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Tibebe Ghion Specialized Operetive Outcome and Associated Factors of Neonatal Intesrinal Obstruction at Felegehiwot and Hospitals in Amhara Region Bahir Dar, Ethiopia

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OPERETIVE OUTCOME AND ASSOCIATED FACTORS OF NEONATAL INTESRINAL OBSTRUCTION AT FELEGEHIWOT AND TIBEBE GHION SPECIALIZED HOSPITALS IN AMHARA REGION BAHIR DAR, ETHIOPIA

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A THESIS RESEARCH SUBMITTED TO THE DEPARTMENT OF SURGERY, SCHOOL OF MEDICINE, COLLEGE OF MEDICINE AND HEALTH SCIENCES, BAHIR DAR UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE SPECIALIZATION OF GENERAL SURGERY

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BAHIR DAR, ETHIOPIA

I hereby certify that I have supervised in doing this thesis titled "Operative outcome and Associated factors of NEONATAL INTESTINAL OBSTRUCTION at FHSH from (sep 1,2007 to Jan1,2011) and TGSH from (Jan1,2011 to aug 2014) EC " by Dr. Mulat Chanie prepared under my guidance. I recommend it for defense

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_____   _____   22/61/2022

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Abbreviations and Acronym

ARM	Ano Rectal Malformation
CBC	Complete Blood cell Count
Cr	Creatinine
FHSH	Felege Hiwot Specialized Hospital
HD	Hirschsprung's Disease
IRB	Institutional Review Board
K	Potassium
Na	Sodium
NICU	Neonatal Intensive Care Unit
NIO	Neonatal Intestinal Obstruction
PLT	Platelate Count
SPSS	Statistical Package Product for Social Sciences and Service Solutions
TGSH	Tibebe Ghion Specialized Hospital
TPN	Total Parentral Nutrition
VACTERL	V .- Vertebral
WBC	White Blood cell Count
	A - Anal
	C – Cardiac
	TE – Tracheo – Esophageal

R - Renal

L – Limb(Radial) anomalies

ABSTRACT

Background; Neonatal intestinal obstruction is the most common surgical emergency in a newborn requiring prompt intervention.

Objective; This study aims to asses operative outcome and associated factors of neonatal intestinal obstruction.

Methods; This study was done retrospectively to include all operated cases of neonatal intestinal obstruction from FHSH from (sep 1,2007 to Jan1,2011) and TGSH from (Jan1,2011 to aug 2014) EC and various factors affecting outcome will be analysed.

A structured research tool used to collect all the necessary data from the patients' medical records. Data analyzed by using SPSS version 25 Frequencies with percentages used to describe the surgical management outcome of NIO. Binary logistic regression model used to explore the determinant factors associated with the surgical management outcome of NIO. Factors at P value < 0.05 declared statistically significant.

Result : During the study period ,175 neonates operated for neonatal intestinal obstruction. Birth weight <2.5kg had significant association for neonatal intestinal obstruction (p=0.000) and adjusted odds ratio (AOR) of 71.859 and 95% CI (8.693,594.033). Intestinal anastomosis was also significantly associated with neonatal intestinal obstruction with(p=0.013) AOR=3.104 and 95% CI (1.204,8.706). Duration of illness before operation (in days) was also significantly associated with intestinal obstruction (p=0.020), AOR=3.238 and CI (1.204,8.706)

Conclusion : The study identified that longer duration of illness(>3days), low birth weight were significantly relate with unfavorable outcomes.

The overall survival rate of newborns operated for NIO was found to be 83.4% and sepsis was the leading postoperative complication resulting death.

Kay words: Neonatal Intestinal obstruction, Etiology, operative outcome

1. INTRODUCTION

1.1 BACKGROUND

Intestinal obstruction in the neonatal period is a common cause of emergency presentations requiring urgent surgical intervention(1). Majority of the causes are congenital in nature as the disordered development of the intestine can lead to either partial or total occlusion of the bowel lumen. The obstruction is often mechanical in most cases but may be functional when it is caused by Hirschsprung's disease. The mechanical causes of neonatal intestinal obstruction are often found in the upper gastrointestinal tract producing vomiting, failure to thrive, and constipation(2, 3)

  NIO occurs in approximately one in 2,000 live births (4). The causes of obstruction are diverse with different embryological origins, and some etiologies are not yet well defined. Common causes of neonatal intestinal obstruction are intestinal atresia, anorectal malformation (ARM), Hirschsprung's disease (HD), meconium ileus, malrotation etc (5).

Newborn babies are not only tiny human. They have unique anatomic, physiologic, pathologic and psychologic existence. Surgery on neonates is a sensitive issue, especially in a nonspecialized setup. Ideally it should be done in an organized neonatal surgical unit with facilities of neonatal intensive care unit (NICU), total parenteral nutrition (TPN), neonatal

anaesthesia and specialized paediatric nursing care

The principal features of neonatal intestinal obstruction are bile-stained vomiting, failure to pass meconium and abdominal distension. Early vomiting, in the first 24 hours of life, indicates a high obstruction (duodenal or jejunal) while the later onset of vomiting indicates a lower obstruction (ileal or colonic) Early diagnosis and treatment leads to better outcome. Failure to recognize neonatal bowel obstruction can result in aspiration of vomit, sepsis, midgut infarction or enterocolitis.

Surgery in neonates is a challenging issue especially in developing countries

Some factors attributing to the high mortality in developing countries include prematurity, late presentation, associated severe congenital anomalies and complications of surgery as well as lack of intensive care facilities(6, 7)

1.2 STATEMENT OF PROBLEM

Significant advances in neonatal surgery have resulted in the improved survival of children with many types of congenital malformations that were formerly considered lethal. Improved obstetric care, perinatal pathological diagnoses, neonatal anaesthesia, surgical techniques and perinatal support, including paediatric intensive care and appropriate management of associated abnormalities, have all contributed to the improved survival of the surgical neonate(8).

The management of NIO in developing countries remains challenging, with poorer outcomes compared with the results from the industrialized countries (6).

The mortality associated with NIO ranges between 21 and 45% in developing countries, unlike the less than 15% in Europe(7, 9).

In Sub-Saharan Africa and other developing countries, mortality is still high due to late presentation, poor transport system, inadequate equipment, poor obstetric care, poverty, and presence of associated malformations. All these make active management of the neonates with intestinal obstruction very challenging in these countries.(2, 10-12)

1.3 SIGNIFICANCE OF THE STUDTY

While many studies have been done to assess problems and management outcomes NIO in developed countries, the condition remains largely unstudied in the Ethiopia context. Only a few studies conducted in Ethiopia,

There is a lack of research about the causes and outcomes of NIO in Ethiopia, particularly in the northern, western and eastern parts of the country.

Furthermore, there is no recently published literature in rural and sub-urban regional hospitals. Thus, this study is to be conducted to fill this gap and generate base line information about NIO in Bahir Dar, north Ethiopia. It can also be used as an input for other researchers to study in this area.

2 . LITRETURE REVIEW

Neonatal intestinal obstruction occurs in 1/1500 live births. Intestinal obstruction in the neonate may be due to different causes , including Imperforate anus atresia and stenosis, annular pancreas, malrotation, duplication cyst, meconium ileus, meconium plug syndrome and neonatal small left colon syndrome, Hirschsprung disease, necrotising enterocolitis and other rarer causes((13)

The mode of presentation can be acute, chronic or acute with systemic upset due to shock. Early and accurate diagnosis is paramount for proper patient management. Management of intestinal obstruction is almost always surgical and it should always be preceded by appropriate resuscitation and preparation of the neonate. Major risk factor in any neonate with intestinal obstruction is the delay in diagnosis, electrolyte imbalance, hypovolemia, sepsis and presence of multiple anomalies ((14).

A retrospective review done in Kanti Children's Hospital showed NIO is the most common neonatal surgical emergency. Anorectal malformation was the commonest etiology followed by intestinal atresia and Hirschsprung's disease. Overall survival rate was 78%. Cases with Hirschsprung's disease and anorectal malformation had about 90% survival rate. Intestinal atresia was the major cause of mortality. Mortality is mainly due to delayed diagnosis, referral and intervention which lead to higher complications of cases(5).

One hundred and seventeen neonates comprising 85 (72.7%) boys and 32 (27.3%) girls

were managed for intestinal obstruction,in tertiary center in Nigeria with retrospective review. The age at presentation ranged from 0 to 29 days, with a mean of 6.86 ± 8.4 days. Seventy-five (64.1%) patients presented within a week of onset of symptoms and 42 (35.9%) patients later. Eighty-five patients (72.6%) presented with symptoms from birth. The most common causes of intestinal obstruction included anorectal malformation in 62 (53%) neonates and Hirschsprung's disease in 16 (13.7%) neonates. Other causes included obstructed inguinoscrotal hernias, duodenal atresia, jejunoileal atresia, malrotation, and annular pancreas. Eleven patients died with a mortality rate of 9.4%. The age at presentation

(P = 0.001) and the presence of postoperative complications (P = 0.009) were significantly related to the duration of hospital stay. Furthermore, the presence of postoperative complications (P = 0.012) was significantly associated with postoperative mortality(15).

A study showed,out of 216 neonates admitted under surgical care, Most common was anorectal malformation (ARM) (35.6%), followed by Hirschsprung's disease (23%), meconium ileus (18.5%), intestinal atresia (14%), malrotation of gut (6.3%). Male-female ratio was 1.6:1.

Gestational age varies from 32 weeks to 42 weeks and only 13% (24) of neonates were premature. Associated congenital anomalies (e.g. congenital heart disease, spinal dysraphism, urinary tract abnormality, duodenal atresia and limb abnormality) were common

among ARM. Preoperative complications like perforation, volvulous and septicaemia were present among those neonates where diagnosis of surgical condition was delayed

Overall survival rate following initial surgical treatment was 84% .

Among 16% deaths following surgery, the highest mortality was observed in intestinal atresia and lowest among ARM. The ultimate causes of death were septicaemia, anastomotic failure, aspiration pneumonia and apnea(16).

In a study done in Calabar ,Nigeria Forty neonates; 26(65%) males and 14(35.5%) females were studied. Imperforate anus was seen in 40% of subjects while Hirschsprung's disease and intestinal atresia each were seen in 10%. Aetiology could not be determined in about a fifth of the cases. Age less than one week at presentation was significantly associated with a

poor outcome. No case had surgical intervention within twenty-four hours of presentation. The overall mortality was 30%, most of these 9 (75%) was due to anorectal malformations.

Early age at presentation was significantly associated with mortality. This could be

attributed to severe forms of intestinal obstruction as well as early onset of neonatal mortality that are associated with poor neonatal outcomes(17).

Reoperation, postoperative bleeding and perioperative sepsis were significant determinants of mortality as highlighted in a study done Ile Ife(2).

As per 15 yr experience in tertiary care hospital ,the ultimate cause of death were septicaemia, anastamotic leak and aspiration pneumonia(

A three year retrospective review at Tikur Anbessa Specialized Hospital in Addis Ababa,

Ethiopia was done where fifty-one (41 males and 10 females) cases of neonatal intestinal

obstructions were described. ARM was the most common type of intestinal obstruction

followed by intestinal atresia and Hirschsprung's disease. Delayed diagnosis of cases was

observed in 72%. Associated congenital anomalies were documented in 13 % of the cases.

Death occurred in 20% of the cases. One or another form of infection accounted for 90% of the deaths. Neonatal sepsis and being unfit for anesthesia were determinants of mortality with p-value <0.02 and < 0.0007 respectively(18).

2.1 Conceptual frame work

Figure 1 Operative outcome associated factors of NIO

Patient factors
- Sex
- Age
- Gestationa age
- Birth weight

Clinical factors
- Durationof symptoms
- Perioperative condition
- Type of intervention
- Length of hospital stay

Operative outcome

Cause/Pathology
- ARM(low,high)
- HD
- Intestinal atresia
- Meconeum ileus

Associated anomalies
- VACTREL
- Down syndrome
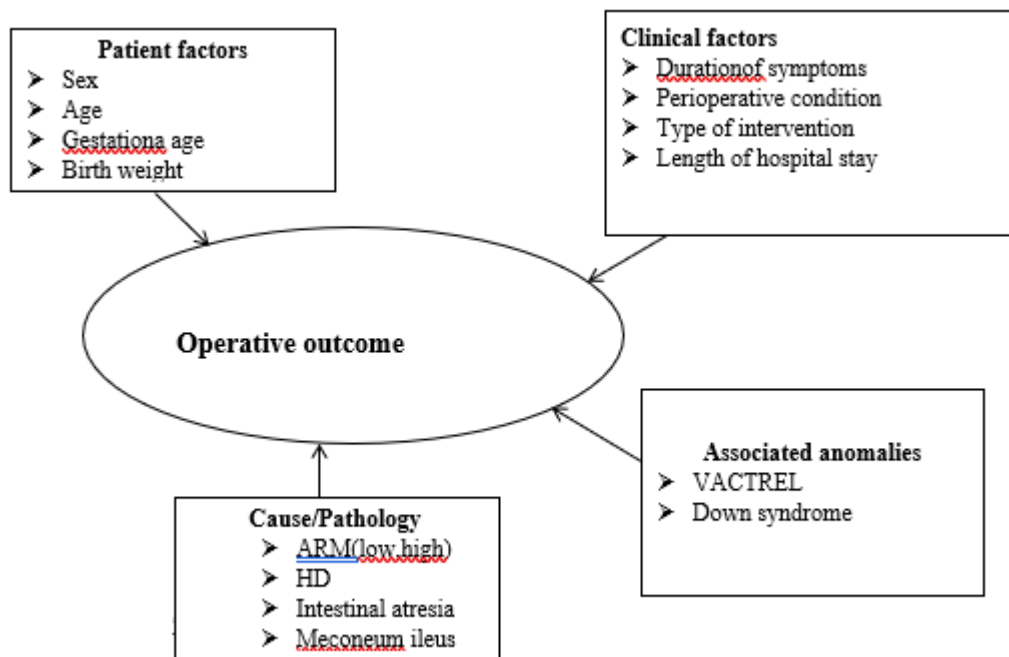
3 Objective

3.1 General Objective

> To asses operative outcome and associated factors of neonatal intestinal obstruction

3.2 Specific Objectives

> To asses operative outcome of neonatal intestinal obstruction
> To determine associated factors of neonatal intestinal obstruction

4. Methods and materials

4.1 Study Area and Period

The study conducted at FHSH from (sep 1,2007 to Jan1,2011) and TGSH from (Jan1,2011 to aug 2014) EC department of Surgery, which are located in Bahir Dar town, Western Ethiopia. Bahir Dar town is found at 545 Km to the west of Addis Ababa.

4.2 Study Design

An institution-based retrospective cross sectional study conducted

4.3 Population

4.3.1 Study population

All neonates with intestinal obstruction who were surgically treated at FHSH (Sep1,2007 – Jan,2011) TGSH from sep 2011 to aug 2014 EC

4.4 Inclusion and exclusion criteria

4.4.1 Inclusion criteria

> All neonates with intestinal obstruction who were operated at FHSH from (sep 1,2007 to Jan1,2011) and TGSH from (Jan1,2011 to aug 2014) EC will be included

4.4.2 Exclusion criteria

- Patients who has incomplete medical records
- Neonates who are admitted to TGSH after being operated from other hospitals for neonatal intestinal obstruction

4.5 Variables of study

4.5.1 Dependent variables
- Operative outcome of NIO

4.5.2 Independent variables
- Socio – demographic factors
  - Age
  - Sex
  - Residence
- Clinical factors
  - Duration of symptoms
  - Perioperative patient condition
  - Type of intervention
  - Length of hospital stay
  - Gestational age
  - Birth weight
- Cause or Pathology
  - ARM (low or high type)
  - HD
  - Intestinal atresia
  - Meconeum ileus

4.6 Operational definition and term definitions

Intestinal obstruction – Impairment of flow of intestinal luminal contents due to mechanical or functional cause

Neonatal period – Time from birth to 28 days of life

Operative outcome

- **Favorable outcome** the condition of the patient after the procedure has been done and a patient does not develops postoperative complications until the patient discharged from hospital.

- **Unfavorable outcome**: the condition of the patient after the procedure has been done that develops any postoperative complications or died until the patient discharged from hospital.

4.7 Sample size determination and sampling procedure

Newborns who meet the inclusion criteria in FHSH from (sepember 1, 2007, to Jan 1,2011) and in TGSH(Jan1,2011to Aug 2014) EC will be included.

4.8 Data collection tools and methods

Data collection was by using structured and questionnaire. Data collected by retrospective chart review by trained two data collectors. The primary investigator rechecked the data collection forms to ensure their completeness and accuracy.

4.9 Data quality control

Before the actual data collection, data collectors and supervisors trained on the contents of the questionnaire, checklist, data collection methods, and ethical concerns. Therefore, data collectors become familiar with the questionnaire.

During data collection, both supervisors and the principal investigator checked the data for its completeness and missing information at each point. Furthermore, checked during entry and compilation before analysis.

4.10 Data Processing and Analysis

After data collection, each data set checked for completeness based on the code given during data collection. The data entered in to SPSS version 25 statistical package. Coding of individual questionnaires checked before data entry into the software. Further data cleaning performed to check for outliers, missed values and any inconsistencies before the data are analyzed using the software. Descriptive statistics used to describe the independent variable and management outcome IO. Bi variable and multivariable analysis were done to see the association between dependent and independent variables using the binary logistic regression. A confidence limit of 95% and p- value less than 0.05 considered statistically significant.

A draft of the results submitted to the advisors for approval

4.11 Ethical Consideration

Ethical clearance obtained from Institutional Review Board (IRB) of College of Medicine and health sciences, Bahir Dar University, Ethiopia. Official letter of permission from the college submitted to Bahir Dar University College of medicine and health sciences. A formal letter also submitted to all concerned bodies to obtain their cooperation. S

4.12 Dissemination of the Result

After the data is analyzed, the results of the research will be presented to Bahir Dar University College of medicine and health sciences, department of surgery. The findings will be published in a relevant scientific journal and disseminated online so that they can be of use for other academic researchers and clinical practitioners. It will also be presented on different conferences, and professional society meetings like Ethiopian Society of surgery. The data can also serve as a base line for future studies.

5 RESULTS

During specified study period, there were a total of 175 neonatal admissions with NIO to whom surgery was done on emergency basis.

In this study ARM, HD and intestinal atresia respectively are commonest causes of NIO accounting 80(45.7%), 46(26.3%) and 38(21,8%). And congenital pouch colon, congenital band adhesion and annular pancreas are among the least causes of NIO

In this study ARM, HD and intestinal atresia respectively are commonest causes of NIO accounting 80(45.7%), 46(26.3%) and 38(21,8%). And congenital pouch colon, congenital band adhesion and annular pancreas are among the least causes of NIO.

(See table below)

Table 1 shows etiologies NIO in FHSH (Sep 2007 – jan 2011 EC) and TGSH (Jan 2011 – Aug 2014 EC)

Etiology	Frequency	Percent
ARM	80	45.7
HD	46	26.3
doudenal atresia	12	6.9
Jejunoileal atresia	26	14.9
congenital band adhesion	2	1.1
Congenital pouch colon	1	.6
Annular pancreas	2	1.1
Bowl incarceration through defec	2	1.1
meconeum ileus	1	.6
complicated NEC	3	1.7
Total	175	100.0

5.1 Sociodemographic characters

Out of 175 patients, majority are males making123(70.3%) and the remaining 52(29.7%) are females.

Overall male to female ratio is about 2.4:1.

Table 2 Sex of neonates with NIO in FHSH (Sep 2007 – jan 2011 EC) and TGSH (Jan 2011 – Aug 2014 EC)

Sex	Frequency(n)	Percent (%)
Male	123	70.3%
Female	52	29.7%
Total	175	100%

In ARM males outnumber females by 30 making male to female ratio 2.2:1. In HD and intestinal atresia male to female ratios are 4.8:1 and 1.5:1 respectively.

DIAGNOSI * SEX Crosstabulation

Count

		SEX		Total
		male	female	
DIAGNOSI	ARM	55	25	80
	HD	38	8	46
	doudenal atresia	9	3	12
	Jejunoileal atresia	14	12	26
	congenital band adhesion	2	0	2
	Congenital pouch colon	1	0	1
	Annular pancreas	0	2	2
	Bowl incarceration through defec	1	1	2
	meconeum ileus	1	0	1
	complicated NEC	2	1	3
Total		123	52	175

In this study out of 175 newborns 30(17.1%) born prematurely while majority 145 (82.7%) born at term .

Table 3   Gestational age of newborns with NIO in FHSH (Sep 2007 – jan 2011 EC) and TGSH (Jan 2011 – Aug 2014 EC)

Gestational age	Frequency	Percent (%)
< 37 weeks	30	17.1
>37 weeks	145	82.9
Total	175	100

Out of 175 neonates about 129(73.7%) born with normal birth weight and the remaining 46 (26.3%) had low birth weight . (see table below)

Table 4 *Shows birth weight of neonates with NIO* in FHSH (Sep 2007 – jan 2011 EC) and TGSH (Jan 2011 – Aug 2014 EC)

Birth weight	Frequency	Percent (%)
>2.5 kg	129	73.7
<2.5 kg	46	26.3

5.2 Clinical presentation

Most newborns 126(72%) experience symptoms of neonatal intestinal obstruction within three days of postnatal life and the remaining 49(28%) after three days of age.

Table 5 Shows age at onset of symptoms of newborns with NIO in FHSH (Sep 2007 – jan 2011 EC) and TGSH (Jan 2011 – Aug 2014 EC)

Age a onset of illness	Frequency	Percent (%)
< 3days	126	72
≥3days	49	28

Failure to pass meconium is the most common presenting symptom accounting 162(92.6%). Abdominal distension 146(83.4%) and vomiting 112(64%) are other frequent symptoms.

Out of 175 neonates only 56(32%) present within 3days of their illness. The remaining 119(68%) present late after 3 days of disease onset.

Table 6 Clinical presentation of newborns with NIO in FHSH (Sep 2007 – jan 2011 EC) and TGSH (Jan 2011 – Aug 2014 EC)

Variables	Category	Frequency	Percent (%)
Vomiting	Yes	112	64
	No	63	36
Abdominal distension	Yes	146	83.4
	No	29	16.6
Failure to pass meconium	Yes	162	92.6
	No	13	7.4
Duration of illness	<3days	56	32
	>3days	119	68

5.3 Operative management of NIO

Over this specific study period 175 patients operated of which colostomy was most commonly performed procedure 130(74.3%). For the remaining 45(25.7%) anastomosis was done.

Table 7 Operative interventions done in newborns with NIO in FHSH (Sep 2007 – jan 2011 EC) and TGSH (Jan 2011 – Aug 2014 EC)

Procedure	Frequency	Percent (%)
Colostomy	130	74.3
Anastomosis	45	25.7

Out of 175 operated patients 105(60%) have favorable outcome where as 70(40%) have unfavorable outcome.

Table 8 Outcome newborns with NIO in FHSH (Sep 2007 – jan 2011 EC) and TGSH (Jan 2011 – Aug 2014 EC)

Outcome	Frequency	Percent (%)
Favorable	105	60
Unfavorable	70	40

After surgery , death 29(16.6%) ,sepsis 29(16.6%) and wound infection 13(7.4%) are frequent complications in decreasing order.

Others like anastomotic leak, intraabdominal collection and bleeding are also noticed complications .

The most common cause of death from this study were ARM(48.3%) and intestinal atresia(37.9%).

Table 9 Postoperative complications of newborns with NIO in FHSH (Sep 2007 – jan 2011 EC) and TGSH (Jan 2011 – Aug 2014 EC)

Complications	Frequency	Percent (%)
Bleeding	1	0.6
Anastomotic leak	2	1.1
Intraabdominal collection	1	0.6
Wound infection	13	7.4
Sepsis	29	16.6
Death	29	16.6
No complication	100	57.1

Table 10 : Mortality rate of newborns with NIO in FHSH (Sep 2007 – jan 2011 EC) and TGSH (Jan 2011 – Aug 2014 EC)

Variables	Frequency	Percent (%)
ARM	14	48.3
HD	1	3.4
Duodenal atresia	2	6.9
Jejunoileal atresia	9	31
Congenital band	0	0
Congenital pouch colon	0	0
Annular pancreas	0	0
Bowel incarceration	0	0
Meconium ileus	1	3.4
Complicated NEC	2	6.9

5.4 Factors associated with NIO

Using bivariate and multivariable logistic regression analysis, odds ratios and corresponding 95% confidence intervals for associated factors of neonatal intestinal obstruction are calculated. Independent variables with presence of association (p<0.25) in binary logistic regression are subjected into multivariate logistic regression to assess the strength of association between these variables and neonatal intestinal obstruction by controlling the confounding effect of other variables.

Birth weight <2.5kg has significant association for neonatal intestinal obstruction (p=0.000) and adjusted odds ratio (AOR) of 71.859 and 95% CI(8.693,594.033) . Intestinal anastomosis is also significantly associated with neonatal intestinal obstruction with(p=0.013) AOR=3.104 and 95% CI (1.204,8.706). Duration of illness before operation (in days) is also significantly associated with intestinal obstruction (p=0.020), AOR=3.238 and CI(1.204,8.706).

(See table 11)

Table 11: Associated factors of with NIO in FHSH (Sep 2007 – jan 2011 EC) and TGSH (Jan 2011 – Aug 2014 EC)

Variables	Category	Outcomes		COR (95%CI)	AOR (95%CI)	P-value
		Favorable	Unfavorable			
Sex	Male	76(61.8%)	47(38.2%)	0.807(0.419,1.556)	0.780(0.404,1.504)	0.458
	Female	29(55.8%)	23(44.2%)	1	1	
Age at onset of symptoms	< 3 days	77(61.1%)	49(38.9%)	0.877(0.440,1.712)	0.848(0.434.1.658)	0.631
	>3 day	28(57.1%)	21(42.9%)	1	1	
Duration of illness	<3 day	40(71.4%)	16(28.6%)	1	1	
	>3 day	65(54.6%)	54(45.4)	2.148(1.086,4.252)	3.238(1.204,8.706)	**0.020**
Gestational age	<37 weeks	4(13.3%)	26(86.7%)	14.444(4.761,43.825)	0.606(0.061,6.055)	0.670
	>37 weeks	101(69.7%)	44(30.3%)	1	1	
Birth weight	>2.5 kg	101(78.3%)	28(21.7%)	1	1	
	<2.5 kg	4(8.7%)	42(91.3%)	0.028(0.009,0.830)	71.859(8.693,594.033)	**0.000**
Procedure	Colostomy	86(66.2%)	44(33.8%)	1	1	
	Anastomosis	19(42.2%)	26(57.8%)	2.675(1.336,5.355)	3.104(1.204.8.706)	**0.013**

6 DISCUSSIONS

The most commonly identified aetiology of neonatal intestinal obstruction in this study was ARM 80(45.7%) which is inline with study done in Nigeria(40%) but lower than one done in Addis ababa((19),(20)). The difference with the later study might be due to the fact that it excludes those presenting after 7 days of postnatal neonatal period.

This study showed that neonates born with birth weight of <2.5 kg had statistically significant association with neonatal intestinal obstruction with odds ratio of 71 times more than those having normal birth weight. This implies that babies born with low birth weight are 71 times more likely to develop neonatal intestinal obstruction than those with normal birth weight.

For majority of neonates 130(74.3%) colostomy was done and bowl anastomosis in the remaining 45(25.7%) but the latter has statistically significant association with poor outcome with odds of 3 than those with colostomy.

Longer duration of illness more than 3 days is significantly associated with poor outcome than those presenting within 3 days of illness . Delayed presentation after 3 days illness is related with increased mortality.

In this study out of 175 neonates 29 died. This makes the mortality rate of neonatal intestinal obstruction about 16.6% and overall survival rate 83.4%. This figure is consistent with a study done in india(16.4%) and lower than the report from blacklion hospital (20%)(21).

The most common diadnosis with increased mortality in this study is ARM followed by intestinal atresia.

This study showed, sepsis was the commonest postoperative complication sustained by neonates in the post operative period and the others were wound infection and anastomotic leak. Of all postoperative complications overwhelming sepsis is the leading attribute for death of newborns operated for neonatal intestinal obstruction. This finding was compatible with studies done in black lion, Nigeria and Nepal(19,20).

Operative outcome of neonatal intestinal obstruction might also be affected by different factors like cause of obstruction, duration of illness and whether or not the anticipated complications detected on time.

7 CONCLUSION AND RECOMMENDATION

7.1 Conclusion

Neonatal intestinal obstruction is common cause of admission to neonatal intensive care unit.

In this study , the commonest causes of neonatal intestinal obstruction are ARM,HD and intestinal atresia in decreasing order.

The study identified that longer duration of illness(>3days), low birth weight were significantly relate with unfavorable outcomes.

The overall survival rate of newborns operated for NIO was found to be 83.4% and sepsis was the leading postoperative complication resulting death.

7.2. Limitation of the study

It was retrospective study which based on chart review as a result lacks complete documentation . As it was retrospective and cross-sectional it didn't asses temporal relationship

7.3 Recommendation

➤ awareness should be increased to advance the neonatal setup to reduce the observed magnitude of complications and mortality.

➤ Awareness should be given to mid and lower-level health professionals on the diagnosis, resuscitation and importance of early referral to higher centre

➤ Attention should be given to patients who present after long duration of illness and those having low birth weight.

Further research using prospective study design is warranted as a way to overcome the limitations of secondary data in the current retrospective research that preclude generalization to the whole population.

7. References

1. Singh V, Pathak M. Congenital Neonatal Intestinal Obstruction: Retrospective Analysis at Tertiary Care Hospital. J Neonatal Surg. 2016;5(4):49-.
2. Ademuyiwa AO, Sowande OA, Ijaduola TK, Adejuyigbe O. Determinants of mortality in neonatal intestinal obstruction in Ile Ife, Nigeria. African journal of paediatric surgery : AJPS. 2009;6(1):11-3.
3. Ali I, Mufti GN, Bhat NA, Baba AA, Sheikh KA, Hamid R, et al. Assessment of Predictors of Mortality in Neonatal Intestinal Obstruction. J Neonatal Surg. 2018;7(1):2.
4. Sarma VP, Menon SS. The approach to a neonate with suspected intestinal obstruction: the pediatric surgical perspective. International Surgery Journal. 2019.
5. Thapa B, Basnet A. Patterns and outcome of neonatal intestinal obstruction in Kanti children's hospital. Journal of Nepal Paediatric Society. 2020;40(2):120-4.
6. Seth A, Chanchlani R, Rakhonde AK, editors. Neonatal Gastrointestinal Emergencies in a Tertiary Care Center in Bhopal , India : A Prospective Study2015.
7. Uba AF, Edino ST, Yakubu AA, Sheshe AA. Childhood intestinal obstruction in Northwestern Nigeria. West African journal of medicine. 2004;23(4):314-8.
8. Bustos Lozano G, Orbea Gallardo C, Domínguez García O, Galindo Izquierdo A, Cano Novillo I. [Congenital anatomic gastrointestinal obstruction: prenatal diagnosis, morbidity and mortality]. Anales de pediatria (Barcelona, Spain : 2003). 2006;65(2):134-9.
9. Ameh EA, Chirdan LB. Neonatal intestinal obstruction in Zaria, Nigeria. East African medical journal. 2000;77(9):510-3.
10. Osifo OD, Ovueni ME, editors. The Prevalence, Patterns, and Causes of Deaths of Surgical Neonates at Two African Referral Pediatric Surgical Centers2009.
11. Ameh E. Challenges of Neonatal Surgery in Sub-Saharan Africa. African Journal of Paediatric Surgery. 2004;1.
12. Chirdan LB, Ngiloi PJ, Elhalaby EA. Neonatal surgery in Africa. Seminars in pediatric surgery. 2012;21(2):151-9.
13. Rescorla FJ, Grosfeld JL. Intestinal atresia and stenosis: analysis of survival in 120 cases. Surgery. 1985;98(4):668-76.
14. Rathore D, Ramji J, Joshi R, Shah A, Dilhare T, Bachani M. Neonatal intestinal obstruction-four year experience. J Dent Med Sci. 2018;17(2):50-3.
15. Ogundoyin OO, Olulana DI, Lawal TA, Ajao AE. Outcome of Management of Neonatal Intestinal Obstruction at a Tertiary Center in Nigeria. Nigerian journal of surgery : official publication of the Nigerian Surgical Research Society. 2019;25(2):163-6.
16. Saha AK, Ali MB, Biswas SK, Sharif HMZ, Azim A. Neonatal intestinal obstruction : patterns, problems and outcome. Bangladesh Medical Journal Khulna. 2013;45(1-2):6-10.
17. Ntia HU, Udo JJ, Ochigbo S, Amajor AC, Ikpeme A, Inyang A. Retrospective study of neonatal intestinal obstruction in Calabar: Aetiology and outcome. Nigerian Journal of Paediatrics. 2014;41:96.
18. Mohammed M, Amezene T, Tamirat M. Intestinal Obstruction in Early Neonatal Period: A 3-Year Review Of Admitted Cases from a Tertiary Hospital in Ethiopia. Ethiopian journal of health sciences. 2017;27(4):393-400.
19. Ntia H, Udo J, Ochigbo S, Amajor A, Ikpeme A, Inyang A. Retrospective study of neonatal intestinal obstruction in Calabar: Aetiology and outcome. Nigerian Journal of Paediatrics. 2014;41(2):96-8.

20.   Mohammed M, Amezene T, Tamirat M. Intestinal obstruction in early neonatal period: A 3-year review of admitted cases from a tertiary hospital in ethiopia. Ethiopian Journal of Health Sciences. 2017;27(4):393-400.

21.   Verma A, Rattan KN, Yadav R. Neonatal Intestinal Obstruction: A 15 Year Experience in a Tertiary Care Hospital. Journal of clinical and diagnostic research : JCDR. 2016;10(2):Sc10-3.

8 ANNEX

Date of charw review---------------   MRN--------------------

Part 1

1 .Age ----------------hours/days

2.Sex   M-----

          F-----

3. Adress ---------------urban   ---------------rural

4. Place of birth -------------home   -----------health care

5. Mode of delivery -----------------C/S ----------------Vaginal delivery

6. Gestational age ------------------in weeks

7. Birth weight   -------------------

8. Source of referral------------

Part II. Presenting complaints

1. Vomiting   ---------------yes   --------no
2. Abdominal distension   ------------yes -------------no
3. Constipation   -----------------yes ----------no
4. Other ------------
5. Age at onset of symptom-----------------
6. Total duration of illness ----------------

Part III. Physical examination

1.Vital signs HR------- RR --------- T ------ Spo2 ……

2.Abdominal distension

3. Visible peristalsis

4. Inguinal bulge

Other -----------------

Workup

1) CBC   WBC ……… N% ………. PLT……..
2) Cr …………
3) Serum electrolyte Na ……… K ……..Cl…….
4) Abdominal ultrasound
   ……………………………………………………………………………………………
   ……………………………………………………………………………………………
   ……………………………………………………………………………………………
5) Plain abdominal X- ray
   ……………………………………………………………………………………………
   ……………………………………………………………………………………………
   ……………………………………………………………………………………………

Diagnosis

1. ARM
2. HD
3. Intesial atresia (write type)
4. Congenital adhesion band
5. Other -----------------
   Operative findings ----------

Post operative Complications

1.Bleeding

2. Anastomotic leak

3.Intrabdominal collection

4. Wound infection

5. Sepsis

6. Death

6. Other---------

Out come

1. Favorable
2. Unfavorable