Risk factors for wound dehiscence after limited posterior sagittal anorectoplasty in female patients with low and intermediate anorectal anomalies

A Thesis
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Ayman Mostafa Allam

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List of Abbreviations

ADA	:	Anterior displacement of the anus
AM	:	Anterior meningocele
ARMs	:	Anorectal malformations
ASARP	:	Anterior sagittal anorectoplasty approach
ASD	:	Atrial septal defect
CM	:	Cloacal membrane
CS	:	Currarino syndrome
EAS	:	External anal sphincter
EMG	:	Electromyography
HSD	:	Hirschsprung's disease
IAS	:	Internal anal sphincter
IV	:	Intravenous fluids
MCU	:	Micturating cystourethrogram
NPO	:	Nil per os
PC	:	Pubococcygeal distance
PDA	:	Patent ductus arteriosus
PFO	:	Patent foramen ovale

List of Abbreviations (Cont.)

PRS	:	Posterior rectal shelf
PS	:	Pulmonary stenosis
PSARP	:	Posterior sagittal anorectoplasty
SSIs	:	Surgical site infections
TOF	:	Tetralogy of Fallot
VACTERL	:	Vertebral, anal, cardiac, tracheoesophageal, renal and limb anomalies
VSD	:	Ventricular septal defect
VUR	:	Vesicoureteric reflux

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Introduction

Anorectal malformations (ARMs) are congenital anomalies that occur in approximately 1 in 5000 live births. ARMs comprise a wide spectrum of diseases, which can affect boys and girls, and involve the distal anus and rectum as well as the urinary and genital tracts. Defects range from the very minor and easily treated with an excellent functional prognosis, to those that are complex, difficult to manage, are often associated with other anomalies, and have a poor functional prognosis **(Levitt and Peña, 2007)**.

The Krickenbeck conference, participants came to the following conclusions. The international Wingspread classification is still useful in the choice of the surgical approach (This classification distinguished between high, intermediate, and low anomalies in the male and female, with special groups established for cloacal and rare anomalies).However, to develop a system for comparable follow-up studies, a modification of the classification of Peña according to the type of the fistula and including rare/regional variants was proposed. The major clinical groups were classified as perineal (cutaneous) fistulas, rectourethral fistulas (prostatic and bulbar), rectovesical

fistulas, vestibular fistulas, cloacal anomalies, patients with no fistula, and anal stenosis. Rare/regional variants were subclassified as pouch colon, rectal atresia/stenosis, rectovaginal fistulas, H-type fistulas and others. This new international classification enables the different operative procedures to be more comparable to each other than with the Wingspread classification **(Peña, 1995)**.

Most of the literature concerning management of ARMs is centered on the treatment and outcome of high anomalies. The management of low anomalies has been considered significantly less challenging than high anomalies. Also, the outcome of low anomalies has traditionally been considered good. However, recent more critical long-term follow up reports show a different picture. Many patients with low anomalies suffer from long-term anorectal functional problems, especially constipation but also soiling that occurs in a significant percentage of patients **(Pakarinen and Rintala, 2010)**.

Vestibular fistula is the most common form of ARMs in female children and is associated with the best prognosis. It is estimated that 93% of patients with vestibular fistula will develop voluntary bowel movements by the age of 3 years **(Peña and Hong, 2000)**.

Also one of the most common ARMs seen in female children is the perineal fistula, which is an anterior opening of the rectum on the perineum. We use the term fistula because the opening is not completely surrounded by sphincter muscle. It is usually narrower than the normal anus, and there is no true anal canal with a pectinate line **(Peña, 2004)**.

The posterior sagittal anorectoplasty (PSARP), devised by **Peña and deVries (1982)**, has revolutionized the management of ARMs by providing complete exposure of the anatomy of the anorectal region during surgery. This is the most widely used method and provides exact visualization of the fistula between the rectum and the female genital tract and place the rectum within the confines of the striated muscle complex giving best chance to achieve continence **(DeVriesand Peña, 1982)**.

LowARM, despite its simplicity, is also likely to have the highest chances of failure leading to sever sequelae if proper reconstruction is not done at the first attempt. The perceived disadvantages of primary repair include wound infection and wound dehiscence. This makes secondary repair difficult because of fibrosis, which further decreases the chances of normal continence. A colostomy is therefore

traditionally advised so as to get the best results **(Peña and Hong, 2000)**.

It must be taken into account, however, that colostomies have complications. Besides the extra operation that is needed for colostomy closure (as well as creating one), there are complications such as prolapse, skin excoriation, and the burden for parents in dealing with the colostomy. The question is whether these disadvantages outweigh the protective effect of a colostomy on wound healing after anal reconstruction **(Chandramouli, et al., 2004)**.

Aim of the Work

The aim of this study was to identify the risk factors for wound dehiscence after limited posterior sagittal anorectoplasty in female patients with low and intermediate anorectal anomalies in Ain Shams Universityhospitals.

Anatomy and Embryology

Embryology of the hindgut:

The normal embryology of the hindgut always has been a matter of debate. Two major theories exist to explain the differentiation of the hindgut into the urogenital (ventral) and anorectal (dorsal) part: The theory of the septation of the cloaca; and the theory of the migration of the rectum **(Kluth, 2010)**.

The "Anorectal Septum" of the Hindgut:

In very young embryos, the hindgut is a simple structure. Cranially, it is in continuity with the midgut; caudally, it is in direct contact with the ectoderm, thus forming the "cloacal membrane." When development progresses, the caudal part of the hindgut, the "cloaca," differentiates into two separate organ systems– the urogenital tract and the anorectal tract **(Kluth, 2010)**.

Since the work of Tourneux **(Tourneux, 1888)**and Retterer **(Retterer, 1890)** at the end of the nineteenth century, it has been generally accepted that the normal development of these tracts depends upon the proper subdivision of the cloaca by a septum, the so-called urorectal septum. According to this theory, abnormal septal

development should always result in abnormal cloacal development. However, there is no agreement among investigators about the nature of this septum and the way it develops **(Kluth, 2010)**.

However, it was noted that neither lateral ridges nor signs of fusing lateral wall components could be discerned. Therefore, clear proof of this process of septation is still missing. It is more likely that a normal-looking septum is the result of normal cloacal development rather than its cause **(Kluth, 2010)**.

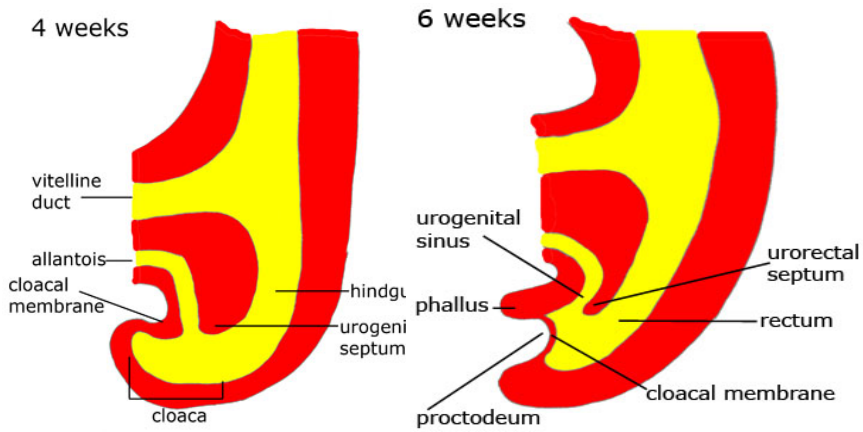

Fig. (1): Normal embryology of the hind gut **(Sadler, 2012)**

The "migration" of the rectum:

Studying the morphology ofanorectal malformations (ARMs) in human newborns, **Bill and Johnson in 1958**and later **Gans and Friedman in 1961** stated that in most forms ofARM the fistula may present an "ectopic" anal