made in 10 cases {16.6%}. During a mean follow up of 3months {1week to 9months, procedure related complications in 16 patients {26.6%} and 8patients died {mortality of 13.3%}. Conclusion: Surgical care of the neonate with a wide range of pathologies is still major challenge in our setting. Good political will, capacity building in form of manpower development and procurement of appropriate equipment will enhance the outcome.

**Keywords:** Neonatal Surgery, Challenges, Outcome

## 1. Introduction

Paediatric surgery is a relatively young specialty whose rapid growth has largely been due to the development of neonatal surgery. The ultimate survival of the neonate with the surgical treatable anomaly depends upon early recognition by the physician who may refer the infant to a paediatric surgical centre [1].

The detection of an anomaly in the fetus triggers a series of events, which will impact the pregnancy positively. Neonatologist, cardiologist, surgeon as well as Obstetrician will counsel in detail to ensure optimal care for mother and

child. [1, 2] The counseling will also ensure parents are fully prepared for eventual outcomes and events after delivery. Parents in discussion with the counseling team will have to make decisions of the optimal siting, timing and mode of delivery. For a child with suspected complex anomalies, a tertiary setting is preferred for optimal neonatal care. For a child with suspected surgical problems, delivery obviously is better done in a setting with neonatal surgical and anesthetic expertise. The majority of pregnancies are allowed to progress naturally to term. Fetus with a condition, which is incompatible with postnatal life, may be terminated after full disclosure, if this is legal and socially acceptable to parent. [2].

The management of a surgical neonate is a challenge to the

paediatric surgeon worldwide but more to the paediatric surgeon in developing countries. The stress of illness and surgical intervention is significant on newborns undergoing several transformational changes for extrauterine adaptation. This burden is greater in premature and low birth weight babies. [3] The Increased understanding of the neonatal physiology, prenatal diagnosis, better anaesthesia, improved neonatal intensive care and development of neonatal centres have enabled intervention measures that have resulted in a marked rise in neonatal surgery survival from about 28% in 1949 to more than 95% current [1-3]. However, the outcome is still poor in developing countries due to inadequate personnel and facilities, delayed presentation, transportation under unfavorable conditions and lack of intensive care facilities. [3-5]

We reviewed all neonatal surgical cases that was managed at the Abia State University Teaching Hospital Aba, a tertiary institution in the South East Nigeria with the aim of determining the challenges and management outcome.

## 2. Methods

A Prospective study of sixty neonates who had operative treatment at the Abia State University Teaching Hospital Aba between October 2016 to July 2018. Proforma was opened for sex, weight, prenatal care, age at presentation, duration of symptoms prior to presentation, surgical pathology, treatment offered, associated congenital anomaly, evidence of prenatal diagnosis, complications and management outcome. All the patients were operated on by the consultant. The primary outcome measure was taken to be discharge or death after management, while secondary outcome measures were various complications occurring after surgical operations.. Data was analysed using statistical package of social sciences (SPSS7.0) as proportions and percentages.

## 3. Results

During the twenty-two months period, Six hundred babies were admitted at the special care baby unit of the hospital. Sixty babies (10%) of these were neonatal surgical cases. There were 40 males and 20 females, with male to female ratio of 2:1. The mean weight of the neonates was 2.5kg (range1.1-4.3kg). The average age at operation was 3 days (1-15days), the mean duration of symptoms before presentation was 3.5days.

The major indication for operation was anorectal malformation 32 patients{53.3%}, anterior abdominal wall defect 8 patients {13.3%}, Intestinal atresia 8 patients{13.3%}, Intestinal perforation 8 patients (13.3%), obstructed hernia 4 patients{6.6%}.

**Table 1.** Diagnosis and mortality rate.

Diagnosis	Number of patients	Cases fatalities
Anorectal malformation	32	1
Anterior abdominal wall defect	8	2
Intestinal atresia	8	2
Intestinal perforation	8	3
Obstructed hernia	4	0

The type of operative procedure carried out and associated mortality are shown in Table 3. Colostomy fashioning was the commonest procedure performed in 20 (33%) of the patients followed by anoplasty for low anorectal malformation in 12 and emergency closure of anterior abdominal wall defects (ruptured exomphalos and gastroschisis) in 8 (6%). 8 patients (13.3%) died following surgical intervention.

**Table 2.** Procedure carried out with associated mortality.

Procedure	Number	Mortality
Colostomy	20	1
Anoplasty	12	0
Anterior abdominal wall repair	8	2
Closure of perforation	8	3
Repair of intestinal atresia	8	2
Herniotomy	4	

There was associated congenital abnormality in five patients {8.3%}; a prenatal diagnosis was made in 10 patients {16.6%}.

During a mean follow up of 3months {1week to 9months} procedure related complications occur in 16 patients (26.6%) Infective conditions (sepsis, surgical site infection, wound breakdown) accounted for the greater number of morbidity (n=12, 75%), followed by anaesthesia-related complications (n=4, 25%) as shown in Table 3.

**Table 3.** Complications.

Complications	Number of patients
Anaesthesia related	4
Surgical site infection	5
Sepsis	6
Wound breakdown	1

Eight patients died {mortality of 13.3%}. The following factors contributed to mortality (age at presentation, the body weight and gestational age). However, the non-survivors had a longer delay before presentation (>48hours), lower body weight (<2 kg) and gestational age <38weeks as shown in table 4.

**Table 4.** Comparison of mortality from several outcome variables.

	Number of patients	Mortality	% mortality
Presentation(Hours)			
<48	15	1	6.6%
>48	45	7	15.5%
Gestational age(Weeks)			
<38	10	4	40%
>38	50	4	8%
Weight(kg)			
<2kg	5	3	60%
>2kg	55	5	9%

## 4. Discussion

Neonatal surgical mortality has steadily fallen over the last five decades in developed countries as a result of improvement in the diagnosis and treatment of congenital

disorders. [4]. Most babies with congenital anomalies that corrected by surgery are now stabilized and optimized before the procedure as the transition period following birth can be complicated by the presence of congenital anomalies with consequent derangement of physiological status of these neonates. [3, 4]

Although prematurity and presence of associated congenital anomalies have been identified as the most important factors causing death in neonatal surgery in developed countries, in many cases, the final outcome is most often by the type of initial care received at the referring hospital, during transport, as well as intra- and postoperative management of these neonates. In most developing countries, preoperative stabilization before referral of neonates requiring emergency surgery is lacking, as shown by the present study. Most neonates arrive at our hospital been carried by their parents without being accompanied by any health personnel. Where attempts were made at pre-transport resuscitation they are inadequate and are usually with held during transfer; hence there was no benefit to those groups of patients in this study who had preoperative resuscitation at the referring hospital. [5]

The commonest indication for neonatal surgery was anorectal malformation 53.3% followed by anterior abdominal wall defects 13.3%. These findings was similar to studies done at Ile Ife<sup>3</sup> Western Nigeria where the majority had lower gastrointestinal obstruction as the most common indication followed by upper gastrointestinal obstruction. The most common procedure performed was colostomy for anorectal malformations. Surgery for closure of ruptured exomphalos and gastroschisis, thoracotomy and oesophageal anastomosis, as well as intestinal resection and anastomosis are associated with high mortality in their series. However, studies done in Zaria Northern Nigeria [3, 15], anorectal malformation followed by Hirschsprung's disease are the commonest indication for neonatal surgery.

The delay in presentation of patients more than 48 hour from the onset of symptoms occurs in 75% of our in our series with significant impact on survival. Ekwunife [5] reported 76.9% of their patients at the Nnamdi Azikiwe University Teaching Hospital Nnewi South East Nigeria presented late to the hospital. Other workers in developing countries like Tenge-Kuremu et al. [6] in Kenya reported a median age of presentation of 3 days and Mouafo Tambo et al. [7] in Yaounde, Cameroun, a mean delay at presentation of 3.7 days. Osifo et al. [8] in Nigeria reported that 65.5% mortality in neonatal surgical emergencies was associated with delayed presentation of which 7.5% were too ill on arrival and died during resuscitation [9]. They attributed the delay to ignorance, financial constraint, lack of adequate means of transportation among others [5, 6, and 8]. Training of all birth attendants in recognition of neonatal surgical emergencies and having an efficient emergency transport system especially in rural areas for immediate referral has been suggested could improve on the delay in presentation and hence mortality [9]. This might be useful in Sub-Saharan African countries as a significant percentage of the babies are

often delivered at home by traditional birth attendants or in rural health centers. [10] These will lead to varying degree of derangement in the physiologic and metabolic state of the babies. The three- delay model: delay in recognition of the disease, delay in seeking and accessing care and delay in the provision of care lead to high morbidity and mortality [9, 11].

Prenatal diagnosis is on the increase with recent advances in medical technology. This enables in-utero diagnosis of fetal anomalies and transportation of the fetus to tertiary centers with obstetric and neonatal service for planned delivery [12]. Prenatal diagnosis of fetal anomalies is still suboptimal in our environment despite the numerous scanning centers. This may due to lack of skill and optimal equipment to detect most of these anomalies. Prenatal diagnosis was made in 16.6% in our series. However, similar findings were reported in other centers in Nigeria [5] where 14% of their patients had valid prenatal diagnosis.

Sepsis is a common complication in surgical neonates due to immature immune system, malnutrition, invasive procedures and late presentation increases the risk of sepsis. 75% of our patients had infective conditions, which accounted for the greatest number of morbidities (Table 3). Sowande et al [4] noted that Sepsis the most common complication and had the worst outcome, followed closely by respiratory and bleeding problems. This agrees with the series reported by Ameh et al [16]. In addition, may be because most of these patients were never resuscitated adequately from the referring hospital, coupled with the poor transportation condition they were subjected to. The efficacy of most antibiotics available in many developing countries like ours cannot be assured and may contribute to the non-response to treatment in some of the patients Osifo and Oveni [12] recorded 53% of established sepsis in neonates presenting for neonatal surgery in their centre. However, 45% of neonatal surgeries in Nnewi [5] Nigeria had documented infective conditions.

The overall mortality of 13.3% in our series, although comparable low to other reports from other parts of Nigeria by Sowande et al, Ekwunife, Ameh et al. [3-5], Olumide et al. and others[12-18]. The majority of mortalities occurred postoperatively and linked to stress of transportation, sepsis, lack of neonatal intensive care unit (NICU) and other facilities. It follows, therefore, that most of the deaths are preventable. The mortality associated with various surgical conditions in the neonate also varies higher compared with mortality rate from developed countries that is less than 10% [14, 15, 18]. Mortality was higher in patients that presented to the hospital after 48hours, gestational age less than 38weeks and low birth weight babies <2kg (Table 4).

## 5. Conclusion

Surgical care of the neonate with a wide range of pathologies is still major challenge in our setting. Good political will, inform of free antenatal care, prompt referral to facilities that have paediatric surgeons, improved ambulance services, capacity building in form of further training of

Paediatric Surgeons, Anesthetist and Nurses in the care of surgical neonate. Building, staffing and equipping of neonatal surgical intensive care unit will enhance the outcome in the management of the neonates.

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