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Ancillary Investigative Tools to Diagnose Fistula in Ano

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Abstract--- *Inadequate drainage or spontaneous bursting of a perianal abscess leading to the development of Fistula in ano. If the surgeon fails to track the tract during surgery or inadequate extinction of infection causing the recurrence of the disease. Preoperative imaging is a useful tool for the identification of infection that would have otherwise gone unidentified. Current updates on diagnostic tools recommend that magnetic resonance (MR) imaging outcomes have been considered to impact surgery and noticeably reduce the chances of reappearance. But in countries like India this is not possible for common patients to afford MR imaging because of cost effectiveness and availability of MRI equipment at various remote centres. Other diagnostic techniques like Endoanal and Transcutaneous perianal ultrasonography is also being widely used but this has also got limitations like difficult to use in perianal inflammatory conditions, anal stricture or stenosis and always cannot be done because of many reasons. Hence fistulography is commonly used for preoperative imaging of fistula in ano. In this article, fistula in ano and its various diagnostic techniques are described in detail.*

Keywords--- *Magnetic Resonance (MR), CT Scan, Endoanal.*

I. INTRODUCTION

A fistula-in-ano is an atypical hollow tract or cavity associated with granulation tissue and these connects a main opening inside the anal canal to a secondary opening in the perianal skin. Secondary tracts may be manifold and can spread out from the same main opening. It is a common condition usually recurs regardless of seemingly adequate surgery. Recurrence of the disease is usually due to escape of the extent of infection during surgery and has thus gone untreated.[1] It is diagnosed by medical history, clinical examination with special emphasis to rectal examination associated with probing, proctoscopy, fistulography, CT scan, endoanal / perianal ultrasonography & MRI.[2] many research and clinical works reported that preoperative imaging especially magnetic resonance (MR) imaging is useful to identify infected tracts and abscesses. Preoperative MR imaging findings assist the surgeon to identify the extent of infection and markedly diminish the chance of recurrent disease as a result.[3] Endoanal and Transcutaneous perianal ultrasonography are the investigative procedure for the diagnosis of fistula in ano. However these tools have certain limitations because these are not indicated in patients of perianal inflammatory conditions, anal stenosis, anal stricture etc.[5]

Hence fistulography is a useful tool because it is affordable even to the poor patients. In developing countries

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like India where majority of population lies below poverty line, hence this tool has been tried in 100 patients with fruitful results. The method of imaging is not only economical but also can be carried out at small centres.

Anal Canal and Fistula in Ano

Anal canal tube enclosed by Internal and external anal sphincters and these are the two muscular sphincters and these are composed of smooth and striated muscle, correspondingly. [4]

Parks et al did not describe submucosal fistulas, which are very superficial and do not involve the sphincter at all.[6&9]

Fistulas probably start as a simple single primary tract, unabated infection may result in ramifications. These secondary tracts are commonly recognised as "extensions. [7&8]

Diagnosis

Diagnostic modalities for the diagnosis of fistula in ano

a) Medical History, Clinical examination especially digital rectal examination where internal opening can be felt as nodule on the wall of the anal canal are the primary diagnostic techniques along with ancillary investigations like Proctoscopy, Probing etc)
b) Proctoscopy can disclose internal opening and concomitant conditions like haemorrhoids, fissure etc.
c) Probing was used abundantly earlier in routine practice but nowadays it is not recommended because it cause severe pain and may create false tract due to forceful probing.
d) Histopathological and biochemical examinations are done to know the general body condition and associated illness.
e) Radioimaging techniques like fistulography, CTscan, MRI, Transcutaneous perianal/Endoanal or Endorectal ultrasonography can be used in the evaluation of tract of Fistula in ano. CT demonstrates thickness of the muscles (Puborectalis sling and external anal sphincter) whereas MRI reveals structure of muscles in multiple planes ie. Axial, coronal and sagittal.

Imaging Fistula in Ano: Fistulography

Radiologists have provided the lot of information based on their observation to assist the surgeons to answer the surgical questions for the treatment of fistula in ano. This enabled the varying degrees of success to the surgeons. Contrast material–enhanced fistulography is the first modality and in this procedure the external opening is catheterized with a fine cannula and a water-soluble contrast agent is gently injected to outline the fistula tract[12] Conventional fistulography in a male patient. Coronal image illustrates that there are numerous high extensions; however, the exact anatomic location of these is unclear because the pelvic floor cannot be openly visualized.

Fistulography has two main disadvantages namely 1. Extensions from the main tract may fail to fill with contrast material in case if they are plugged with debris or there is excessive contrast material reflux from either the internal or external opening or obstruction due to any cause in the tract.

2. The sphincter muscles themselves are not directly image which means that the relationship between any tract and the sphincter must be guessed. Furthermore, an inability to visualize the levator plate.

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To summarise the fistulographic findings are both difficult to interpret and unreliable and its findings are inaccurate and unreliable.

Fistulography is usually unhelpful because radiologists are not familiar with the concepts of fistula pathogenesis and anatomy and the relevant surgical questions, which can result in iatrogenic secondary tracts.[13]

Inacceptebility of fistulography technique has almost made this technique unreliable. But a different technique of fistulography is in practice since long in department of Shalya tantra, Faculty of Ayurveda, Institute of Medical sciences, Banaras Hindu university, Varanasi, which is known as Deshpande technique. This technique is modification of Ahlback et al technique and is quite excellent in mapping of complicated fistulae. Ahlback et al (1974) mentioned that fistulography should always be done in relapsing and high anal fistulas. Diagnosis with help of fistulography can cause rectal fistula. New method of fistulography was adopted by them in 93 patients. A Clausen rectal catheter with a balloon and a solid rubber ball having 35 mm. diameters was taken. Balloon is inflated within rectum by which ball is pressed against the anus and anal canal is thus defined in between. Urograffin 60% is injected during fluoroscopy through a Nelaton catheter wide enough to occlude external opening of fistula. Full size films were taken in frontal, lateral and oblique projections. Clinically they classified fistula in ano into low anal, high anal and anorectal or pelvirectal verities.the boundry between low anal and high anal is the dentate line or pectinate line. This line is not demonstrable radiologically. They consider it to be 15mm above the anal opening. Boundary between high anal and pelvirectal is puborectal loop part of levator ani which is also not demonstrable. They considered it to be above 30mm above anal opening. Radiological findings are confirmed in 67 out of 93 cases. Deshpande et. al also devised a new technique which is almost similar to the method of Ahlback et al (1974) except that in place of solid rubber ball he used lead marker and condom in place of balloon.[1]

Technique has been tried in 100 patients and following results have been drawn. Anatomical marking of rectum and anal canal with the help of rectal catheter and condom helps to establish the relation of fistulous tract with the rectum and anal canal. Internal opening and its location above or below the anorectal ring is identified with this technique. Ramifications and cavitation and its relation to anal canal and rectum are located. Extent of fistulous tract can be identified. Communication with other viscera can be identified.(Fig-1 & 2).

Figure 1

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Figure 2

Figure 1 & 2 showing fistulography by Deshpande technique. Here presence of gas shadow in the rectum filled in condom marks rectum, whereas rubber catheter in the anal canal marks the anal canal. Junction of the gas shadow and rubber catheter marks the level of anorectal ring. External fistulous opening and anal verge is marked by lead marker.

Figure 3

Figure 4

Figure 3 & 4 showing fistulography by Deshpande technique. Here presence contrast agent over inflated condom shows internal openining and course of tract its relation with anal canal, anorectal ring and rectum is seen. Although anorectal ring is not imaged but it is assumed at meeting point of part of anal rubber tube and beginning of inflated part of condom. Lateral view shows cavitation at perirectal space.

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Imaging Fistula in Ano: CT

Computed tomography (CT) may portray fistula in ano if rectal and intravenous contrast material are used. This is because the CT attenuation of the anal sphincter and pelvic floor is akin to that of the fistula itself, without the latter contains air or contrast material. This is compounded by the inability to image in the surgically relevant coronal plane.[3]

Imaging Fistula in Ano: Anal Endosonography

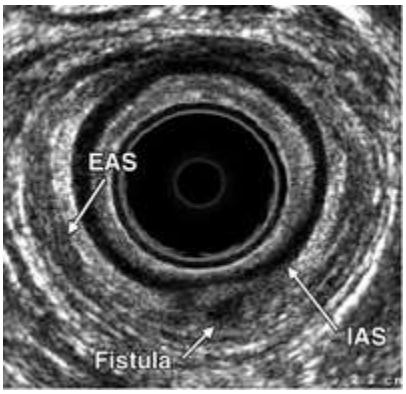

Figure 5

EAS- Intersphincteric plane between external

IAS- Internal anal sphincters.

Anal endosonography directly illustrate the anal sphincter complex in detail and this technique has attracted considerable attention because of its ability to demonstrate the presence and extent of anal sphincter disruption, notably after vaginal delivery and it has also been used extensively for the preoperative classification of fistula in ano. The probe is softly introduced into the distal rectum and then withdrawn through the anal canal. The internal sphincter is visualized as a hypoechoic ring encircling the anal canal, whereas the external sphincter is of mixed echogenicity (5). The intersphincteric space and longitudinal muscle lie between these and are of mixed echogenicity and are easily identified by using modern 10-MHz transducers. At surgery, the internal opening was located at 6 o'clock posteriorly and was correctly predicted from anal endosonographic visualization because of the radial position of the fistula within the intersphincteric plane.[14&15]

Imaging Fistula in Ano: MR Imaging

MR imaging has appeared as the top competitor for preoperative classification of fistula in ano. Images help accurately to classify tracts but also to detect disease that otherwise would have been overlooked has had a palpable effect on surgical treatment and final outcome of the patient.

Imaging Planes

Success depends on the correct alignment of imaging planes with respect to the anal canal. Because the anal canal is slanted forward from the vertical by approximately 45°, straight transverse and coronal images will fail to attain this alignment because of marked partial volume effect.

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Few research has precisely addressed the usefulness of several imaging planes, but combination of a transverse series and a longitudinal series (coronal, sagittal, radial, or a combination) provided all necessary information for successful interpretation. [16-17&18]

II. CONCLUSION

Fistula in ano is a complex disease and the preoperative MR imaging influences the surgical approach leading to the understanding of extent of explorations a result it improves the ultimate outcome of the patients. Recurrence rate of the fistula in ano is usually due to incomplete eradication of the infection by surgeons. It is claimed that MR imaging portrays inaccessible foci of infection and it is superior to any other diagnostic modality including surgical assessment. The MR imaging is not freely available and the cost is high and it is not affordable by the poor people, hence Deshpande technique of fistulography and anal endosonography is a viable alternative to MR imaging. The Deshpande technique is cheaper and needs only x-ray equipment along with some minor articles like rubber catheter, lead marker, condom and infant feeding tube which is freely available at smaller centres. Therefore this technique should be adopted for primary preoperative imaging of fistula in ano whereas anal endosonography and MR imaging may be used at tertiary centres.

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