Neonatal Intestinal Atresia, Risk Factors and Outcome

Thesis

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Mira Ayoub William Bassaly

Dedication

To my great and supportive mother

Who sacrificed everything to help me, may god rest her soul in peace

To My Dear Father

To my sweet brother and sister for their continuous encouragement

To my beloved husband

For his continuous caring love and faith in me

This work would have never come true without your support and encouragement

Mira Ayoub

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List of Abbreviations

Abb.	Full term
ASD	*Atrial septal defect*
C/S	*Cesarean section*
CA	*Colonic atresia*
CBC	*Complete blood count*
CRP	*C-reactive protein*
DALYs	*Disability-adjusted life-years*
DIC	*Disseminated intravascular coagulopathy*
FAE	*Follicle-associated epithelium*
GBD	*Global burden of disease*
GI	*Gastrointestinal*
Hg	*Hemoglobin*
IA	*Intestinal atresia*
MCM	*Major congenital malformations*
MCMGIT	*Major Congenital Malformations of the Gastrointestinal Tract*
PDA	*Patent ductus arterioses*
PFO	*Patent foramen oval*
PHTN	*Pulmonary hypertension*
Plt	*Platelets count*
TLC	*Total leukocytic count*
TPN	*Total parenteral nutrition*
US	*Ultrasound*
VATER	*Vertebral defects, anal anomalies, esophageal atresia, and renal abnormalities*
VSD	*Ventricular septal defect*
WHO	*World Health Organization's*

INTRODUCTION

Congenital anomalies account for a staggering 25.3–38.8 million disability-adjusted life-years (DALYs) worldwide ***(Murray et al., 2012).*** DALYs are a well established metric for measuring the burden of disease in terms of both mortality and morbidity. The World Health Organization's (WHO) recent global burden of disease (GBD) study reports that anomalies rank 17th in causes of disease burden ***(Murray et al., 2012).***

Of the conditions measured in the GBD study, cardiac defects represent the greatest overall burden, and, Congenital malformations of the Gastrointestinal Tract, neural tube defects and cleft lip and palate, cause 21 million DALYs.***(Higashi et al., 2013).***

Major Congenital Malformations of the Gastrointestinal Tract (MCMGIT) usually manifest in the neonatal period, with symptoms and signs of gastrointestinal tract obstruction and they can be life-threatening. The reported proportion of all major congenital malformations (MCM) that involve the gastrointestinal tract have shown a wide variation among different countries and ethnicities, with proportions as low as 1% to as high as 45.2% ***(Loane et al., 2011).*** MCMGIT is a significant cause of neonatal morbidity and mortality ***(Jehangir et al., 2009).*** Developmental, teratogenic, socioethnic, and genetic factors play a considerable role in the etiology of

MCM, including MCMGIT, and influence the pattern of these malformations ***(Forrester and Merz, 2004).***

Congenital malformation of Gastrointestinal Tract including esophageal atresia, intestinal atresia, omphalocele, gastrochisis.. etc

Atresia means a complete congenital obstruction of the lumen of a hollow viscus. Intestinal atresia is one of the most frequent causes of bowel obstruction in the newborn and can occur at any point in the gastrointestinal tract ***(Osifo and Okolo, 2009).***

Interruption of the normal development of the gastrointestinal tract may result in intestinal atresia. Causes of the vascular disruption in the human fetus include segmental or midgut volvulus, intussusception, internal hernia, and interruption of the segmental mesenteric blood supply ***(Kilic et al., 2003).***

The outcome of intestinal atresia following surgical repair is very good especially in developed countries but In many low and middle income countries, outcome has remained poor, paucity of neonatal surgical intensive care unit facilities and late presentation in poorer countries have been the purported factors largely contributing to the disparity in mortality rate between developed countries and poor countries ***(Shakya et al., 2010).***

Aim of the Work

The aim of this study was to analyze the etiology, clinical presentation and outcome of neonatal intestinal atresia, 70 patients were enrolled on the study by random seletion from multicenters and data of demographics, antenatal history, presentation, location and type of intestinal atresia (duodenal, jejuno-ileal, colonic), investigations, operation, and final outcome were collected.

Chapter 1
EMBRYOLOGY OF THE GUT

Understanding the development of the human gastrointestinal tract, from both an anatomic and cellular basis, has a long history, dating back more than a century. This knowledge encompasses prenatal in utero and postnatal processes. Changes in both morphogenesis and cellular differentiation drive structural formation of the gastrointestinal tract in the developing embryo. Digestive function continues to develop following birth, clear understanding the normal gastrointestinal development is essential for the understanding of the diseases of the gastrointestinal tract ***(Christine and Sherin, 2011).***

During the first 2 weeks when the embryo is a bilaminar disc, endodermal development is slow. By the end of the second week, the endoderm forms the secondary yolk sac. The endoderm of the median plane of the roof of the yolk sac will become the gastrointestinal tract,a result of the cephalocaudal and lateral folding of the embryo, a portion of the endoderm lined yolk sac cavity is incorporated into the embryo to form the primitive gut. The gut system extends from the oropharyngeal membrane to the cloacal membrane and is divided into the foregut, midgut, and hindgut ***(Sadler, 2012).***

The middle part, the midgut, remains temporally connected to the yolk sac by means of the vitelline duct.

Portions of the gut tube and its derives are suspended from the dorsal and ventral body wall by mesenteries, double layers of peritoneum that enclose an organ and connect it to the body wall ***(Moore and Agur, 2009).***

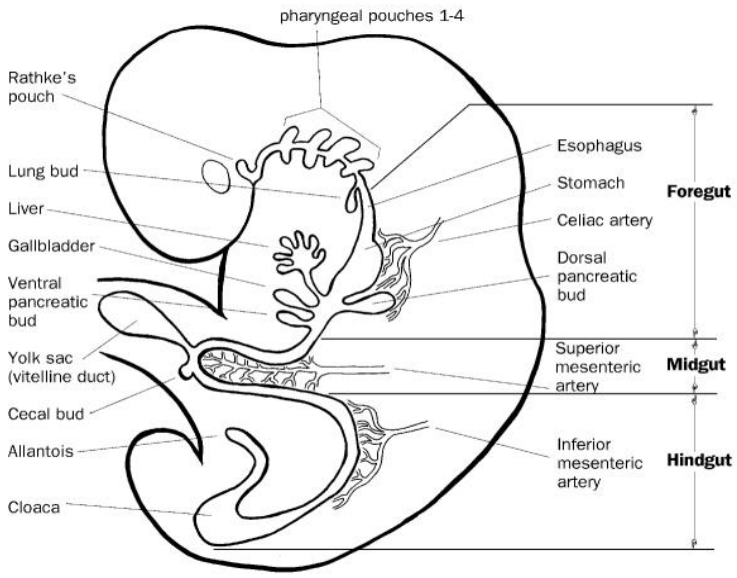

Figure (1): Showing differentiation of the gut into foregut, midgut, hingut ***(Metzger et al., 2011)***.

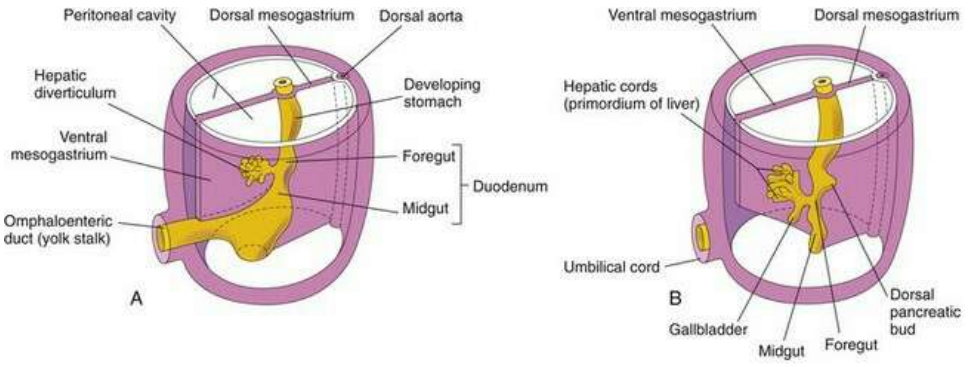

Figure (2): Derevatives of foregut and midgut ***(Moore and Persaud, 2007)***