The rectum

Surgical anatomy

the rectosigmoid junction lies opposite the sacral promontory

The rectum has three lateral curvatures: the upper and lower are convex to the right, and the middle convex to the left: on the mucosal (lumen) aspect these three curves are marked by semicircular folds (Houston's valves)

The adult rectum is approximately 18—20 cm in length and is divided into three equal parts:

the upper third, which is mobile and has a peritoneal coat except near to the middle third where the peritoneum only covers the anterior and part of the lateral surfaces

The lowest part of the rectum is separated by a fascial condensation — Denonvilliers' fascia — from the prostate in front, and behind by another fascial layer from the coccycx and last two sacral vertebrae. *These fascial layers are surgically important as they are a barrier to malignant penetration, and are valuable guides at operation*

Blood supply

The superior rectal artery is the direct continuation of the inferior mesenteric artery and is the main arterial supply of the rectum

The middle rectal artery arises on each side from the inter-nal iliac artery

The inferior rectal artery arises on each side from the inter-nal pudendal artery

Venous drainage

The superior haemorrhoidal veins draining the upper half of the anal canal above the dentate line pass upwards to become the rectal veins:

these unite to form the *superior rectal vein which later becomes the inferior mesenteric vein. This forms part of the portal venous system, and*

ultimately drains into the splenic vein. Middle rectal veins exist, but are small, unimportant channels unless the normal paths are blocked.

Lymphatic drainage

Superior rectal nodes

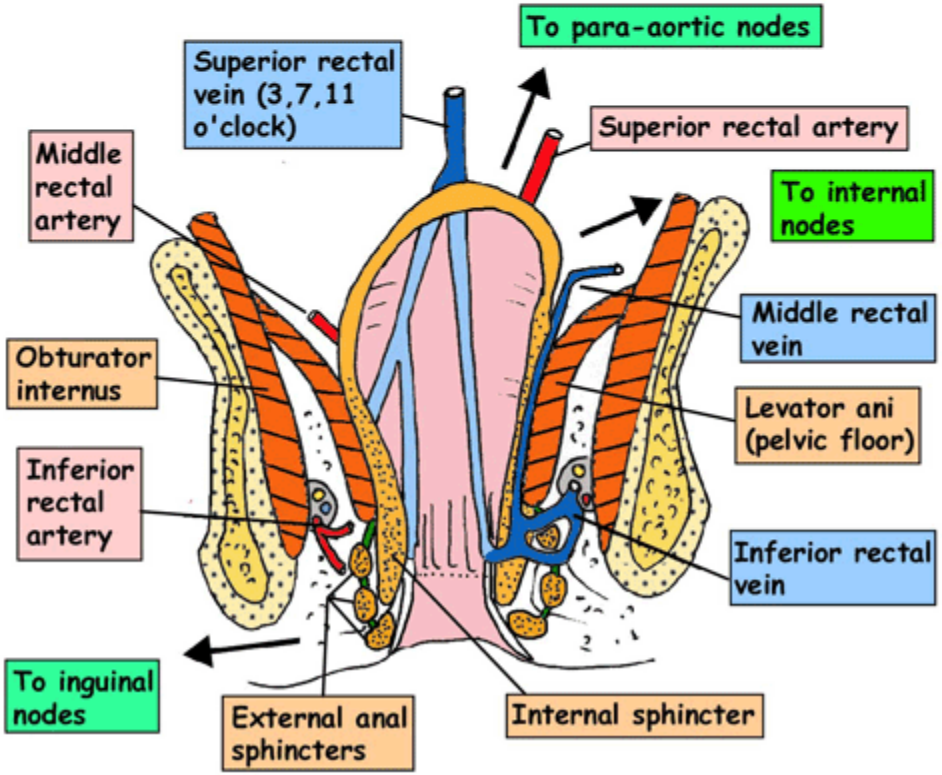
These are an important group of nodes on the back of the rectal ampulla above the levator ani muscle , also known as the pararectal lymph glands of Gerota.

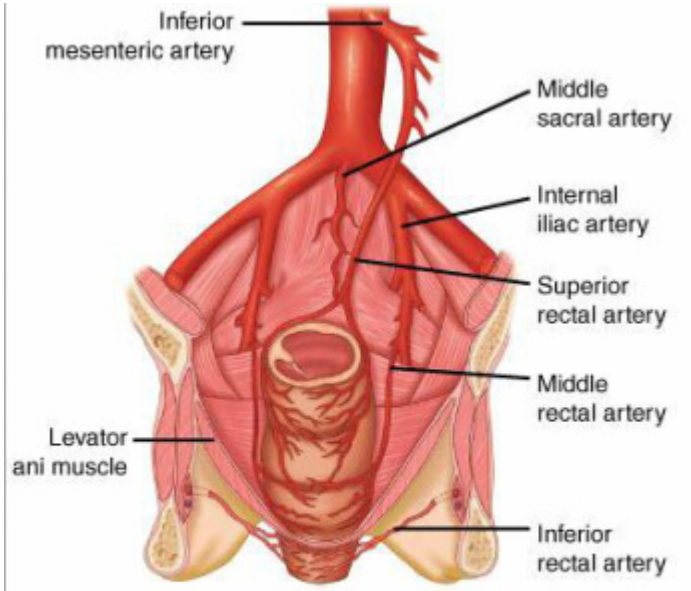
Middle rectal nodes

These lie close to the middle rectal arteries and pass to lymph nodes around the internal arteries. The Japanese have stressed the importance of removing these lymph glands when operating on rectal cancer.

RECTUM - VESSELS/LYMPHATICS

- Blood supply: Superior rectal artery from inferior mesenteric
  Middle rectal artery from internal iliac. May be small
  Inferior rectal artery from internal pudendal
  Median sacral may contribute
  All arteries supply all layers
- Venous drainage: Superior rectal vein to inferior mesenteric which is portal. Middle rectal to internal iliac (systemic)
  Inferior rectal to internal pudendal to internal iliac (systemic)
- Portosystemic anastomosis: In upper anal canal where internal & external venous plexuses meet. Superior rectal vein (portal) meet middle/inferior (systemic)
- Lymphatics: Follow deep veins and arteries (black arrows below)





Arterial supply to the rectum and anal canal.

Clinical features of rectal disease

Symptoms

Bleeding

This demands at least digital examination at any age.

Altered bowel habit

Early morning stool frequency ('spurious diarrhea') is a symptom of rectal carcinoma, while blood stained frequent loose stools characterize

the inflammatory diseases.

Discharge

Mucus and pus are associated with rectal pathology.

Tenesmus

Often described by the patient as 'I feel I want to go but nothing happens'; this is normally an ominous symptom of rectal cancer.

Prolapse

This usually indicates either mucosal (partial) or full thickness (complete) rectal wall descent.

Pruritis

This may be secondary to a rectal discharge.

Loss of weight

This usually indicates serious or advanced disease, e.g. hepatic metastases.

Main symptoms of rectal disease

- Bleeding per rectum
- Altered bowel habit
- Mucus discharge
- Tenesmus
- Prolapse

Signs

Because the rectum is accessible via the anal orifice these can be elicited by systematic examination. The patient is either positioned in the left lateral (Sims) position or examined in the knee-elbow position .

Inspection

Visual examination of the anus precedes rectal examination to exclude the presence of anal disease, e.g. fissure, haemorrhoids or fistula.

Digital examination

The index finger used with gentleness and precision remains the most valuable test for rectal disease . Tumours in the lower and middle thirds of the rectum can be felt and assessed; by asking the patient to strain, even some tumours in the upper third can be tipped' with the finger. After it is removed the finger should be examined for tell-tale traces of mucus, pus or blood. It is always useful to note the normal as well as the abnormal findings on digital examination, e.g. the prostate in the male. Digital findings can he recorded as intraluminal (e.g. blood, pus), intramural (e.g. tumours, granular areas, strictures) or extramural (e.g. enlarged prostate, uterine fibroids).

Proctoscopy

This can be used to inspect the anus, anorectal junction and the lower rectum (up to 10 cm) (. Biopsy can be performed of any suspicious areas.

Sigmoidoscopy

The sigmoidoscope was in the past a rigid stainless steel instrument of variable diameter and was normally 25 cm in length.

This has in the main been replaced by a disposable Perspex instrument which has major advantages when considering transmittable disease. The rectum must be empty for proper inspection with a sigmoidoscope. Gentle-ness and skill are required for its use, and perforations can occur if care is not exercised.

Flexible sigmoidoscope

The ‘flexiscope’ can be used to supplement or replace rigid sigmoidoscopy It requires special skill and experience, and the lower bowel should be cleaned out with preliminary enemas. In addition to the rectum, the whole sigmoid colon is within visual reach of this instrument. The instrument is expensive and requires careful maintenance.

Injuries

The rectum or anal canal may he injured in a number of ways, all uncommon.

- By falling in a sitting posture on to a spiked or blunt pointed object. The up turned leg of a chair, handle of a broom, floor mop, pitch fork or a broken shooting stick have all resulted in rectal impalement.
- By the fetal head during childbirth, especially forceps assisted.

Diagnosis. When there is a history of rectal impalement, the patient asked , 'Has the patient passed urine since the accident?'

The anus having been inspected, the abdomen should be palpated. If rigidity or tenderness is present, early laparatomy is imperative. Prior to the operation, a urethral catheter is passed. If the urine is bloodstained and/ or the quantity recovered is unexpectedly small, it is wise to suspect ruptured bladder or urethra .

Treatment. After the patient has been anaesthetised, the rectum is examined with a finger and a speculum, especial attention being directed

to the anterior wall. A lower laparotomy is then performed. If an intra peritoneal rupture of the rectum is found, the perforation is closed with sutures. Should blood be present beneath the pelvic peritoneum, it is necessary to mobilise the rectosigmoid, which allows the rectum to be drawn upwards, thus permitting the perforation below the pelvic diaphragm to be closed securely. A perforation in the bladder can also be sutured via this avenue. After closing the laparotomy wound, a defunctioning colostomy is constructed in the left iliac fossa. In cases where the bladder has been injured, a self-retaining urethral catheter is placed inposition. If the rectal injury is below the pelvic floor, wide drainage from below is indicated. A ‘protective’ colostomy is advisable. If the defect in the rectum is very large, resection may have to be contemplated. In such circumstances, a Hartmann’s procedure is indicated. Care must he taken to preserve sphincter function during the debridemcnt of the perineal wounds. Antibiotic cover should be provided against both aerobic and anaerobic organism

Foreign bodies in the rectum

The variety of foreign bodies which have found their way into the rectum is hardly less remarkable than the ingenuity displayed in their removal

. A turnip has been delivered *per anus by the use of obstetric forceps. A stick firmly impacted has been withdrawn by inserting a*

into its lower end.

Prolapse

Partial prolapse

The mucous membrane and submucosa of the rectum protrude outside the anus for approximately 1-4 cm. When the prolapsed mucosa is palpated between the finger and thumb, it is evident that it is composed of no more than a double layer of mucous membrane (cf. complete prolapse). There is some confusion as to its exact nature. Some believe that partial rectal prolapse represents the head of a rectal intussusception, and is the early manifestation of a complete rectal prolapse. Others consider that it is a separate entity. The probable truth is that both types exist. The condition occurs most often at the extremes of life — in children between 1 and 3 years of age, and in elderly people.

In infants

The direct downward course of the rectum, due to the as yet undeveloped sacral curve , predisposes to this condition, as does the reduced resting anal tone which offers diminished support to the mucosal lining of the anal canal (Mann).

In children

Partial prolapse often commences after an attack of diarrhea, as a result of severe whooping cough, or from loss of weight and consequent diminution in the amount of fat in the ischiorectal fossae.

In adults

The condition in adults is usually associated with third-degree haemorrhoids. In the female, a torn perineum predisposes to prolapse, and in the male straining from urethral obstruction. In old age, both partial and complete prolapse are associated with atony of the sphincter mechanism but whether this is the cause of the problem or secondary to it is unknown.

Partial prolapse may follow an operation for fistula-in-ano where a large portion of muscle has been divided. Here the prolapse is usually localised to the damaged quadrant and is seldom progressive. Prolapsed mucous membrane is pink; prolapsed internal haemorrhoids are plum coloured and more pedunculated.

Treatment

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In infants and young children

Digital reposition. The parent must be taught to replace the protrusion. The distal two-thirds of the index finger is wrapped in tissue paper.

The finger is inserted into the protrusion and the mass is eased into place. Gently, the finger is withdrawn, leaving the tissue paper to disintegrate. In cases of malnutrition, dietetic adjustments are necessary.

Submucous injections. If digital reposition fails after 6 weeks' trial, injections of *5per cent phenol in almond oil are carried out under general* anaesthesia. As a result of the aseptic inflammation following these injections, the mucous membrane becomes tethered to the muscle coat. **Technique. The submucosa at the apex of the prolapse is injected circularly, so as to form a raised ring, up to 10 ml of the solution being** injected. A similar injection is made at the base of the prolapse. Alternatively, if the prolapse cannot be brought down, the injections are given through a proctoscope.

Thiersch's operation. When the prolapse persists in spite of these measures, Thiersch's operation (below) may succeed. In infants, insertion of the little finger into the anus before the stitch is tied is recommended. In infants and young children, strong chromic catgut should be used for the stitch instead of silver wire: if wire were employed (or any other retained unabsorbable material) as growth proceeded, the stitch would have to be removed or anal stenosis would result. As the procedure is designed only as a *temporary measure in the young, chromic catgut is* adequate for the purpose

In adults

Submucous injections. Submucous injections of phenol in almond oil occasionally are successful in cases of early partial prolapse.

Excision of the prolapsed mucosa. When the prolapse is unilateral the redundant mucosa can be excised after inserting and tying Goodsall's ligature which, after the needles have been cut off, permits the base of the prolapsed mucous membrane to be ligated in three

portions lying in juxtaposition. When necessary, the operation is combined with haemorrhoidectomy, and if the pedicle of one or more of the haemorrhoids is broad, Goodsall's ligature is applied. Alterna-tively, an endoluminal stapling technique can now be used.

Complete prolapse

Complete prolapse (syn. procidentia) is less common than the partial variety. The protrusion consists of all layers of the rectal wall and is a

descending of the rec-tum downwards through the levator ani. As the rectum descends, it intussuscepts upon itself. The process starts with the anterior wall of the rectum where the supporting tissues are weakest, especially in women. It is more than 4 cm and

commonly as much as 10—15 cm in length. On palpation between the finger and the thumb, the prolapse feels much thicker than a partial

prolapse, and obviously consists of a double thickness of the entire wall of the rectum

Treatment

Surgery is required and the operation can be performed via the perineal or the abdominal approaches. Whenever possible, an abdominal rectopexy is recommended, but when the patient is elderly and very frail, or is suffering from injury or disease of the spinal cord, or in very early life, a perineal operation is indicated

Perineal approach. Two procedures have been used most commonly.

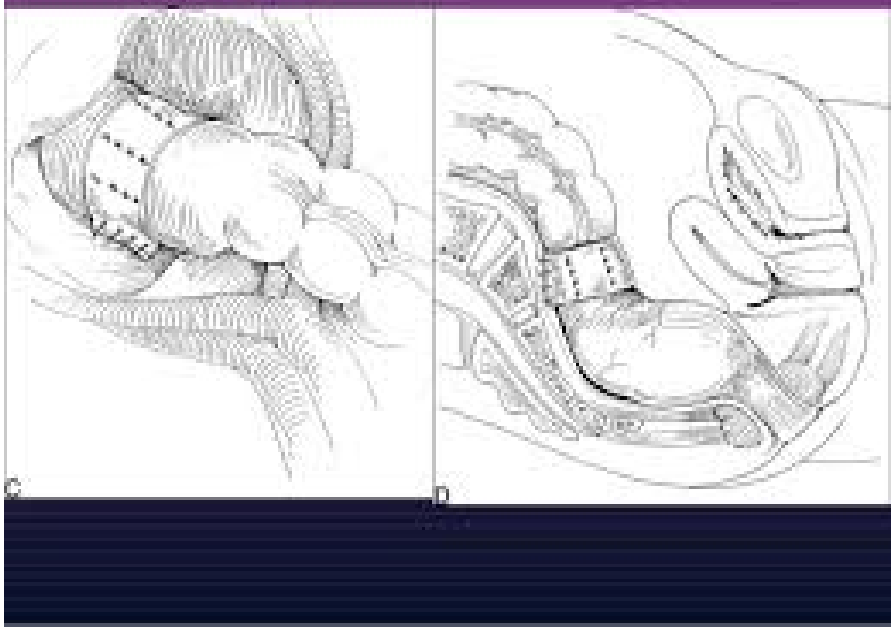
Thiersch's operation.Delorme's operation

Abdominal approach. The principle of all abdominal operations for rectal prolapse is to replace and hold the rectum in its proper position.

Ripstein's operation

Wells' operation

Ripstein Procedure



Delorme Procedure