

Imaging of Obstructed Defaecation Syndrome.

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Abstract: Obstructed defaecation syndrome (ODS) is now recognised as an important clinical entity needing specific diagnosis and treatment strategies. Hence radiology plays an important role in patient evaluation. Conventional defaecography has been the mainstay of evaluation in these patients, but now magnetic Resonance (MR) defaecography has also proved to be useful and is fast becoming the standard investigation in some centres for these patients. We discuss these modalities and our experience in the imaging of these patients. The advances and refinements in radiology often parallel the surgical technical innovations due to the need for accurate anatomical and pathological demonstrations of the disease process. The aforementioned fact is reiterated in the newer concepts of obstructive defecation. Not only has the radiologist to demonstrate the normal anatomy but also detect, characterise and grade the disease. In this article, we first describe the relevant anatomy, physiology and pathology and then discuss the imaging techniques with their merits and demerits. We also summarise the findings in the patients imaged for ODS at our centre. We did a retrospective analysis of all the patients who underwent imaging for ODS at our centre. The radiology armamentarium includes radiography, endoanal ultrasound and MRI in the evaluation of ODS.

ANATOMY REVISITED



Figure A: Normal anatomy during digital rectal examination.

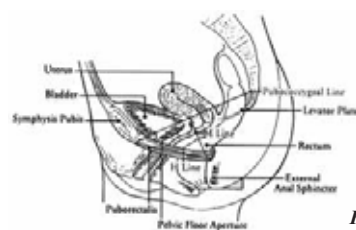


Fig D.



Figure B.: Normal anatomy in conventional proctography.



Figure C.: Normal anatomy in MRI proctography

normal circumstances not measure more than 5 cm, the M line should be less than 2 cm. (Fig D)

Anorectal angle (ARA)

Angle measured between the axis of the anal canal and the median rectal axis (or posterior rectal wall tangent)

Perineal position

Position of the anorectal junction in relation to the inferior ischial spine or a line drawn from the pubic symphysis and the tip of coccyx. It is measured at rest, squeeze, and straining.

TERMINOLOGY OF PATHOLOGIC CONDITIONS

Rectocele

Herniation of anterior wall of rectum or less likely the posterior or lateral wall due to inadequate support and laxity of the endopelvic fascia above the anal canal. The depth of rectocele is measured beyond the expected margin of the normal anterior rectal wall. Two types of rectocele are described: Distension or pulsion type in which anterior rectal distension occurs with absence of uterovaginal prolapse. Displacement type in which rectocele occurs with vaginal prolapse.



Figure E: Rectocele

The normal pelvic floor suspension is due to complex alignment of bony structures, muscles and ligaments. The pelvic diaphragm, urogenital diaphragm and endopelvic fascia support the pelvic floor and its organs. The pelvic floor also contains the urethra in anterior compartment, vagina in middle compartment and rectum in posterior compartment^{1,2}.

TERMINOLOGY OF RADIOANATOMY

The pubococcygeal line is drawn on a sagittal midline image from the inferior pubic symphysis to the last coccygeal articulation. The bladder neck and the vaginal vault remain above the pubo-coccygeal line. The H line is drawn from the inferior pubic symphysis to the posterior anorectal junction and the M Line is drawn perpendicular on the pubococcygeal line to the posterior anorectal junction. The H line and the M line contain the levator hiatus. The H line should in

Enterocoele

Herniation of a small bowel loop in a peritoneal sac downward and along the ventral rectal wall into the cul de sac or pouch of Douglas.



Figure F: Enterocoele

Intussusception and Rectal Prolapse

Invaginations of the rectal wall that descend toward the anal canal. The term rectal prolapse is actually a severe form of extrarectal intussusceptions.



Figure G: Intussusception



Figure H: Posterior pelvic floor laxity.

Descending Perineal Syndrome

As a consequence of pudendal nerve damage, the muscle tone of the pelvic floor is pathologically decreased and its imaging diagnosis is based on descent of anorectal junction in relation to pubococcygeal line.

Spastic Pelvic Floor Syndrome

cf. Pelvic floor dyssynergia (puborectalis paradoxus)

As a consequence of hypertonic puborectalis muscle indenting the posterior rectal wall, the anorectal angle remains acute during straining and defecation and so the patient has constipation and incomplete defecation.

IMAGING MODALITIES

Conventional and contrast radiography

Traditionally before the advent of endoanal USG and dynamic MR defecography, Xray films have been used for diagnosis of megarectum and colonic transit studies. Megarectum is labelled for a mean rectal diameter of 12 cm, measured at pelvic brim following contrast instillation in the rectum³. Transit time abnormality is considered when calculated transit time >24 hr for right colon, >31 hr for left colon, >33 hr for rectosigmoid and >67 hr for total colon transit. However, these tests suffer from lack of sensitivity and also poor clinical correlation⁴.

Contrast evacuation defecography / proctography has been one of the mainstay in the evaluation of ODS since it is a modality which replicates the physiology demonstration of defecation in sitting / squatting position. Its drawback is primarily poor spatial resolution

and delineation of extraluminal disease. The modified 4 contrast defecography opacifying the rectum, vagina, bladder and small bowel is cumbersome, time consuming with poor patient compliance and acceptability.

In our institute, we modified the defecogram to obtain 4 films as lateral shoot through on a radiolucent commode in resting, squeeze, straining and post evacuation. To demonstrate the small bowel in the pelvis, barium contrast medium (40% w/v of barium sulphate suspension) was given 1 hour prior to the evacuation proctogram. A pilot film on the radiolucent commode was taken to assess the bony landmarks and small bowel position. Then, with the patient in left lateral decubitus position, 300 ml of thick barium paste in instilled into the rectum via a rectal tube and an adaptor. When the patient indicates adequate rectal distension, the patient is made to sit on the radiolucent commode again and films are obtained in resting, squeeze and defecating phases. A post evacuation film to assess the final rectal emptying is also useful.



Fig I: patient undergoing conventional defaecography

The drawback of evacuation proctogram is its inability to visualise extraluminal soft tissue and the radiation concern. The radiation dosage in an evacuation proctogram would be about 4 mSv⁵. Nonetheless, it remains a physiological modality of assessing defecation with sensitivity of detecting rectoceles and enterocoeles comparable to MR defecography. Abnormal pelvic descent can be detected and graded by both modalities.

Hence we often combine the 4 film Xray evacuation proctogram with an MRI sequence to detect occult rectocele, enterocoele and intussusceptions in dynamic phase. Also, the extrinsic impression of puborectalis sling is easily visualised on MRI.

MRI

The supine positioning of patient for MR defecogram is perhaps its only drawback. The argument that abnormal pelvic descent may not be demonstrated in supine position is countered by the fact that the straining effort is anyways more effective than gravity and hence the supine position alone would not alter the demonstration of pelvic floor abnormalities as long as the patient strains effectively.

In our institute, a combination of ultrasound jelly with 1 ml gadolinium (gadopentate dimeglumine) is used. MR imaging is performed in supine position with a 1.5 T GE Signa Excite magnet. The rectum is filled with 300ml of contrast agent solution which consists of a suspending agent (ultrasound jelly) admixed with 1 ml of gadolinium. This concentration of contrast causes sufficient T1 shortening to permit visualisation of the rectal lumen and the pelvic floor on T1 weighted gradient echo images. A flexible transmit /

receive radiofrequency coil is strapped around the pelvis. A multiphase dynamic fast T1-weighted spoiled gradient-recalled-echo sequence is performed in the mid sagittal plane of the anal canal, with an image update provided every 2 seconds. Images are obtained with patient at rest, at maximal sphincter contraction, during straining and during defecation. These Images are analysed on an attached workstation in cine loop mode. In addition a routine T2 weighted sequence of the pelvis in coronal plane is also acquired to evaluate the routine pelvic anatomy.

In this technique it is vital to make the patient wear an adult diaper with drapes between the patient and the MRI coil to prevent soiling of the equipment which may also pose an electrical hazard to the patient.

Normally, the pelvic floor is elevated with reduced anorectal angle during squeezing (sphincter contraction). On straining and defecation, the anorectal angle increases (so the rectum and anal canal are almost in a straight line) with mild descent of the anorectal junction and widening and opening of the anal canal.

FIGURES OF MRI PROCTOGRAM



Fig J : MR defecography images at rest, squeeze, straining and defecation.

Grading system of findings at defecograms.

Abnormalities	Small	Moderate	Large
Rectal descent	<3 cm *	3-6 cm*	>6 cm*
Bladder descent	<3 cm *	3-6 cm*	>6 cm*
Enterocoele	<3 cm *	3-6 cm*	>6 cm*
Anterior rectocele	<2cm *	2-4 cm*	>4cm*

- No grading system is used for spastic pelvic floor syndrome.
- Intussusceptions are classified as intrarectal, intra anal or extra anal (prolapse)

Our experience

• Total Xray evacuation proctograms	122
• Normal	46
• Rectocele (anterior)	70
• Enterocoele	05
• Abnormal pelvic descent	46
• Intussusceptions	03
• Total MRI proctograms	12
• Normal	04
• Rectocele	07
• Enterocoele	0
• Intussusceptions	0
• Spastic floor	01

CONCLUSION

The salient features of the above studies is the high incidence of prevalence of rectocele in the patients suffering from ODS. 4 patients of pelvic surgery like hysterectomy had enterocoele, which probably is accentuated, by the low position of bowel loops in pelvis due to postoperative status. The low yield of intussusceptions on Xray defecogram is probably due to lack of dynamic assessment and on the MRI defecogram is probably due to supine position. A larger study group of patients would be necessary before commenting on the role of defecograms in transient intussusceptions. Also the fact that rectoceles is seen in normal population according to some studies⁶ makes it natural to question whether the rectocele is a cause or effect of ODS.

REFERENCES

1. Frohlich B, Hotzinger H, Fritsch H. Tomographical anatomy of the pelvis, pelvic floor and related structures. *Clinical Anatomy* 1997;10:223-230.
2. Kruyt RH, D Elemarre JB, Doornbos J, Vogel HJ. Normal anorectum: dynamic MR imaging. *Radiology* 1991;179:159-163.
3. Preston DM, Thomas BM. Towards a radiologic definition of idiopathic megacolon. *Gastrointestinal Radiol* 1985;10:167-169.
4. Chaussade S, Khyari a. Determination of total and segmental colonic transit time in constipated patients. *Dis colon rectum* 1989;34:1168-1172.
5. Goei R, Kemerink G. Radiation dose in defecography. *Radiology* 1990;176:137-139
6. Shorvon PJ, McHugh S, Diamant NE. Defecography in normal volunteers: results and implications. *Gut* 1989;17:37-49.

DRUG PROFILE

Lubiprostone

Clinical Pharmacology: Lubiprostone is a locally acting chloride channel activator that enhances a chloride-rich, intestinal fluid secretion without altering sodium and potassium concentrations in the serum. **Mechanism of Action:** Lubiprostone acts by specifically activating CIC-2, which is a normal constituent of the apical membrane of the human intestine, in a protein kinase A-independent fashion. By increasing intestinal fluid secretion, Lubiprostone increases motility in the intestine, thereby facilitating the passage of stool and alleviating symptoms associated with chronic idiopathic constipation. **Pharmacokinetics:** Lubiprostone has low systemic availability following oral administration and concentrations of Lubiprostone in plasma are below the level of quantitation (10 pg/ml). **Indications:** (i) *Chronic Idiopathic Constipation:* The recommended dosage of Lubowel is 24 mcg twice daily orally with food and water. (ii) *Irritable Bowel Syndrome with Constipation:* The recommended dosage of Lubowel is 8 mcg twice daily orally with food and water. **Contra-indications:** Patients with known or suspected mechanical gastrointestinal obstruction. **Warnings and Precautions:** Patients taking Lubiprostone may experience nausea. If this occurs, concomitant administration of food with Lubiprostone may reduce symptoms of nausea. Lubiprostone should not be prescribed to patients that have severe diarrhea. Patients should be aware of the possible occurrence of diarrhea during treatment. Patients should be instructed to inform their physician if severe diarrhea occurs. In patients with symptoms suggestive of mechanical gastrointestinal obstruction, the treating physician should perform a thorough evaluation to confirm the absence of such an obstruction prior to initiating therapy with Lubiprostone. **Pregnancy & Lactation :** The safety of Lubiprostone in pregnancy has not been evaluated in humans. Lubiprostone should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus. **Drug Interactions:** Based upon the results of in vitro human microsome studies, there is low likelihood of drug-drug interactions. Based on the available information, no protein binding-mediated drug interactions of clinical significance are anticipated. **Side Effects:** 12% and 11% of patients who received Lubiprostone 24 mcg twice daily develop diarrhea and headache; respectively. Rarely abdominal pain, abdominal distention, flatulence, vomiting, loose stools, abdominal discomfort, dyspepsia, dizziness, edema, fatigue and chest discomfort/pain occur.