Outcome of Nissen Fundoplication Surgery for Neonates & Infant with Gastero-Esophageal Reflux Disease in Ain Shams University Hospitals

Thesis

Submitted for Partial Fulfillment of the Master Degree in General Surgery

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2019

سورة البقرة الآية: ٣٢

Acknowledgement

First and foremost, I feel always indebted to Allah, *the Most Kind and Most Merciful.*

I'd like to express my respectful thanks and profound gratitude to Prof. Dr. Ashraf Elzoghby El-Saeed, Professor of General Surgery, Faculty of Medicine, Ain Shams University *for his keen guidance, kind supervision, valuable advice and continuous encouragement, which made possible the completion of this work.*

I am also delighted to express my deepest gratitude and thanks to Prof. Dr. Hany Rafik Wakim, Assistant Professor of General Surgery, Faculty of Medicine, Ain Shams University *for his kind care, continuous supervision, valuable instructions, constant help and great assistance throughout this work.*

I am deeply thankful to Dr. Mohamed Hesham Soliman, Lecturer of paediatric surgery, Faculty of Medicine, Ain Shams University *for his great help, active participation and guidance.*

I would like to express my hearty thanks to all my family for their support till this work was completed.

Last but not least my sincere thanks and appreciation to all patients participated in this study.

Mohamed Salah Mohamed Elshafey

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Abbr.	Full term
BPD;	Bronchopulmonary dysplasia
CDH:	Congenital diaphragmatic hernia
E.A:	Esophageal atresia
GER:	Gastro-esophageal Reflux
GERD:	Gastro-esophageal Reflux disease
LES:	Lower oesophageal sphincter
LPR:	Laryngopharyngeal reflux
NF:	Nissen Fundoplication
NI:	Neurologically impairment
NN:	Neurologically normal
TF:	Toupet Fundoplication
TLESRs:	Transient LES Relaxations

INTRODUCTION

Gastro-esophageal Reflux disease (GERD) is one of the most recognized disorders among neonates and infants. GERD usually resolves physiologically after the developmental maturation of the lower esophageal sphincter and lengthening of the intra-abdominal esophagus in the early months after birth ***(Czinn & Blanchard, 2013).***

Generally, the incidence of GERD is 85 % in infants which occurs 1.6 times more in males than females. Prevalence of GER decreases to 18% in childhood. However; symptoms of (GERD) in infants include coughing or choking, vomiting, chronic respiratory problems, growth failure, sleeping problems, and apnoea. GERD can also be life-threatening and affect the quality of life ***(Kültürsay, 2012).***

The medical management of majority of GERD Patients includes dietary thickeners, head-up positioning, prokinetic agents, and histamine type-2 receptor antagonists is effective. However, anti-reflux surgery such as Nissen fundoplication is needed in case of treatment failure. Nissen fundoplication is a well-established treatment option in children with GERD. Indications for fundoplication include

recurrent aspiration pneumonia, apnoeic episodes, bradycardia, apparent life-threatening events, broncho-pulmonarydysplasia, severe vomiting, growth failure, esophagitis, and esophageal stricture ***(Pacilli et al., 2015).***

The overall goals for the treatment of GERD are to relieve symptoms, maintain remission of symptoms, and manage or prevent complications. Treatment options to achieve these goals include dietary or behavioural modifications, pharmacologic intervention, and surgical therapy. Increased understanding of GERD pathophysiology has led to improved diagnostic techniques, pharmacologic agents, and invariable approaches to surgical management ***(Hope et al.. 2013).***

Up to 60%of healthy infants 0–6 months of age experience occasional refluxing of gastric contents into the esophagus. This percentage declines to 5% at one year of age. The mechanism of reflux is believed to be due to an immature lower esophageal sphincter (LES) and a predominately liquid diet and it is considered physiologic. As the LES matures and solids are introduced into the diet, reflux resolves, typically by 12months of age. Those children who do not experience resolution of their reflux may go on to develop GERD which describes the complications that can

result from persistent GER. The pathophysiology of GERD is believed to have anatomical (short esophagus, stricture, and hiatal hernia) and/or functional components (pharmacologic agents, poor dietary habits, and abnormal gastric motility ***(Hope et al., 2013).***

Surgical management of GERD typically becomes necessary in presence of GER complications and/or failed medical therapy. Anti-reflux procedures are usually performed to eradicate the reflux of gastric contents into the esophagus which should control GERD related symptoms, prevent complications, and permit adequate caloric intake to achieve growth. This is achieved by re-establishing the gastro-esophageal barrier through creation of a partial or complete valve mechanism at the gastro-esophageal junction ***(Blanco et al., 2012).***

Fundoplication provides definitive treatment for GERD and is highly effective in most circumstances. The fundus of the stomach can be wrapped around the distal oesophagus either 360 degrees (i.e., Nissen fundoplication) or to lesser degrees (i.e., Thal or Toupet fundoplication). Initially described in 1954 by Rudolph Nissen, the Nissen fundoplication has evolved to become the standard operation for the surgical treatment of GERD in children and adults.

Nissen described the procedure as a 360 degree gastric fundoplication around the distal esophagus for a distance of 4-5 centimetres. This provided solid control of reflux but was associated with numerous side effects that encouraged modifications to the procedure ***(Geon Yoo et al., 2014).***

AIM OF THE WORK

To investigate the outcomes of Nissen fundoplication surgery for neonates and infants with Gastro-esophageal Reflux disease in Ain Shams university Hospital.

REVIEW OF LITERATURE

In order to understand the pathophysiology of esophageal disease and the rationale for its medical and surgical management a basic knowledge of esophageal anatomy and physiology is essential. The embryological development of the esophagus, its anatomical structure and relationships, the physiology of its major functions and the effect that surgery has on them will all be considered in this section.

The exact burden of GERD in the NICU infant is not known, partly as a result of diverse definitions. To complicate matters, GER is a normal occurrence in the neonate with 2 to 3 episodes of reflux per hour, and is related to the infants' frequent feeding cycles.

The composition of gastric contents varies with feeding methods, and therefore the Physical and chemical properties of the gastric contents, vary within an infant's feeding cycle**.** ***(Jadcherla SR,et al 2013)***

Symptoms are based on the state of activity of the infant (ie, sleepawake- activity states), with infants spending

a considerable amount of time sleeping. Interventions that alter the sleep-awake-activity states may include, but are not limited to, routine examination and providing care, nasogastric tube placement and feeding methods, checking residuals, and suctioning aerodigestive tract secretions in sicker infants. Therefore, changes in sleep patterns and interventions in NICU infants may modify the symptoms and responses to reflux events**.** ***(Sankaran J,et al 2016)***

Pathophysiology of gastroesophageal reflux disease

The esophageal and laryngeal reflexes that protect the esophagus and airway from damage caused by GER appear to be present in healthy preterm infants. Esophageal distension from the reflux of gastric contents activates anterograde peristalsis reflex of the esophagus along with closure of the UES. This prevents the refluxate from reaching the pharynx. However, if the UES relaxes to allow the refluxate to reach the pharynx, the laryngeal chemosensitive receptors trigger the initiation of the laryngeal chemoreflex to prevent aspiration of gastric contents by glottis closure, which is always accompanied by a period of apnea (glottal closure reflex), although the duration of pause in breathing