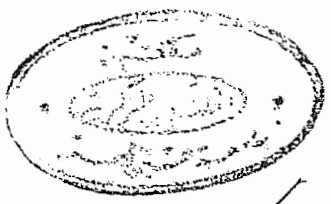
Anal Fistula



Essay

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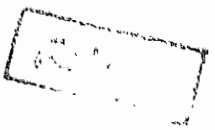

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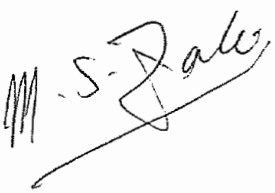

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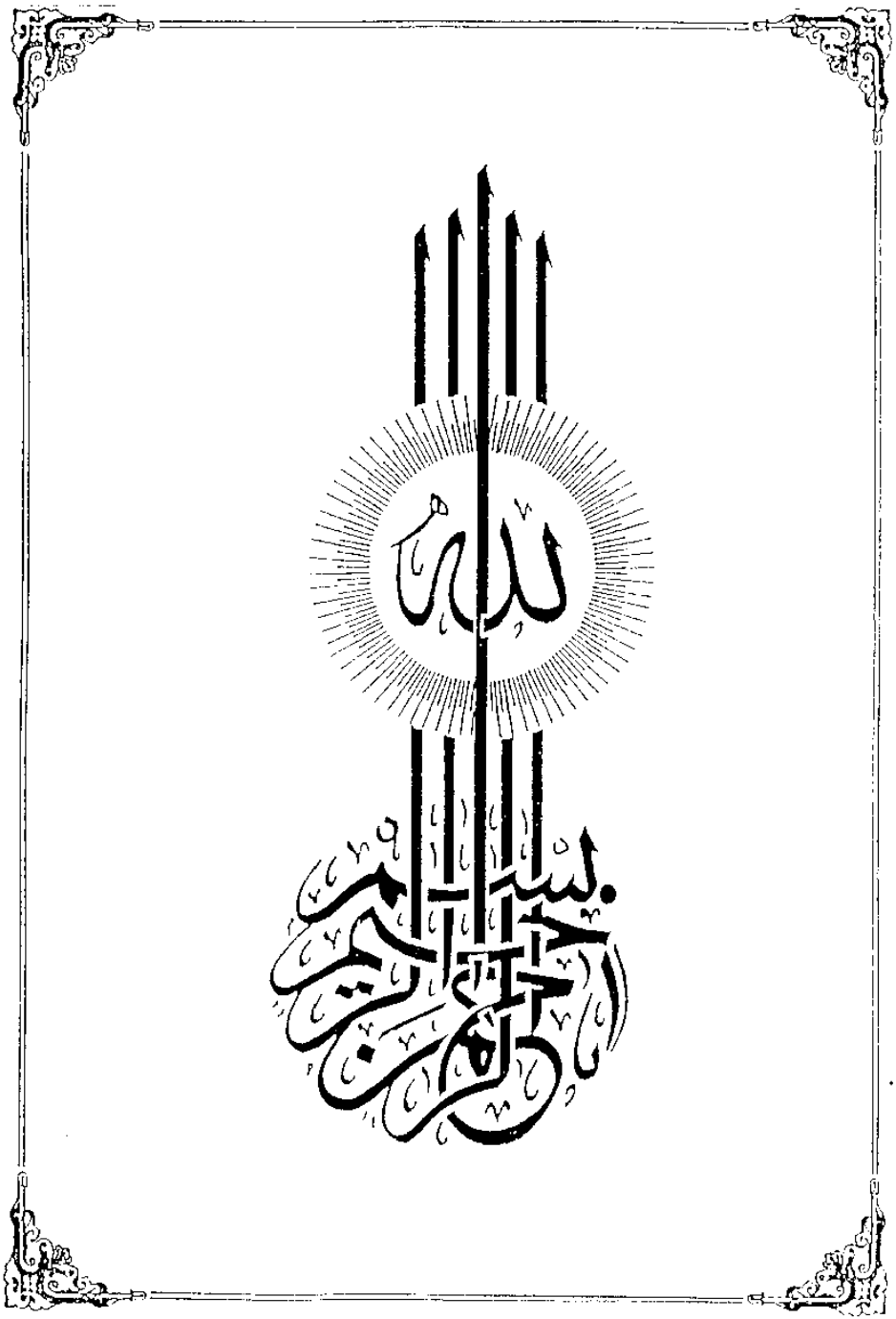

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Contents

Introduction

Introduction

* Anal fistula is a common proctologic problem met within surgical practice, as colonic and anorectal diseases are common in Egypt.

* Anal fistula is a common irritation to both patients and surgeons., Although surgical treatment is the most reliable line of management of anal fistula, yet it bears some hazards at the end of long therapy, some patients only know that the fistula persists, probably, in a worse condition end up with complication as incontinence after surgery. ***(Goligher 84)***

* Treatment failure rate may be decreased by good appreciation of normal anorectal anatomy and fistula pathoanatomy, as well as a wide and practical knowledge of the possible treatment regimens ***(Nicholls, R.J. 1992)***

Embryology of rectum and anal canal

Embryology of Rectum and Anal Canal

The rectum developed from the entodermal cloaca and anal canal developed from the ectodermal cloaca. The hind gut is continous with the entodermal cloaca which is divided into an anterior urogenital and posterior rectal portion by the downward growth of the urorectal septum. ***(McGragor, 1986).***

The entodermal cloaca is closed by cloacal membrane which after division of the cloaca become anal membrane below the rectum and urogenital membrane below urogenital portion. The anal membrane breaks down and represented by the pectinate line of the anal canal. ***(Last, 1990).***

Shafik in 1982, stated that the rectum develops from the hindgut which extend down to the perineal skin as evidenced by the extension to this level of its circular and longtidudinal muscle coats. He demonstrated that the hidngut blind end, reaching the perineal skin is invaginated by the proctodeal dimple, the invagination is effected by the ectoderm only, without muscular elements (fig. 1.). Proctodeum hindgut intussusception aims at both, rupture of the rectal membrane to get the hindgut open to exterior, and establishment of a union between the endodermal hindgut lining and the perineal ectoderm. In the course of hindgut invagination, an anorectal sinus forms but it usually obliterated. (fig. 1. E, G, F.).

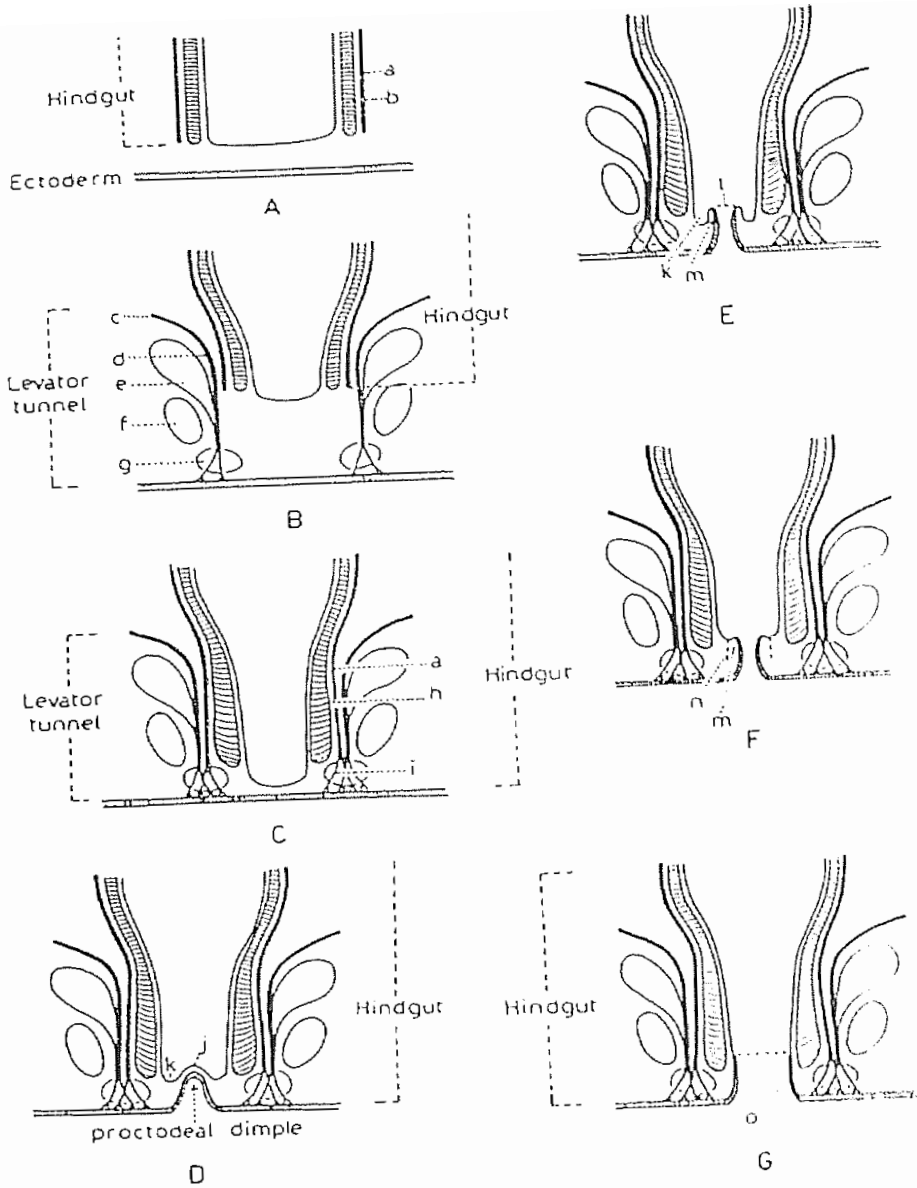

Figure 1. Diagrams illustrate the embryological development of the lower end of hindgut (modified from Shafik[9]). a—hindgut longitudinal muscle coat. b—hindgut circular muscle coat. c—levator plate. d—suspensory sling. e—top loop of external sphincter (conjoined deep external sphincter and puborectalis). f & g—intermediate and base loops of external sphincter. h—internal sphincter (hindgut circular muscle coat). i—hindgut longitudinal muscle attachment to perineal skin. j—hindgut membrane (rectal membrane). k—anorectal sinus. l—pectinate line. m—para-anal space. n—obliterated anorectal sinus. o—skin lining hindgut. (A) Hindgut migrating toward perineal skin. (B) Levator tunnel formation. Hindgut migrates through and is guided by levator tunnel to the perineal skin. (C) Hindgut reaches and is fixed to perineal skin by its longitudinal muscle coat. (D) Proctodeal dimple invaginates hindgut lower end with resultant anorectal sinus formation. (E) Rectal membrane rupture with a resulting hindgut opening to the exterior and para-anal space formation. (F) Anorectal sinus obliteration with persistance of para-anal space. (G) Rectal neck remodeling resulting in para-anal space obliteration.

(From Shafik, 1982)

Remodling of the proctodeal skin follows so as to come in aligament with hindgut lining (fig. 1. G.). The ultimate embryological result is that the hindgut opens to the exterior, and that the proctodeal ectoderm fuses with its mucosal lining just within the hindgut lower end, at the pectinate line.

Shafik's studies (1980), have shown that the anal canal does not exist, neither as an embryological nor as an anatomical separate entity, but only as a skin which lines the terminal part of the hindgut, and forms in the course of hindgut opening to the exterior.

According to ***Shafik, (1982)***, it seems that the hindgut is guided to its normal location in the perineum by tracking through the levator tunnel (fig. 1. B.).

The stimulus to proctodeal dimpling is not identifiable. It could be either the hindgut fixation by its longitudinal fibres to the perineal skin or the levator tunnel formation, the latter seems more conceivable since proctodeal dimpling can occur without the hindgut entering the tunel or being fixed to the perineal skin. The levator tunnel formation, thus appears to stimulate not only normal hindgut migration to the perineum but also proctodeal dimpling.

A New concept of origin of anal gland

The anal canal proper and rectum developes from two different origins, the former from the proctodeum, and the latter from the hindgut. ***Shafik, (1987)***, in his study on embryology of rectum, found that during embryonic development as the proctodeal dimple proceeds up to meet the hingut, it invaginates the lower end of the hindgut (fig. 2). In doing so, it pushes up and stretches tight the anal membrane which separates the hindgut from the proctodeum, meanwhile, it enfolds the lower end of the hindgut mucosa, invagination continues till the anal membrane ultimately ruptures leaving the anal valves to mask its situation (fig. 2, A and B.). Two spaces result from anorectal invagination,

(a) an outer space which is called by ***Shafik*** "Ano-rectal sinus" (ARS) and (b) an inner space which is also called by ***Shafik,*** "para-anal space" (fig. 2. B.). The ano-rectal sinus represents the enfolded part of the hindgut mucosa, and is that structure termed by investigator as the anal glands. The para-anal space lies between the epithelial lining of the anal canal proper and the ano-rectal space.

Ano-rectal invagination seems to occur more posterior than anterior as evidenced by the deeper extension of ano-rectal space on the posterior anal aspect compared to elsewhere. It could be that anterior invagination is

hampered by the prostate in males and vagina in female being located anterior to anal canal proper.

The deep ano-rectal sinus extension in the posterior anal wall could explain the high incidence of certain pathologic lessions as chronic anal fissure, in the posterior anal wall compared to the anterior. *(Shafik, 1987).*

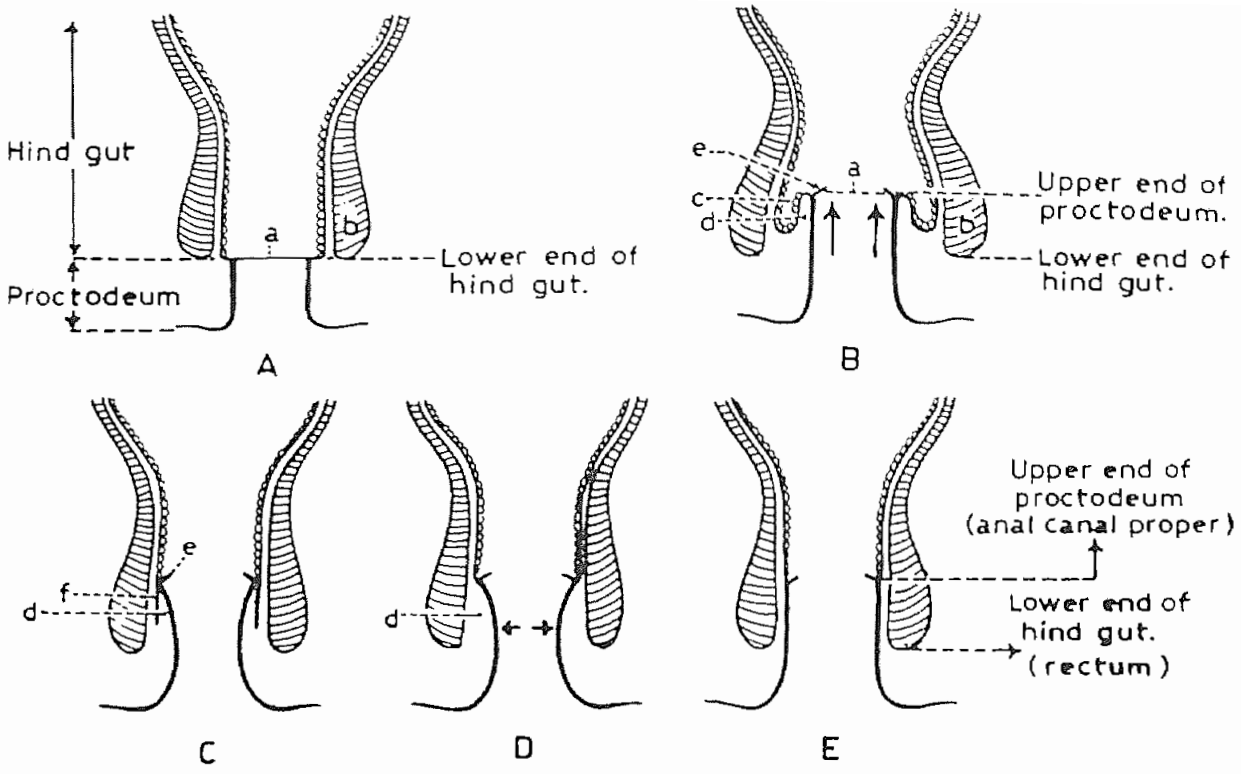

FIG 2. Diagram illustrating embryonic anorectal invagination: *a* anal membrane, *b* internal sphincter, *c* anorectal sinus, *d* para-anal space, *e* anal valves, *f* anorectal band.

A. Proctodeum and hindgut separated by anal membrane.

B. Proctodeum invaginating hindgut with resultant anorectal sinus and para-anal space formation as well as anal membrane rupture leaving anal valves to mark its situation.

C. Anorectal sinus obliteration leaving anorectal band.

D. Disappearance of anorectal band with persistent para-anal space.

E. Remodeling of proctodeum so that it comes in alignment with hindgut thus obliterating para-anal space.

(From Shafik, 1980)

Vascular pattern

Shafik, (1982), stated that the hindgut artery is the inferior mesentric, and its continuation, the superior haemorrhoidal which normally should accompany the hindgut to its termination at the perineal skin. In the postnatal life however, the artery ends approximately at the pectinate line. The explanation might be that, due to invagination by the proctodeum, the lower part of the artery is involved in anorectal sinus oblitrative process, and thus terminates at the pectinate line. The hindgut below this level acquires blood supply from inferior haemorrhoidal artery.