
Carcinoma Associated with Fistula-in-ano
- MC type of carcinoma to arise in fistula-in-ano: Colloid carcinoma (44%) > Squamous cell carcinoma (34%) > Adenocarcinoma (22%)
- Clue to early diagnosis is the appearance of mucin globules in Fistulotomy or fistulectomy specimens

71. Ans. d, Intersphincteric is the most common type
72. Ans. d. Fistulotomy
73. Ans. c. Anorectal ring
74. Ans. b. MRI

ANAL FISSURE


Anal Fissure (Fissure-in-ANO)
- An anal fissure is a longitudinal split in the anoderm, extending from the anal verge to the dentate line.
- MC site: Mid-line posteriorly.
- MC symptom: Pain.

Etiology
- Trauma caused by the strained evacuation of a hard stool or from the repeated passage of diarrhea.
- Anterior anal fissure: More common in women, arise following vaginal delivery.

Clinical features
- Acute fissure: Characterized by severe anal pain associated with defecation with passage of fresh blood, normally noticed on the tissue after wiping.
  - Chronic fissures: Characterized by a hypertrophied anal papilla + Sentinel tag + Deep canoe shaped ulcer
- Mostly seen in young adults, men and women are affected equally.

Treatment
- Conservative initially, consisting of sitz bath (in a basin containing warm antiseptic lotion), stool-bulking agents and softeners, nitrates and calcium channel blockers to relax the anal sphincter and improve blood flow.
- Surgery if above fails, consisting of lateral internal sphincterotomy or anal advancement flap.
Diagnosis
- External opening is found at the bottom of a depressed area or with granulation tissue or it is seen discharging pus.
- Internal opening may be felt on digital examination as indurated area or sometimes can be seen with proctoscopy or after sigmoidoscopy.
- The entire track may be palpable as indurated cord like structure.
- Endorectal ultrasonography and MRI seem to identify internal openings and fistula. However, they can be selectively used in deserving cases.
- Examination under general or regional anaesthesia.

TREATMENT (Figs 31.75 to 31.80)

I. Fistulotomy
It is indicated in low fistula. (internal opening below the anorectal bundle). A probe is passed through the external opening into the rectum and along the length of this tract the fistula is laid open. It is done under anaesthesia. The wound is left open and allowed to heal by granulation tissue developing from the floor of the fistula (marsupialisation).

Intersphincteric and low trans-sphincteric fistulas of recent origin are treated by fistulotomy and marsupialisation.

Advantages
- Least chances of recurrence
- Relatively easy procedure
- Minor degree of incontinence.

II. Fistulectomy
All chronic fistulae (low) are treated by fistulectomy by excising the entire fibrous tissues and tract. Here also, the wound is kept open. This can also be done for posterior semi horseshoe and horseshoe fistula. Some incontinence can occur.

III. Fistulectomy with or without colostomy
It is indicated in high fistula in ano. The internal opening is situated above the anorectal bundle. Hence, during fistulectomy, there is a chance of injury to the anorectal bundle and may cause incontinence. Temporary or permanent colostomy may be necessary. If there is a cause, treat the cause. Surgery of intersphincteric fistula and trans-sphincteric fistula may result in incontinence.

IV. Use of seton or medicated thread (Ksharsutra)
Ksharsutra is an ayurvedic term. It is a medicated thread passed through the entire tract and both ends are tied and tightened once a week so that by 6 weeks it cuts through (Key Box 31.20).

Fig. 31.76: Fistula—rectovaginal fistula
Fig. 31.77: Low fistula in ano
Fig. 31.78: Fistulectomy by passing a fistula probe

Fig. 31.75: Multiple recurrent fistula in ano—biopsy reported as tuberculosis
**SETON**

- It is a Latin word. Seton means bristle—material such as thread, wire, or gauze that is passed through subcutaneous tissues.
- Varieties of materials used as setons—plastic tubes, infant feeding tubes, proline suture material, medicated thread used in Ayurvedic method—Ksharasutra. Ksharasutra is a sanskrit phrase in which Kshar refers to anything that is corrosive or caustic; while sutra means a thread.
- Cutting tight setons: Used in complicated high fistulae wherein a fistulotomy may result in anal incontinence. So, seton is tied, patient will tighten it everyday for a period of 8–12 weeks till it comes down. Once it comes down, seton is removed. This will decrease the chances of incontinence.
- Main advantage of seton is it eliminates sepsis by keeping the track open.
- Disadvantage is that patient will always feel a foreign body sensation in the rectum and anal canal.

See Key Box 31.21 for recent advances in fistula surgery.
See Ten commandments for fistula in ano.

**FISSURE IN ANO**

**Definition**

Longitudinal tear in the lower end of anal canal results in fissure in ano. It is the most painful condition affecting the anal region. Commonly seen in young patients.
Rectum and Anal Canal

and lack of support to anal mucous membrane. Acute fissure in females may occur after vaginal delivery.

PEARLS OF WISDOM
Fissure away from midline should raise the possibility of Crohn’s disease, sexually transmitted diseases, etc.

VARIOUS FACTORS WHICH PRECIPITATE ANAL FISSURE
- Faeces—hard
- Ischaemia
- Surgical procedures—haemorrhoidectomy
- Sphincter hypertonia
- Underlying diseases—Crohn’s, sexually transmitted disease, etc.
- Repeated childbirth
- Enthusiastic usage of ointments and abuse of laxatives

Remember as FISSURE

Clinical features
- Severe pain during and after defaecation, burning in nature, lasting for about ½ to 1 hour because of which defaecation is postponed.
- Severe constipation is present.
- Stools are hard, pellet like and there is a drop of blood or streaks of fresh blood.

PEARLS OF WISDOM
Drop of blood is due to anal fissure. Splash of blood is due to haemorrhoids, bloody slime is due to carcinoma.

Sentinel pile refers to tag of skin at the outer end of the fissure.
- In some cases, fissure may be associated with a small perianal abscess resulting in worsening of pain.

Diagnosis (Table 31.5)
1. When the buttocks are spread apart, a longitudinal tear and a hypertrophied, thickened skin is seen near the lower end of fissure—sentinel pile.
2. Per rectal examination can be done (with lignocaine jelly application) and sphincter spasm can be appreciated.
3. Proctoscopy is contraindicated because the condition is very painful.

Treatment (Table 31.6) I. Conservative
- Avoid constipation—encourage fibre diet, mild laxatives and not to postpone defecation.
- Surface anaesthetic creams: Lignocaine jelly.
- Metronidazole and antibiotics
- Sitz bath

Table 31.5: Difference between acute fissure in ano and chronic fissure in ano

<table>
<thead>
<tr>
<th>Acute</th>
<th>Chronic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sudden onset—example after vaginal delivery or following hard stools</td>
<td>Slight pain in the anal canal, burning after defaecation with bleeding</td>
</tr>
<tr>
<td>Acute pain in the anal canal, severe burning after defaecation with bleeding</td>
<td>Itching is usually present due to ulcer or hypertrophied skin—sentinel pile</td>
</tr>
<tr>
<td>No itching around anal opening</td>
<td>Sphincter spasm, chronic canno shaped ulcer in the lower anal canal</td>
</tr>
<tr>
<td>Severe sphincter spasm, small crack in the lower anal canal</td>
<td>Sentinel pile—tag of skin</td>
</tr>
<tr>
<td>No sentinel pile—tag of skin</td>
<td>PR—painful</td>
</tr>
<tr>
<td>PR—very painful</td>
<td>Proctoscope—can be done with proper lignocaine jelly application to the anal canal</td>
</tr>
<tr>
<td>Proctoscopes—better not try insertion</td>
<td>Responds to conservative treatment but effect is temporary surgery is the treatment of choice</td>
</tr>
<tr>
<td>Usually responds to conservative treatment—local application of glyceryl trinitrate (GTN) 0.2% 3–4 times a day or diltiazem 24% twice a day</td>
<td>Lateral sphincterotomy or other procedures may be required</td>
</tr>
</tbody>
</table>

Emergency sphincterotomy may be required in a few patients.
**Table 31.6** Treatment of chronic fissure in ano

<table>
<thead>
<tr>
<th>Pharmacological agents</th>
<th>Injection botulinum A toxin</th>
<th>Lateral sphincterotomy/flaps</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2% glyceryl trinitrate ointment for local application</td>
<td>Healing rate is 80% in chronic anal fissures</td>
<td>Gold standard</td>
</tr>
<tr>
<td>Headache is a complication</td>
<td>6% recurrence in 6 months</td>
<td>Manometry of anal sphincter can be done before procedure especially in women because 30-40% of patients develop incontinence following lateral sphincterotomy</td>
</tr>
<tr>
<td>Still it is a popular treatment because it is simple</td>
<td>Simple injection, simple method, smooth recovery—chances of sepsis are present</td>
<td>Advancement flap</td>
</tr>
<tr>
<td>Drug releases NO (nitric oxide) at a cellular level and mediates relaxation of internal sphincter</td>
<td></td>
<td>Women—postpartum fissure—poor anal tone</td>
</tr>
<tr>
<td>Oral nifedipine 20 mg, twice daily. Topical nifedipine also helps</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Agents which decrease sphincter pressure**

Glyceryl trinitrate (0.2%) topical application: Significant headache and 50% recurrence are drawbacks. It reduces spasm, increases vascular perfusion.

**Purified botulinum toxin injection into internal sphincter:** It inhibits presynaptic release of acetylcholine from cholinergic nerve endings and cause temporary paresis of striated muscle. Cost, perianal thrombosis and sepsis are drawbacks. Injection produces **prolonged but reversible** effects, thus avoiding **permanent injury** (Key Box 31.23).

Calcium channel blockers: Nifedipine, diltiazem oral and topical applications (2%) also have been used.

**Key Box 31.23**

**ROLE OF BOTULINUM TOXIN INJECTION**

- Achalasia cardia and other oesophageal motility disorders.
- Anal fissures
- Sphincter of Oddi dysfunction
- Frey syndrome

**III. Surgical treatment**

1. Lateral anal sphincterotomy of Notaras (or dorsal) is the best alternative procedure. Here internal sphincter is divided away from fissure either in right or left lateral positions. The procedure can be easily done by using a bivalved speculum in the anal canal. This is the procedure of choice. Sphincterotomy should be limited to the length of fissure to avoid incontinence.

2. Fissurectomy and local advancement flap: This is indicated in persistent, chronic, nonhealing fissure. After excision of the fissure, the resultant defect in the anal canal is closed by a small (rhomboid) advancement flap. This should be considered not as a first line of treatment. Recovery from this operation takes much more time than other treatments for anal fissures.

3. Lord’s dilatation: It is also called blunt sphincterotomy—few fibres of internal sphincter are divided. It relieves the spasm and the fissure heals. Rarely, in female patients it may result in incontinence. It is not a recommended treatment nowadays.

**PEARLS OF WISDOM**

Lateral sphincterotomy is very popular and gives good results.

**PILONIDAL SINUS (JEEP-BOTTOM)**

Pilonidal sinus means nest of hairs in Greek. Also called jeep-bottom because it was very common in jeep drivers

- More common in dark people than fair people
- It is an acquired condition, commonly found in hairy males
- It is acquired due to following reasons
  - Appears between the age of 20 and 30 years
  - Hairy men are more affected
  - The hair follicle is never demonstrated in the wall of the pilonidal sinus but hair is the content of pilonidal sinus.
  - Hair accumulates due to vibration and friction causing shedding of the hair. Thus, it accumulates in the gluteal cleft and enters the opening of the sweat glands.
  - Pointed end of the dead hair is inside (blind end of the sinus).

**Differential features**

- Fissure opening of the sinus seen just above the anal verge, in the midline over the coccyx (Key Box 31.24).
- History of discharge of pus
- History of recurrent abscesses which rupture, discharge pus
- Can be asymptomatic

**Diagnosis**

Congenital sinus of the coccyx is the only differential diagnosis for pilonidal sinus. Hence, X-ray of the coccyx should be taken.

**Treatment** (Figs 31.82 to 31.85)

- Inject methylene blue to demonstrate branches of the sinus followed by excision of the sinus. The patient is positioned prone with buttocks elevated (Jack knife position).
Treatment of Anal Fissure

- Chemical sphincterotomy: Nitroglycerine (0.2%\(^9\)) or diltiazem (2\(^%\)) for relaxation of anal sphincter.
- Lord’s procedure: Dilatation of sphincter under GA, not practiced due to high rate of incontinence\(^6\).
- Notara’s lateral sphincterotomy: Surgical procedure of choice for anal fissure\(^8\).
- Anal advancement flap: An inverted house-shaped flap of perianal skin is carefully mobilized on its blood supply and advanced without tension to cover the fissure, and then sutured with interrupted absorbable sutures.

Atypical Fissures
- A fissure sited elsewhere around the anal circumference or with atypical features should raise the suspicion of a specific etiology\(^6\).
- Early examination under anesthesia, with biopsy and culture to exclude:
  - Crohn’s disease, tuberculosis\(^8\),
  - STD (syphilis, Chlamydia, chancroid, lymphogranuloma venereum, HSV, CMV, Kaposi’s sarcoma, B-cell lymphoma).
  - HIV-related ulcers\(^8\),
  - Squamous cell carcinoma\(^8\).

PILONIDAL SINUS


Recurrence is common, even though adequate excision of the track is carried out.

Pilonidal Sinus

- Acquired disease, seen in hairy males\(^9\).
- Seen in age group of 20-29 years.
- Found at the pilonidal sinus opening the coccyx\(^8\).
- Consisting of noninfected, midline openings communicating with a fibrous track lined by granulation tissue and containing hair lying loosely within the lumen.
- Common among military personnel, also known as ‘jeep disease’\(^8\).

Etiopathogenesis
- Hair follicles have almost never been demonstrated in the walls of the sinus.
- Hairs projecting from the sinus are dead hairs, with their pointed ends directed towards the blind end of the sinus.
- Recurrence is common, even though adequate excision of the track is carried out\(^8\).
- It is thought that the combination of buttock friction and shearing forces in that area allows shed hair or broken hairs to drill through the midline skin, or that infection in relation to a hair follicle allows hair to enter the skin by the suction created by movement of the buttocks, so creating a subcutaneous, chronically infected, midline track\(^8\).
- From this primary sinus, secondary tracks may spread laterally, which may emerge at the skin as granulation tissue-lined, discharging openings\(^8\).
Clinical Features
- Characteristically seen in dark-haired individuals rather than those with softer blond hair.
- Patients complain of intermittent pain, swelling, and discharge at the base of the spine.
- History of repeated abscesses that have burst spontaneously or which have been incised, usually away from the midline.
- Primary sinus may have one or many openings, all of which are strictly in the midline between the level of sacrococcygeal joint and tip of coccyx.
- Interdigital pilonidal sinus is an occupational disease of hairdressers.
- Also seen in axilla and umbilicus.

Treatment
- Conservative treatment: For minor symptoms, simple cleaning out of the tracks and removal of all hair, with regular shaving of the area and strict hygiene, may be recommended.
- Treatment of an acute exacerbation (abscess): Abscess drainage with thorough curettage of granulation tissue and hair.

Surgical Treatment of Chronic Pilonidal Disease
- Laying open of all tracks with or without marsupialisation.
- Excision of all tracks with or without primary closure.
- Excision of all tracks and closure by Limberg’s flap, Karydakis procedure.
- Bassini’s procedure: Incision lateral to the midline to gain access to the sinus cavity, which is rid of hair and granulation tissue and excision and closure of the midline pits. The lateral wound is left open.

86. Ans. d. Treatment of choice is surgical excision of sinus tract.
88. Ans. a. Seen predominantly in women.

CARCINOMA ANAL CANAL

89. Ans. b. Chemoradiation (Ref: Sabiston 19/e p1405-1407; Schottenz 9/e p1053; Bailey 2/e p1276-1267, 25/e p1267-1269 Schackelford 7/e p2166-2170)

- MC type of CA anal canal: SCC>BCC>Melanoma.
- Median age at diagnosis: 60 years.
- MC symptom: Bleeding FR.
- MC site of metastasis: Lung.
- MC site of LN metastasis: Inguinal LN.

Risk Factors for Carcinoma Anal Canal
- HPV infection (16, 18, 31, 33).
- HIV of immunosuppression.
- Smoking.
- Anal receptive intercourse.
- Sexual promiscuity.
- Chronic inflammation.
- Anal intra-epithelial neoplasia.
- History of vulvar or cervical cancer.

Clinical Features
- Most patients present with rectal bleeding and pain.
- Patients are frequently misdiagnosed as having a benign anorectal condition such as hemorrhoids.
- Additional symptoms: Incontinence, change in bowel habits, pelvic pain, and rectovaginal or rectovesical fistulas are ominous.
- Suggest advanced malignancy with infiltration into the sphincters or penetration into the rectal wall.

Diagnosis
- Proctoscopy with biopsy; Investigation of choice for diagnosis of CA anal canal.
- CT abdomen and pelvis: Mandatory because all of the draining lymph nodes are not palpable.
- CT scan: Evaluate distant metastasis.
**Treatment**
- Nigro regimen: Chemoradiation is the treatment of choice.
- More than 80% are cured by chemoradiation. If any residual tumor is left behind after chemoradiation, APR is performed.
- Chemotherapy regimen: 5-FU + Mitomycin C/Cisplatin.
- First chemotherapy is given followed by radiotherapy.

**Prognosis**
- Overall 5-year survival: 66%

| 7th AJCC: TNM Classification of Carcinoma of the Anal Canal and Anal Margin |
|---|---|---|---|
| **Tis:** Carcinoma in situ (Bowen disease, high-grade squamous intraepithelial lesions (HSIL), anal intraepithelial neoplasia II-III (AIN II-III)) | **Anal Canal** |
| **T1:** Tumor ≤ 2 cm in greatest dimension | **N1:** Metastases to perirectal LN(s) |
| **T2:** >2 cm but ≤ 5 cm in greatest dimension | **N2:** Metastases to unilateral internal iliac and/or inguinal LN(s) |
| **T3:** >5 cm in greatest dimension | **N3:** Metastases to perirectal and inguinal LN(s) and/or bilateral internal iliac and/or bilateral inguinal LN(s) |
| **T4 (Anal Canal):** Invading adjacent structures: vagina, urethra, or bladder (involvement of the sphincter muscle alone, rectal wall, or perirectal subcutaneous tissue or skin is not classified as T4) | **N4:** Metastases to ipsilateral inguinal LN(s) |
| **T4 (Anal Margin):** Invading deep extradermal structure: skeletal muscle or bone | **M1:** Distant metastasis |

**Staging**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Tis</th>
<th>T1 N0 M0</th>
<th>T1 N1 M0</th>
<th>T2 N0 M0</th>
<th>T2 N1 M0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage I</td>
<td>Tis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage II</td>
<td>T1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage IIIA</td>
<td>T2 N0 M0</td>
<td>T1 N1 M0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage IIIB</td>
<td>T4 N1 M0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anal Margin</td>
<td>Any T N2,3 M0</td>
<td>Any T N2,3 M0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage III</td>
<td>T4 N0 M0</td>
<td>T1 N1 M0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage IV</td>
<td>Any T Any N M1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Ans. a. Radiotherapy + chemotherapy, d. Radical surgery** (Ref: Sabiston 19/e p1402-1405; Schwartz 9/e p1053; Bailey 26/e p1268-1267, 25/e p1267-1269; Shackelford 7/e p2173)

**Anal Margin Tumors**
- These tumors arise on the perianal skin beyond the anal verge.
- Squamous cell carcinoma of the anal margin is treated by primary surgical excision similarly to skin cancers.
- Metastases are late and rare, and recurrences are typically locoregional.
- Symptoms include pain, bleeding, itching, and palpable mass.
- Diagnosis is often suspected by the experienced clinician on inspection, but biopsy prior to definitive treatment is imperative.
- Small lesion: Wide-local excision
- Large lesion or sphincter involvement: Chemoradiation
91. Ans. b. Recurrence

92. Ans. a. HPV (Ref: Sabiston 19/e p1402; Schwartz 9/e p1053; Bailey 26/e p1263-1264, 25/e p1266-1267; Schackelford 7/e p2172)

    ANAL WARTS OR CONDYLOMATA ACCUMINATA
    - HPV forms the etiological basis of: Anal and perianal warts, AIN, and SCC of the anus.  
    - Subtypes (16, 18, 31, 33) are associated with a greater risk of progression to dysplasia and malignancy.  
    - Condylomata acuminate is the MC STD encountered by colorectal surgeons.  
    - Most frequently observed in homosexual men.

    Clinical Presentation
    - Many are asymptomatic but pruritus, discharge, bleeding and pain are usual presenting complaints.  
    - Rarely, relentless growth results in giant condylomata (Buschke- Löwenstein tumour), which may obliterate the anal orifice.  
    - Diagnosis is confirmed by biopsy.

    Treatment
    - Application of 25% podophyllin.
    - Surgical excision.
    - Recurrence is common.

93. Ans. c. HPV 6, 11, 16, 18 (Ref: Maingot 11/e p732)

    HPV VACCINES
    - Gardisill is a recombinant vaccine against HPV types 6, 11, 16, 18.
    - It is currently approved for use in females age 9-26 years of age and requires a series of three injections over a 6 month period.
    - Nearly 100% prevention rate in genital warts, and vulvar, vaginal, and cervical precancerous lesions caused by the serotypes against which the vaccine is directed.
    - Vaccine is only effective in patients not previously exposed to the viruses included in the vaccine, and it confers no protection against viruses not covered by the vaccine.

94. Ans. a. Chemoradiation

95. Ans. a. Squamous cell carcinoma

96. Ans. b. Epidermoid

    EPIDERMAL CARCINOMA OF ANUS
    - Epidermoid carcinoma of the anus includes SCC, cloacogenic carcinoma, transitional carcinoma and basaloid carcinoma.
    - The clinical behavior and natural history of these tumors are similar.

97. Ans. a. Cisplatin based chemotherapy followed by radical radiotherapy

98. Ans. d. All of the above

99. Ans. c. Combined chemotherapy and radiotherapy

100. Ans. c. Chemoradiation

101. Ans. a. 2 cm

102. Ans. a. SCC

PAGET’S DISEASE OF ANAL CANAL

103. Ans. c. Intra-epithelial adenocarcinoma (Ref: Sabiston 19/e p1405; Bailey 26/e p590, 25/e p1269; Schackelford 7/e p2174-2175; Maingot 11/e p743-744)
NO EFFECT ON PROGNOSIS

- No effect on Prognosis: Tumor size and duration of symptoms
- Tumor size and configuration (endophytic, exophytic, annular) do not carry any prognostic significance in colorectal carcinoma.

29. Ans. b. Anterior resection
30. Ans. a. Surgical resection only Dukes A stage rectal carcinoma is confined to bowel wall, best treated by surgical resection.
31. Ans. c. Signet ring carcinoma
32. Ans. b. Barium enema
33. Ans. c. Hartmann’s operation
34. Ans. c. Preserving the anal sphincter
35. Ans. d. Cancer is less than 5 cm from anorectal margin
36. Ans. a. 2 cm

HEMORRHOIDS

37. Ans. c. Third degree- no surgery (Ref: Sabiston 18/e p1387-1391; Schwartz 9/e p1057-1060; Bailey 24/e p1230-1237, 25/e p1233-1259; Schackery 7/e p1896-1900)

Surgery can be done for 3rd degree not controlled by other measures.

- Recent theories regard hemorrhoids as normal anatomical structures.
- These are cushions of submucosal tissue containing venules, arterioles, smooth muscle fibres and elastic connective tissue.
- Three hemorrhoidal cushions are found in the left lateral, right anterior and right posterior position (3, 7 and 11 O’Clock)
- Hemorrhoids or piles are symptomatic anal cushions

- More common when intra-abdominal pressure is raised, e.g., in obesity, constipation and pregnancy.
- Symptoms: bright-red, painless bleeding, mucous discharge and prolabation
- Hemorrhoids cannot be palpated, best diagnosed by proctoscopy.

<table>
<thead>
<tr>
<th>Internal Hemorrhoids</th>
<th>External Hemorrhoids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Located distal to the dentate line</td>
<td>Located proximal to the dentate line</td>
</tr>
<tr>
<td>Painless, can be ligated</td>
<td>Painful, not ligated</td>
</tr>
<tr>
<td>Bonding is preferred</td>
<td>Excision is done</td>
</tr>
</tbody>
</table>

Repetitive thrombosis leads to semi-ripe black current appearance

Classification of Internal hemorrhoids

1st degree Painless bleeding, no prolapse
2nd degree Prolapse through the anus, on straining but reduce spontaneously
3rd degree Prolapse through the anal canal and require manual reduction
4th degree Permanently prolapsed and cannot be manually reduced

Treatment
- More presence of hemorrhoids is not necessarily an indication of treatment.
- Treatment is only indicated if they are symptomatic. Best treatment is the least invasive one which is possible to alleviate the symptoms.

<table>
<thead>
<tr>
<th>Treatment of hemorrhoids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical therapy</td>
</tr>
<tr>
<td>- Bleeding from 1st and 2nd degree hemorrhoids often improve with the addition of dietary fibre, stool softeners and other diet regulation.</td>
</tr>
<tr>
<td>Rubber band ligation</td>
</tr>
<tr>
<td>- Done for 1st, 2nd and selected 3rd degree hemorrhoids</td>
</tr>
<tr>
<td>Infrared Photoscoagulation</td>
</tr>
<tr>
<td>- Done for 1st and 2nd degree hemorrhoids</td>
</tr>
</tbody>
</table>
Surgery Essence

| Scleotherapy | Done for 1st, 2nd and selected 3rd degree hemorrhoids<sup>9</sup>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Most commonly used sclerosant is 5% phenol in almond or arachis oil.</td>
</tr>
</tbody>
</table>
| Operative hemorrhoidectomy | 3rd and 4th degree hemorrhoid<sup>9</sup>
|                          | 2nd degree not cured by non-operative methods<sup>9</sup>
|                          | Mixed (combine internal/external hemorrhoids)<sup>9</sup>
|                          | Fibroed hemorrhoids                                                               |

Operative Hemorrhoidectomy

- Milligan-Morgan open hemorrhoidectomy<sup>9</sup>
- Ferguson closed hemorrhoidectomy<sup>9</sup>
- Whitefield submucosal hemorrhoidectomy<sup>9</sup>
- Longo's stapler hemorrhoidectomy<sup>9</sup>

38. Ans. c. III degree
39. Ans. b. Can be palpated on DRE in absence of complications
   - Hemorrhoids cannot be palpated, best diagnosed by proctoscopy<sup>9</sup>
40. Ans. a. Band ligation, b. 5% phenol in almond oil is used as sclerosant, c. May be resolved by diet modification, d. Hemorrhoidectomy is TOC
41. Ans. a. Painful
42. Ans. b. Internal hemorrhoids

Complications of Hemorrhoidectomy

<table>
<thead>
<tr>
<th>Early complications</th>
<th>Late complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain (MC) &lt;sup&gt;9&lt;/sup&gt;</td>
<td>Secondary hemorrhage</td>
</tr>
<tr>
<td>Acute retention of urine (2&lt;sup&gt;nd&lt;/sup&gt; MC)</td>
<td>Anal stricture</td>
</tr>
<tr>
<td>Reactionary hemorrhage</td>
<td>Anal fissure &lt;sup&gt;9&lt;/sup&gt;</td>
</tr>
<tr>
<td>Incontinence</td>
<td></td>
</tr>
</tbody>
</table>

44. Ans. c. Banding
45. Ans. a. Surgery, b. Sclerotherapy
46. Ans. a. Sclerotherapy
47. Ans. c. Thrombosed external hemorrhoids
48. Ans. a. They are arteriolar dilatations
49. Ans. a. Excisional surgery is cornerstone (Ref: Bailey 26/e p1252, 25/e p1256)
   Mere presence of hemorrhoids is not necessarily an indication of treatment. Treatment is only indicated if they are symptomatic. Best treatment is the least invasive one which is possible to alleviate the symptoms.
50. Ans. a. Pain (Ref: Bailey 24/e p1259)

Most important disadvantage of cryosurgery for hemorrhoid is pain.

**Cryosurgery**

- The extreme cold (<-190°C) of liquid nitrogen application causes coagulation necrosis of the piles, which subsequently separated and dropped off.

- Cryosurgery for hemorrhoids cause:
  - Pain<sup>9</sup>
  - Mucous discharge<sup>9</sup> (Not the watery discharge)

51. Ans. c. Internal hemorrhoids bleed profusely and painless
HAEMORRHOID (PILES)

**Definition**
Dilated plexus of superior haemorrhoidal veins, in relation to anal canal.

**Classification—aetiological**

I. Primary/Idiopathic haemorrhoids

1. **Standing posture:** It has been told nicely that varicosity is the penalty for verticality against gravity. It is also true for haemorrhoids. It is true that animals do not develop haemorrhoids.

   Thus man’s upright posture and absence of valve in the portal system with other factors precipitate development of haemorrhoids.

2. **Haemorrhoidal veins** and their branches are the thin veins which pass through submucosa of the rectum. They get compressed due to contractions caused by rectal musculature (the sphincters) during the act of defaecation.

3. **Genetic/familial factors:** Absence of valves, or congenital weakness of the vessel wall are few other factors contributing for the haemorrhoids.

4. **Diet:** A diet deficient in fibres which prolongs the gut transit results in constipation and small hard pellet like stools. The hard stools compress veins and result in haemorrhoids.

II. Secondary haemorrhoids

**Causes**

1. **Carcinoma of rectum,** by blocking the veins, can produce back pressure and can manifest as piles.

2. **Portal hypertension**—uncommon cause of rectal varices.

3. **Pregnancy,** due to compression on superior rectal veins or due to progesterone which relaxes smooth muscle in the wall of the veins, can cause haemorrhoids.

**Current view:** Latest theory is that haemorrhoids occur due to caudal displacement of anal cushions. It is due to recurrent trauma, shearing forces, loss of elasticity. Thus normally the cushions retract after defaecation.

**Location**

Classically situated in the 3, 7, 11 o’clock positions (Fig. 31.51).

Superior haemorrhoidal artery (vein) gives 2 branches on right side and 1 branch on left side. Hence, piles are two on right side and one on left side.

**Clinical features** (Table 31.4)

- **Rashness bleeding**—fresh bleeding occurs after defaecation.
- **Splash in the pan.** This causes chronic anaemia. Haemorrhoids which bleed are called Grade I haemorrhoids.

**The capillaries of the lamina propria are only protected by a single layer of epithelial cells. Hence, minor trauma precipitates bleeding.**

<table>
<thead>
<tr>
<th>Grades features</th>
<th>Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Never prolapse</td>
<td>Bleeding per rectum</td>
</tr>
<tr>
<td>II. Prolapse on defaecation</td>
<td>Something coming down and going back</td>
</tr>
<tr>
<td>III. Prolapse on defaecation requires manual reduction</td>
<td>Something coming down, bleeding, mucus discharge, pruritus</td>
</tr>
<tr>
<td>IV. Permanent prolapse</td>
<td>Acute pain, throbbing discomfort</td>
</tr>
</tbody>
</table>

![Fig. 31.51: Classical location of pile masses](image)

---

**III. Depending upon the location of haemorrhoids**

1. **Internal haemorrhoids**—above the dentate line, covered with mucous membrane.
2. **External haemorrhoids**—at anal verge, covered with skin (Fig. 31.54).
3. **Internal-external**—both varieties together.

**Investigations**

- **Per rectal examination is done mainly to rule out carcinoma rectum or other causes of bleeding per rectum. Haemorrhoids cannot be felt by rectal examination unless they are thrombosed or fibrosed.**
- **Proctoscopy:** As the obturator is removed, piles prolapse into the lumen of proctoscope as cherry red masses.
Sigmoidoscopy and proctoscopy are done to rule out proximal cancer.

Complications of haemorrhoids (Figs 31.55 to 31.57)

1. It can cause chronic anaemia. Rarely, massive bleeding can occur because of portal hypertension.
2. Prolapse outside presents with severe pain in the perianal region—piles gripped by internal sphincter results in venous congestion and oedema followed by strangulation. Such patients are treated by:
   - Elevation of foot end of bed
   - Metronidazole 400 mg, 3 times a day for 5 days
   - Saline dressings to reduce oedema
   - Local lignocaine 1% application
   - Ulceration and secondary infection
   - Thrombosis and fibrosis

Fig. 31.57: Complications of piles
TREATMENT OF HAEMORRHOIDS

A. Nonoperative treatment: It is indicated in Grade I and Grade II piles which are not causing significant bleeding or discomfort (Key Box 31.13).

> KEY BOX 31.13

**NONOPERATIVE TREATMENT**
- Fibre supplementation
- Increased fluid intake
- Bulk purgative—laxatives—ispaghul husk, etc.
- Encourage to lose weight
  
  Remember as FIBRE

B. Injection of sclerosant: 5% phenol in almond oil is injected into submucosa above the dentate line. Hence, it is painless. It produces aseptic thrombosis of pile mass and is indicated in Grade I. The injection is perivascular.

C. Barron's band application: It is indicated for grade II and grade III haemorrhoids, wherein bands are applied at the

> ![Fig. 31.60: Three pile masses are held with artery forceps](image)

> ![Fig. 31.61: Ligatures are applied at the base of the haemorrhoids and they are being cut with cautery](image)

> ![Fig. 31.62: After haemorrhoidectomy the excised portion should look like a clover](image)

> **KEY BOX 31.14**

**BAND LIGATION: WISDOM LINES**
- Bands should be applied 1–2 cm above dentate line to avoid pain.
- Bands should not be applied in patients who are taking anticoagulants.
- Bands should not be applied for immunocompromised patients without broad spectrum antibiotics to avoid life-threatening sepsis.
- Should not band all the three pile masses at same time.
- Quadrant by quadrant with a gap of 2 weeks is ideal.
- If severe pain, fever and urinary retention develops after band (sepsis), examine under general anaesthesia and remove band.

> **HAEMORRHOIDECTOMY** (Key Box 31.15)

Excision of the pile masses up to base is indicated in Grade II and Grade III hemorrhoids. It can be done by 3 methods: Open, closed and with stapler (vide infra).

**PEARLS OF WISDOM**

Excisional haemorrhoidectomy produces more discomfort (pain) than stapler haemorrhoidopexy but lesser recurrences.
## Interesting Wisdom in Haemorrhoids

- Haemorrhoids occur due to downward prolapse of vascular cushions into and beyond anal canal.
- Minimum ideal investigation for haemorrhoids should be flexible sigmoidoscopy.
- Preserve adequate mucocutaneous bridges in excisional procedures to prevent anal stenosis.
- Urgency and tenesmus following stapled haemorrhoidectomy responds well to oral nifedipine.
- Metronidazole is the most important agent in reducing pain after haemorrhoid surgery.
- Grade I and II can be injected: Injections should be perivascular, submucosal and above the level of dentate line.
- Grade III require haemorrhoidectomy or haemorrhoidopexy.
- Grade IV require initial conservative treatment followed by surgical procedure.

### Types

1. **Open method:** Milligan-Morgan ligature and excision (Figs 31.60 to 31.62)
   - Stretch the sphincter
   - Identify the positions of pile masses
   - Dissection up to the base (pedicle)
   - Transfixation ligature with nonabsorbable silk
   - Excision of the piles with skin
   - Trimming the wound
   - Haemostasis obtained
   - Wound packed with roller gauze
   - A tube drainage is provided so that the blood (oozing) can escape outside.

### Pearls of Wisdom

**Always leave a bridge of skin in between the excised pile masses to prevent anal stenosis.**

II. **Closed method** (Hill-Ferguson)

- Basic steps are the same as above
- Cut mucosa and skin edges are sutured with absorbable catgut sutures.

### Postoperative Management

1. Strong analgesics, in the form of injection pethidine or morphine, are given to reduce the pain.
2. Antibiotics along with metronidazole are given to prevent secondary infection.
3. Bulk purgatives are given to avoid constipation.
4. Sitz bath twice a day is given by using warm saline or KMnO₄ solution.

### Postoperative Complications

- They can be classified into early and late complications. Acute retention of urine and haemorrhage are early complications.
- Anal stricture, anal stenosis, anal fissure and incontinence are the late complications. Few complications are described below.

1. **Retention of urine** is common in men due to severe pain. It can be managed by treating the patient and hot water fomentation in the suprapubic region. Catheterisation is done as a last resort.
2. **Reactionary haemorrhage** is more common. It is due to a loose ligature or some opened up bleedings. Generally stops by pressure packing. Otherwise, under anaesthesia, ligate or cauterise bleeding point.
3. **Secondary haemorrhage** can occur due to infection. It manifests 6 to 8 days after. If the bleeding is significant, exploration in the operation theatre may be necessary. It should be done under anaesthesia. With good illumination it is possible to identify the bleeding points and ligate them.
4. **Anal stenosis** can occur if too much skin is excised during haemorrhoidectomy. It needs regular dilatation.
5. **Anal fissure, submucous abscess, and incontinence** can occur after haemorrhoidectomy.
6. **Wound infection:** Minor degree of wound infection does occur and can be treated with sitz bath, antibiotics and regular dressings.

### Stapler Haemorrhoidopexy: Non-Excisional Procedure (Figs 31.63 to 31.68)

- A novel method for 3rd and 4th degree haemorrhoids was introduced by Dr. Antonio Longo in 1997.
- It is also called Procedure for Prolapse and Haemorrhoids (PPH).
- After reduction of prolapsed piles, a prolene purse string suture is applied circumferentially, taking good mucosa bits 3 cm above dentate line.
- This is possible by using **Circular Anal Dilator (CAD)**.
- By maintaining traction in the tails of suture, the stapler is fully closed and fired.
- Slowly stapler is opened and withdrawn.
- Look at 'deafnut'. If it is complete, nothing to worry.
- Thus, 2 rows of staples and 28 staples are present.

### Advantages

- Lesser operative time
- Less bleeding
- Lesser postoperative pain and need for analgesia
- Lesser postoperative stay at hospital, part of day care procedures
Fig. 31.63: Grade III haemorrhoids before surgery

Fig. 31.64: Circular anal dilator is in place

Fig. 31.65: Purse string suture is applied

Figs 31.66 and 31.67: Maintain traction in the tails of purse string suture and stapler is closed and fired

Fig. 31.68: After surgery

---

Figs 31.63, 31.64, 31.65, 31.66, 31.67, and 31.68

---

**STAPLER HAEMORRHIDOPEXY**

---

**Rectum and Anal Canal**

---

Notes of Dr. Ravindra Goswami (IAS-2015, AIR-153)

---

Eckovation App Group Code: 875461

---

Courtesy: Dr. S.B. Arora, Prof. Dr. Vineet Shenoy, Dr. Ramesh, Prof. Dr. Prashant Shetty, Dr. Sarabha Kant (Consultant), and Dr. Manoj Nadakarni (Registrar). Department of Surgery, KMC, Mangaluru.

- Study period: July 2007–2009
- Total number of patients: 196
  - 93 open, 93 stapled
- Follow up: 2 years

Result of stapled group

- Advantages: Lesser postoperative pain, earlier return to normal activities, better satisfaction.
- Side effects: Mucoid discharge with tenesmus (5 patients), recurrences in 3 patients.
Earlier return to normal activities
- No major postoperative short-term and long-term complications
- No long term side-effects such as anal stenosis or chronic pain as may happen with open haemorrhoidectomy.

Disadvantages
- High cost of instrumentation
- Difficult technically and needs special training (learning curve)
- Rare complications such as intra- and postoperative bleeding. Occasional cases of postoperative fissures, mucosal discharge, persistent tenesmus, infection and long-term complications such as rectovaginal fistulae, polyps at stapler line and recurrance.

PEARLS OF WISDOM
*In open haemorrhoidectomy: If wound is like clover, it is over. In stapler haemorrhoidectomy: If doughnut is complete, it is time to celebrate.*

DOPPLER GUIDED HAEMORRHOIDAL ARTERY LIGATION
- Doppler principle is used to identify the feeding artery to the haemorrhoid mass and it is ligated
- Doppler incorporated proctoscope is introduced, once the artery is recognised by audible signal.
- After this, the needle is inserted into the lumen of the proctoscope
- The artery is ligated by figure of eight suture. Thus, main artery supplying the haemorrhoid is blocked.
- Procedure is simple outpatient procedure. No pain, no anaesthesia. No blood loss, early recovery
- Safe in all types of patients including patients with serious morbidity

External haemorrhoids
- Described by Milligan as 5 day painful self-curing lesion.
- Constipation and sudden straining at stools or lifting weights will result in a tender subcutaneous swelling at the anal margin.
- It is bluish in colour because it is a thrombosed vein or venule (external haemorrhoid).
- If tenderness is extreme, under local anaesthesia, incision can be given over the swelling and clot can be evacuated.
- In other cases, it will resolve within 5 days after fibrosis/suppuration.

ANORECTAL ABSCESS

Acute anorectal suppuration—anorectal abscess
- Mostly originate from the anal gland opening at the base of the anal crypts. This is cryptoglandular theory of intersphincteric anal gland infection described by Sir Allan Parks. From here, pus spreads along path of least resistance—thus form perianal abscess or ischiorectal abscess (Key Box 31.16).
- Other source of anorectal sepsis is foreign body, trauma, sexually transmitted diseases for lower level abscesses.
- Crohn's disease and carcinoma rectum with perforation may form pelvirectal abscess (supralelevator).
- Typically patients presents with high grade fever with chills and rigors. On examination, a tender indurated swelling is found in the perianal region or in the ischiorectal fossa. Culture usually shows E. coli in about 70–80% of cases.
- Staphylococcus aureus, Streptococcus, Bacteroides are the other organisms.

Types (Fig. 31.69)

1. Perianal abscess
   - It occurs due to infection of anal glands in the perianal region.
   - It may be due to a boil, anal gland infection or thrombosed external pile.
   - It produces severe pain, throbbing in nature and on examination a soft, tender, warm swelling is found.
   - Rectal examination reveals a tender, boggy, swelling under the anal mucosa.

   Treatment:
   Antibiotics, incision and drainage and excision of part of skin (roof).

2. Submucous abscess
   - Collection of pus under the mucous membrane of rectum or anal canal.
   - It can also be due to infection of injected haemorrhoids.
   - It can be drained using proctoscope.

3. Ischiorectal abscess
   - Collection of pus in the ischiorectal fossa, which is lateral to rectum and medially to perineum. All bound or above by levator ani and inferiorly by pad of fat in the ischiorectal fossa.
   - The ischiorectal fat is poorly vascularised. Hence, it is more vulnerable to infection.
   - Abscess occurs due to spread of perianal abscess or due to blood-borne infection.
   - Diabetes is the precipitating factor.

KEY BOX 31.16

CAUSES OF ANORECTAL ABSCESS
- Infection
- Irritation (Crohn's disease, ulcerative colitis)
- Immunity low (diabetes, AIDS)
Rectum and Anal Canal

---

**Paget's Disease of Anal Canal**

- MC site of extra-mammary Paget's disease: Anogenital region > Axilla > Eyelid
- MC site in females: Vulva
  - More common in females, median age of 65 years.
  - It can be associated with the presence of rectal adenocarcinoma.
  - Perianal Paget's is associated with an underlying visceral malignancy in 20–86% of cases.
  - MC synchronous tumor: Colorectal adenocarcinoma.

**Pathology**

- Found in both the anal canal and margin.
  - Perianal Paget's cells are foamy and vacuolar in appearance.
  - Positive for PAS, mucicarmine, Alcian blue, and cytokeratin.

**Clinical Features**

- Occurs in apocrine, hair-bearing areas.
- Erythematous, pruritic, scaling plaques with well-defined serpiginous borders are a typical feature of the disease.
- Lesions may also appear ulcerated and crusty with a serous discharge.

**Diagnosis**

- Diagnosis is made on biopsy.

**Treatment**

- Wide local excision is treatment of choice.
- Recurrence rates as high as 61% have been reported following excision of perianal Paget's disease.
- Recurrence is the usual recommendation.

---

104. Ans. a. MC site is vulva

---

**Anal Canal Melanoma**

105. Ans. a. Present usually as anal bleeding (Ref: Sebatin 19/e p119; Schwartz 9/e p1053-1054; Bailey 26/e p1267; Schackelford 7/e p2173, Maingot 11/e p742)

- MC site of melanoma: Skin > Eye > Anorectum
- More common in females
- The tumor can appear small and polypoid, or large and ulcerating.

**Clinical Features**

- Most common symptoms include bleeding, itching, the presence of a mass, pain, tenesmus, or changes in bowel habits.
- Like anal squamous cell carcinoma, misidentification of the tumor as a hemorrhoid is a common mistake.
- Mesorectal lymph node metastases are found in 40–60% of patients at initial presentation and inguinal adenopathy is present in at least 20%.
- Distant spread occurs to the bone, lung, and liver.

**Diagnosis**

- Diagnosis is frequently made following hemorrhoidectomy or local excision of the perianal mass.
- Like melanoma of the skin, anorectal melanoma is staged by depth or thickness of the lesion.

**Treatment**

- Wide local excision has replaced APR for the treatment of anal melanoma.
- Wide local excision with negative margins for those patients without anal sphincter involvement.
- Palliative APR: Large tumor invading sphincter.

**Prognosis**

- Regardless of stage, 5-year survival rates for anorectal melanoma is very poor, averaging about 6%.
- The median survival time following diagnosis is 12–18 months.
ANORECTAL MALFORMATIONS

106. Ans. a. Transverse colostomy (Ref: Nelson 18/e p1637; Sabiston 19/e p1449-1851; Schwartz 9/e p1437-1438; Bailey 26/e p1242-1243. 25/e p1244-1249; Schuckjehoff 7/e p2273-2288)

- The presence of meconium in urine reflects some form of communication between the urinary tract and rectum, and suggests a high type of anorectal malformation.
- Such patients require a diverting colostomy. The colostomy decompresses the bowel and provides protection during the healing of subsequent repair.
- Posterior Sagittal Anorectoplasty (PSARP) is performed after 4-8 weeks.
- The presence of meconium in urine and a flat bottom are considered indications of a protective colostomy.

```
Newborn male-anorectal malformation
perineal inspection

20-24 hrs

Re-evaluation and cross-table lateral film

Perineal fistula
Anoplasty

Rectal gas below coccyx
no associated defects

Consider PSARP
with or without
colostomy

Rectal gas above coccyx
associated defects
abnormal sacrum
flat bottom

Colostomy

Newborn female-anorectal malformation

R/O serious,
potentially lethal
associated defects

Single perineal
orifice cloaca
- Urological evaluation
- R/O hydrocolpos

Perineal
fistula

Vestibular
fistula

No visible
fistula (<10%)

24 hrs

Cross table
lateral X-ray

Colostomy
drain hydrocolpos
urinary diversion
(if necessary)

Anoplasty or
dilations

Colostomy or primary repair*

Rectum
below coccyx

High rectum

Colostomy

* Depending on the experience of the surgeon and general condition of the patient
```
MANAGEMENT OF PATIENTS WITH ANORECTAL MALFORMATIONS
- The principles of management centre around diagnosing the type of defect present. Low or High, depending on the site of termination of rectum in relation to pelvic floor.
- Wermerstein-Rice (Invertogram) is performed 6-12 hours after birth.

<table>
<thead>
<tr>
<th>Clinical clues suggesting Low lesion</th>
<th>Clinical clues suggesting High lesion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bucket Handle:\ - Presence of a prominent midline tag stem tap, below which one can pass an instrument.</td>
<td>Flat-bottom:\ - This usually reflects poor muscle structures and is always associated with very high defects.</td>
</tr>
<tr>
<td>Midline Raphe Fistula: - A subepithelial meconial fistula which looks like a black ribbon, placed in the midline in the perineum.</td>
<td>Meconium (Meconium in urine): - The presence of meconium in urine means that some form of communication exists between the urinary tract and rectum. - It suggests a high lesion.</td>
</tr>
<tr>
<td>Perineal Fistula (meconial): - The presence of meconium coming out through a small orifice located usually anteriorly to the centre of anal dimple.</td>
<td></td>
</tr>
<tr>
<td>Anal Stenosis: - Very narrow anal canal</td>
<td></td>
</tr>
<tr>
<td>Anal membrane: - Very thin epithelial membrane through which one can see meconium</td>
<td></td>
</tr>
</tbody>
</table>

Management
- High lesions: Patients with high lesions are difficult to manage and require an initial protective colostomy. Posterior Sagittal Anorectoplasty (PSARP) is performed after 4-8 weeks.
- Low lesions: Can be treated with a perineal anoplasty (without the need of a protective colostomy).

107. Ans. c. 6 hours after birth
108. Ans. a. Cardiac anomalies
109. Ans. d. Invertogram

- Anorectal malformations are associated with VACTERL abnormalities.

RECTUM AND ANAL CANAL ANATOMY AND PHYSIOLOGY
110. Ans. b. Retained feces in the rectum
111. Ans. a. 4 inches (Ref: Bailey 26/e p1239-1240, 25/e p1221-1222)

<table>
<thead>
<tr>
<th>Proctoscope</th>
<th>10-12 cm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rigid sigmoidoscope</td>
<td>25 cm²</td>
</tr>
<tr>
<td>Flexible sigmoidoscope</td>
<td>60 cm²</td>
</tr>
<tr>
<td>Colonoscope</td>
<td>160 cm²</td>
</tr>
</tbody>
</table>

112. Ans. c. Puborectalis (Ref: Matigot 11/e p663)