Endo-Anal Sonography as a Diagnostic Tool for Perianal Fistula

Essay

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IAS…….....Internal anal sphincter.

EAS.....External anal sphincter .

HIV……Human immune deficiency virus.

EUA……...Examination under anathesia.

US……...Ultrasound.

MRI…….Magnetic resonance imaging.

CT……. .Computed tomography.

EAUS……..Endoanal ultrasound.

3D……....Three dimensional.

EUS…….....Endoanal ultrasound.

ARU…….....Anorectal ultrasound.

2D……Two dimensional.

TAUS……..Transanal ultrasound.

HPUS……..Hydrogen peroxide endoanal ultrasound.

EMG……Electromyography.

3DELUS….Three dimensional endoluminal ultrasound.

ES……External sphincter.

IS……..Internal sphincter.

3D HPUS…Hydrogen peroxide-enhanced three dimensional endoanal ultrasonography.

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Introduction

Anal fistula, is presented in its simplest form as a single track with an external opening in the skin of the perianal region, and ano internal opening in the modified skin or mucosa of the anal canal or rectum (D'Hoore and Penninckx, 2001).

Most perianal fistulas caused by inflammation of an anal gland. This abscess represents the acute stage of the disease, whereas chronic stage is developed when fistula in and has been established (Strittmatter, 2004).

Accurate assessment of the complete fistulous complex involves the localization of all internal and external openings as well as identification of the course of the main tract and its extensions and the anatomy of the fistula in complicated cases should be imaged in a way that is directly related to surgical planes and exploration *(Kumar and Scholefield, 2000).*

Radiological imaging of the pelvis adds an important dimension to our understanding of rectal and perianal disease (*Herbst, 2003).*

Ultrasound has a particular role in recurrent and complex anal fistula and perianal sepsis. Preoperative and perioperative planning with accurate delineation of fistula tracts, extensions and sphincter involvement might help prevent recurrence and impaired continence from sphincter damage after surgery (Rieger et al., 2004).

Endoanal ultrasound with hydrogen peroxide enhancement is an effective examination to visualize fistulous tracts and internal openings. We think it is highly useful for anal or perianal suppuration to identify abscesses, to recognize a perianal sinus, to check the sphincteric condition, and to plan subsequent surgery (Pascual et al., 2005).

Aim of the work

This study was designed to evaluate the effectiveness of endoanal ultrasound in the assessment of fistula-in-ano with injection of hydrogen peroxide.

Anatomy of the Rectum and Anal Canal

*Rectum:

The Latin word rectus means straight, the rectum was originally named in monkeys in which it is straight, but the human rectum appears to be misnamed (McMinn, 1990).

The rectum begins at the sacral promontory. It descends caudally, following the curve of the sacrum, at first it descends downwards and then forward for a distance of 13 to 15 cm at the anorectal ring, or at the top of anal canal (Pemerton, 1991).

This ring is formed by the pelvic floor muscles (puborectalis muscle), internal anal sphincter and deep part of the external anal sphincter (Pemerton, 1991).

The rectum has three lateral curves. The upper and lower curves are convex to the right, whereas the middle curve is convex to the left (Pemerton, 1991).

On the intraluminal aspect of these curves are the valves of Houston. These enfolding incorporate all layers of the rectal wall except the longitudinal muscle layer (Pemerton, 1991).

The rectum is about 12 cm long and continues with the sigmoid colon at level of the 3rd piece of

sacrum and there is no change of structure at the junction (Housten, 1999).

The three taeniae of the large intestine , having broadened out over the sigmoid, come together over the rectum to invest it in a complete outer layer of longitudinal muscle, so there is no sacculations or appendices epipolicae as in the colon (Housten,1999).

Peritoneal covering:

The rectum possesses no mesentery. The peritoneum covers the upper third of the rectum from the front and the sides, while it covers the middle third at the front only, however the lower one third lies below the level of the peritoneum which is reflected forward on the upper part of the bladder in the male, while in female it covers the upper vagina to form the rectovesical and rectouterine pouch respectively (Keighley, 1999).

These pouches form the lowest parts of peritoneal cavity, and begin7.5 and 5.5 cm from the anal margin respectively (Keighley, 1999).

Relations:

Posteriorly, the rectum has a branch of the superior rectal artery on each sides, and is separated

only by a layer of pelvic fascia from sacrum, coccygeus and levator ani **(Chummy, 1999).**

Between these structures and the pelvic fascia are the median sacral vessels,and a sympathetic trunk on each side.Lateral to these are the lateral sacral vessels and the lower sacral and coccygeal nerves **(Chummy,1999).**

Anteriorly, ***in males***, above the site of the peritoneal reflection from the rectum are: the upper parts of the base of the bladder and of the seminal vesicles, the rectovesical pouch and its contents (terminal coils of the ileum and sigmoid colon) below the reflection are: the lower parts of the base of the bladder and of the seminal vesicles, deferent ductus, terminal parts of the ureters and the prostate. ***In females***, above the reflection are: the uterus, the upper vagina, rectouterine pouch and its contents (terminal coils of the ileum and sigmoid colon), while below the reflection is the lower part of the vagina ***(Williams et al., 1989).***

Laterally, the upper part of the rectum is related to the pararectal fossa and its contents (sigmoid colon or lower ileum), while below the peritoneal reflection, are: the pelvic sympathetic

plexuses, coccygei, and levator ani and branches of the superior rectal vessels (Williams et al., 1989).

Blood supply:

This is derived principally from the superior rectal artery with contributions from the middle and inferior rectal and median sacral vessels. The lower end of the inferior mesenteric artery enters the sigmoid mesocolon and changes its name to superior rectal on crossing the pelvic brim (McMinn, 1990).

Venous drainage of the rectum:

The veins of the rectum consist of the superior rectal vein which drains into the inferior mesenteric and the portal system. The middle and inferior rectal veins which enter the systemic venous circulation via the internal iliac veins (Skandalakis, 2000).

Veins correspond to the arteries but anastomose freely with one another, forming internal rectal plexus in the submucosa and external rectal plexus outside the muscular wall. The lower end of the internal plexus is continuous with the vascular cushions of the anal canal (McMinn, 1990).

Lymphatic Drainage:

- **Superior rectal lymph nodes:** These are important group of nodes on the back of rectal ampulla above the levator ani muscle also known as the pararectal lymph glands of Gerota **(Baily and Loves ,1992).**

- **Middle rectal lymph nodes:** These lie close to the middle rectal arteries and pass to the lymph nodes around the internal iliac arteries **(Baily and Loves, 1992).**

*The anorectal ring:

This term was coined to denote the functionally important ring of muscle which surrounds the junction of the rectum and anal canal. This is composed of the upper borders of the internal anal sphincter (IAS) and external anal sphincter (EAS) and the strong puborectalis sling, which completely encircle the junction on the posterior and lateral aspects. As a consequence, the ring is stronger posteriorly and laterally than it is anteriorly **(McMinn, 1990)**.

Recognition of this ring is important in the treatment of abscesses and fistulas in the anal region as its complete division result in rectal incontinence **(Goligher, 1989)**.