

SURGICAL CONDITIONS OF THE NEWBORN: ROLE OF THE NEONATOLOGIST FOR OPTIMAL OUTCOME

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FOCUS OF THIS PRESENTATION

- Burden of surgical conditions in neonates (globally, regionally and in-country)
- Changing the narrative:
 - Role of neonatologists at various levels

LEARNING OBJECTIVES

- Understand the burden of neonatal surgical conditions
- Discuss factors contributing to Outcome of neonatal surgical conditions (NSC)
- Role of Neonatologists in the management of NSC for optimal outcomes

OUTLINE

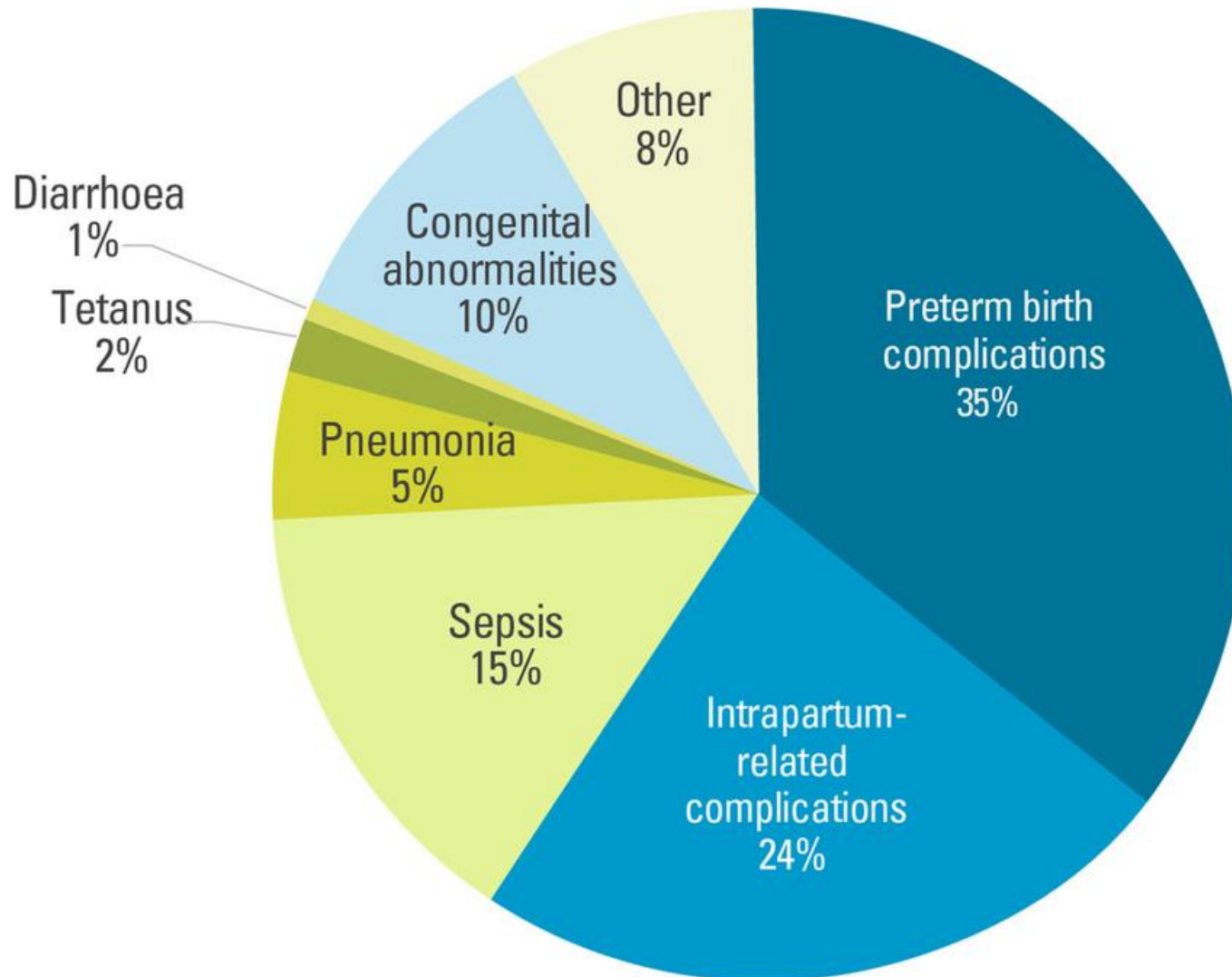
- Introduction
- Burden of surgical conditions in newborns
- Factors associated with outcome
- Changing the narrative
- Conclusion
- Lets hear from the surgeons
- Summary
- Questions/answer

INTRODUCTION

- Surgical conditions/emergencies in the newborns are an important and integral part of neonatal admissions in tertiary Neonatal intensive care units
- They are unique because they require Early diagnosis, Pre-surgical care, Prompt surgery, and Post-operative care to improve the survival and outcome (Multidisciplinary).

- Neonatal surgical conditions, predominantly congenital anomalies account for 11% of the Global Burden of Diseases
- Congenital anomalies are the fourth leading cause of neonatal mortality globally
- The global interventions at reducing neonatal mortality has for long been on the top three leading causes of neonatal mortality: prematurity, Perinatal Asphyxia and Sepsis.

GLOBAL CAUSES OF NEONATAL MORTALITY



- It is estimated that two-thirds of the deaths and disability from congenital anomalies can be prevented through surgical care.
- However, improving neonatal surgical care has received little global focus or action to date
- The SDG 3.2 aimed to
- “By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births”

- Therefore, in order to consolidate efforts at achieving SDG target, there is need to pay attention to the fourth leading cause of neonatal deaths, most of which amenable to surgery.
- This will lead to better outcomes; (reduce long term disability, improved quality of life and reduction in neonatal mortality rate).

BURDEN OF NEONATAL SURGICAL CONDITIONS



GLOBAL BURDEN

- Neonatal surgical conditions account for 11% of the Global Burden of Diseases
- Congenital anomalies form the bulk of most neonatal surgical cases globally
 - affect 3–6% of global live births
 - account for an estimated 303,000 neonatal deaths
 - constitute 10.6% of NMR and
 - is currently the 4th leading cause of neonatal mortality worldwide and 11th leading cause of years of life lost for the global population.
- 1.7 billion children do not have access to safe, affordable, timely surgical care when needed.

LOW/MIDDLE INCOME COUNTRIES

- 3.6% - 8.48% of NICU admissions were due to surgical conditions
- LMICs account for more than 95% of congenital anomaly deaths
- Mortality rate was 14.6% - 42% in some Asian countries
- Mortality in surgical neonates in Africa in the last two decades showed an improvement from a rate of 36.9 % to 29.1%

IN NIGERIA

- More than 6% of NICU admission was due to surgical conditions
- High mortality rate of 26.6% of which 93.8% were from gastrointestinal pathologies



HIGH INCOME COUNTRIES

- HICs continue to report lower mortality rates even with an apparent increase in neonatal surgical cases
- Mortality rate of less than 5%

- “The chances of dying from a gastrointestinal congenital anomaly if born in a low-income country is two in five, compared with one in five in a middle-income country and one in 20 in a high-income country”

Case specific fatality rates

High income	Middle income	Low income
5%	20%	40%

Common Neonatal surgical conditions

1. Anorectal malformation
 2. Intestinal atresias
 3. Omphalocele
 4. Gastroschisis
 5. Oesophageal atresia
 6. Malrotation syndrome
 7. Gastrointestinal perforation
 8. Hirschsprung's disease
1. NECROTISING ENTEROCOLITIS
 2. Posterior urethral valve
 3. Bladder extrophy
 4. OBSTRUCTED INGUINAL HERNIA
 5. Sacrococcygeal tumour
 6. Infantile hypertrophic pyloric stenosis
 7. MULTIPLE ABSCESSSES
 -

FACTORS ASSOCIATED WITH OUTCOME

- Numerous preoperative, intra-operative, and postoperative factors have been linked with poor survival outcomes in surgical newborns:
 - i. Mode of transportation – inter-hospital and intra-hospital
 - ii. Late presentation
 - iii. Low ANC attendance
 - iv. Need for invasive respiratory support
 - v. Co-morbidities – sepsis, prematurity/LBW
 - vi. Non-availability of NICU/support facilities

- vii. positive blood cultures
- viii. associated congenital anomalies
- ix. intraoperative - prolonged duration of surgery, blood loss of >10% blood volume, and intraoperative hypothermia
- x. postoperative - a requirement of mechanical ventilation for a prolonged duration, need for high-dose of vasopressors, postoperative sepsis, major complications in the postoperative period, and prolonged fasting

CHANGING THE NARRATIVE

Global Initiative for Children's Surgery (GICS) framework for improving children's surgical care and outcomes

Four main domains:

- Infrastructure
- Service delivery
- Training and
- Research.

- The care of a surgical newborn is extremely challenging and requires the continuous involvement of skilled neonatologists for favourable outcomes.

Essential components of neonatal surgical care

- Antenatal diagnosis
- Birth at a paediatric surgery centre
- Effective resuscitation
- Timely ambulance transfer
- Use of a surgical safety checklist
- A Physician anaesthetist at primary intervention
- Basic neonatal intensive care unit resources such as ventilation and parenteral nutrition.

SPECIFIC ROLES OF NEONATOLOGIST: ANTE-NATAL PERIOD

- Liaise with obstetricians to ensure anomaly scan
- Once an anomaly is detected/confirmed, refer for foetal intervention if available, otherwise
 - co-ordinate meeting with relevant specialists/parents/relevant stakeholders
 - Plan for baby's delivery
 - Ensure appropriate intervention post delivery

SPECIFIC ROLES OF NEONATOLOGIST: PRE-OP

- Comprehensive history and physical examination
- Ensure correct diagnosis
- Investigations as appropriate
- Resuscitation as indicated including airway management
- Optimize patient:
 - Use of blood products as indicated
 - Correct electrolyte derangements
 - Adequate oxygenation/ventilation
 - Thermal care

- Fluid management
- NPO/maintain euglycaemia
- Care of specific conditions
 - NG/OG tube for GI anomalies
 - Care of exposed bowel in anterior abdominal wall defects
 - Care of myelomeningocele
- Monitoring

INTRA-OP

- FOLLOW YOUR PATIENT TO THE THEATRE, IT IS AN OPPORTUNITY FOR LEARNING AND FOR COLLABORATION WITH SURGEONS AND OTHER SPECIALISTS
- Ensure appropriate thermal care for the baby while in theatre
- Ensure appropriate use/type of fluid
- Ensure correct calculations of drug dosage

POST-OP

- **Appropriate monitoring environment**
 - Arrange the unit in a way to ensure easy access to baby
 - Ensure appropriate monitoring facilities
 - Trained staff
 - Anticipate problems and prepare for solution
- **Respiratory support/apnoea monitoring**
 - Appropriate equipment – apnoea monitor, pulse oximeter
 - Maintain oxygen saturation within normal/acceptable level
 - Supplemental oxygen/bCPAP/mechanical ventilation as indicated

- **Thermal regulation**
 - Provide thermo-neutral environment
 - Frequent/continuous temperature monitoring
- **Analgesia**
 - Use appropriate Pain Scoring System
 - Systemic/Local analgesia as appropriate
 - Adequate monitoring

- **Fluid & Electrolytes management**
 - maintenance/on-going losses should be meticulously calculated and administered
 - Use of appropriate fluid
 - Pay attention to specific conditions- presence of ostomy, NG/OG tube drainage
 - Maintenance electrolytes as indicated
 - Serum electrolytes monitoring/correction as indicated
 - Fluid assessment as indicated – daily, 12hourly, 6hourly

- **Nutrition**

- Appropriate fluid and caloric input
- Parenteral nutrition –partial/total

- **Other medications as indicated** – antibiotics, inotropes

- Most babies will be on antibiotics post op

- **Management of co-morbidities**
 - Sepsis
 - Respiratory distress
 - Anaemia and other haematological problems
- **Collaboration with surgeons/other specialists**
 - co-ordinate the managing team
 - Invite other specialists as indicated
 - Work with nurses



NEONATAL NURSES

PRE-OPERATIVELY

- Monitor (vital signs& SPO2)
- Attach Identification bands to the baby
- Ensure NPO as prescribed
- Administer fluids and medications as prescribed
- Support parents
- Document
- Accompany patient to the theatre and hand over appropriately

POST-OPERATIVELY

- Take over patient from the theatre appropriately
- Check Vital signs before leaving theatre
- Continuous monitoring
- Administer fluids and medications as prescribed
- Observe wound especially for bleeding
- Assess pain
- Alert doctor if there is any danger
- Family support

PROFESSIONAL BODY: NISONM

- **ADVOCACY! ADVOCACY!! ADVOCACY!!!**
- Guidelines and protocols at national and sub-national level
- Neonatal transport policy/action
- Strong referral system
- Training and re-training of staff
- Research



THE FUTURE

- Bedside surgery within NICU
- Minimally invasive neonatal surgery

CONCLUSION



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