"A COMPARATIVE STUDY OF BARRON'S BANDING AND HAEMORRHOIDECTOMY FOR TREATMENT OF SECOND DEGREE HAEMORRHOIDS"

By

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MASTER OF SURGERY

IN

GENERAL SURGERY

Under the guidance of

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ABSTRACT

BACKGROUND AND OBJECTIVES

Haemorrhoids is a common surgical problem in our country. Haemorrhoidal disease is ranked first amongst diseases of anal canal and worldwide prevalence ranges from 2.9% to 27.9%, of which 4% are symptomatic.[1] Haemorrhoids related pathology frequently affects a broad group of patients and causes a variety of symptoms; notably pain, rectal bleeding and mucous discharge.[1] Conventional treatment methods for haemorrhoids fall into two broad groups: less invasive technique i.e., Barron's banding (Rubber band ligation) and more invasive technique i.e., haemorroidectomy. Although isolated studies of rubber band ligation and haemorrhoidectomy in the management of haemorrhoids have been reported, comparison of the two in the treatment of second degree haemorrhoids has not been reported. This study is conducted to assess the efficacy of rubber band ligation and haemorrhoidectomy in the treatment of second degree haemorrhoids.

MATERIALS AND METHODS

An analytical prospective study on patients diagnosed with second degree haemorrhoids was done between January 2012 and July 2013. 60 patients were included in the study who met inclusion criteria. Patients are divided into two groups – RBL and EH. RBL: All even number patients are allocated to Barron's banding group. EH: All odd number patients are allocated to haemorrhoidectomy group after a formal informed consent. An evaluation of the two groups was done considering –

a) Post operative complications

b) Duration of hospital stay

c) Cost of hospital stay

RESULTS

The post operative complications, duration and cost of hospital stay was significantly lesser in RBL group when compared to the haemorrhoidectomy group of patients with a high patient satisfaction.

CONCLUSION

Rubber band ligation has shown efficacy over haemorrhoidectomy in the treatment of second degree haemorrhoids in terms of least post operative complications, short hospital stay and being economical.

Keywords: Second degree haemorrhoids; rubber band ligation; haemorrhoidectomy

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INTRODUCTION

Haemorrhoids are a common surgical problem in our country. People over the age of fifty have some degree of haemorrhoid formation, but it is also encountered in people of all ages.

Haemorrhoids have plagued humans since they attained the erect posture. The word "**HAEMORRHOID**" is derived from Greek, haema meaning blood and rhoos meaning flowing, the common man's term piles is derived from Latin word pila meaning a ball[1].

Haemorrhoids have been defined differently over the years from simplified definition of varicosities of haemorrhoidal plexus to the more recent study describing them as specialized highly vascular "cushions" of discrete masses of thick submucosa, containing blood vessels, smooth muscles, elastic and connective tissue which may slide down due to breakage of collagen and anchoring supporting connective tissue causing symptoms like prolapse, bleeding, pain etc., the cause of which is still hypothesized as erect posture, constipation, straining during defecation, sedentary work and diet low on fibre, heredity, high resting anal pressures[2].

Haemorrhoidal disease is ranked first amongst diseases of anal canal and worldwide prevalence ranges from 2.9% to 27.9%, of which 4% are symptomatic. Haemorrhoids related pathology frequently affects a broad group of patients and causes a variety of symptoms; notably pain, rectal bleeding and mucous discharge.

There has been a long search for the best method of treatment for haemorrhoids. A well established approach to prophylaxis and treatment is to regulate the patient defecation and failing this leads to the use of surgical methods.

Conventional treatment methods for haemorrhoids fall into two broad groups: less invasive technique i.e., Barron's banding (Rubber band ligation) and more invasive technique i.e., haemorroidectomy. Many studies have been done to achieve a minimally invasive, less painful and quick recovery procedure. Duration of post procedure pain, time to return to normal activities, retreatment rate, incontinence, significant bleeding are considered as success measures of treatment.[3] Under these circumstances factors like associated morbidity, long term complications, hospital bed stay requirement and cost effectiveness should be taken into consideration in choosing the form of therapy.

AIMS AND OBJECTIVES

- To evaluate the efficacy of Barron's rubber band ligation.

- To evaluate the efficacy of haemorrhoidectomy.

- To compare efficacy, control of haemorrhoidal symptoms and post operative complications associated with Barron's banding and haemorrhoidectomy.

REVIEW OF LITERATURE

HISTORY

The passage of blood per rectum has attracted the attention of medical man since the ancient times. Before the period of Hippocrates it was believed that all the diseases in the anal canal were called Haemorrhoids. It was Hippocrates who termed the passage of blood from anal veins as haemorrhoids. The writers Aristotle, Cornelieus, Celsius, Aetius and others used the term haemorrhoids for haemorrhage from any part of the body.

Later theories of constitutional venous, mechanical and infectious causes were formulated. Hippocrates thought that pile was a condition which helped in purification of blood. Same concept was held by Galen (Second century AD) and Celsius (25 BC) Morgagni pointed out in the seventeenth century that haemorrhoids were caused by erect posture adopted by man, because this condition was not present in quadrooped animals. It is mentioned in Sushruta Samhita (2500 BC) as Arsha Roga. James (1760) stated the absence of valves in the haemorrhoidal veins and in the portal system causing congestion and also stated that spasm of musculature of rectum and anal canal could be the causative factor in the development of haemorrhoids.[4]

Hippocrates performed an open haemorrhoidectomy 2000 years ago. Earliest types of haemorrhoidectomy consist of excision and ligation, the only difference between procedures being the level of pedicle, method of excision and treatment of anal wound. Variation on this theme evolved open to the closed method of excisional haemorrhoidectomy. In middle ages, haemorrhoids were probably treated with mass ligation of entire internal and external haemorrhoids complex.

In 1774, John Louie Petit proposed sub mucosal method of ligation.

In 1835, Samon, founder of St. Mark's Hospital, was the first to isolate the haemorrhoidal pedicle.

White head described the circumferential amputation of haemorrhoids in 1882.

In 1903, Mitchell described a method of clamping and excision with partial wound closure. This technique was later popularized by Earl and Bacon.

In 1919 Miles modified Samon's original technique of high excision and open haemorrhoidectomy by a lower ligation technique to reduce the amount of raw tissue in the anal canal.

In 1959, Ferguson and Heaton described the technique of closed haemorrhoidectomy.[5]

ANATOMY OF THE RECTUM AND ANAL CANAL:

The alimentary tract terminates at the anus, which provides continence of flatus and faeces. It is useful to consider the anus and surrounding structures as a single unit, the anorectum. It includes the perineal skin, anal canal, anal sphincters and the distal rectum.

EMBRYOLOGY

The rectum is developed from the primitive rectum, i.e., dorsal subdivision of the cloaca. The anal canal is formed partly from the endoderm of the primitive rectum and partly from the ectoderm of the anal pit or proctadaeum. The line of junction of the endodermal and ectodermal parts is represented by the anal valves.[6]

ANAL CANAL

Anal canal is the terminal part of large intestine. It is about 4 cms long, situated below the level of pelvic diaphragm. It lies in the perineum (Anal triangle) in between right and left ischiorectal fossae extending from anorectal ring to anal verge. It is directed downwards and backwards. Anal canal is surrounded by sphincters which keep lumen closed in the form of an anteroposterior slit.[5]

Anorectal junction is marked by the forward convexity of the perineal flexure of the rectum, which lies 2-3 cm in front of and slightly below the tip of the coccyx. In males, Anorectal junction corresponds to the level of apex of the prostrate. The anus is the surface opening of the anal canal, situated 4 cms below and in front of the tip of the coccyx in the cleft between the two buttocks. The surrounding skin is pigmented and thrown into radiating folds and contains apocrine glands.

Relations of anal canal

1. **Anteriorly**

- In both sexes – perineal body
- In males – membranous urethra and bulb of penis
- In females – lower end of vagina

2. **Posteriorly**

- Anococcygeal ligament
- Tip of the coccyx

3. **Laterally**

- Ischiorectal fossa

Interior of anal canal

It is divided into three parts:

a. Upper part (mucous) – It is about 15 mm long.

b. Middle part (Transitional zone or pecten), it is about 15 mm long.

c. Lower part (cutaneous) – It is about 8 mm long.

a. Upper part (Mucous):

It is about 15 m long. Pink columnar epithelium lining the rectum extends into the anal canal. Mucosa of upper anal canal is attached loosely to the underlying structures and covers internal rectal plexus. It is 1/3rd of the anal canal; mucous membrane shows 8-12 longitudinal folds known as anal columns of Morgagni, which are prominent in children.

The lower ends of anal columns are united to each other by short transverse folds of mucous membrane, called anal valves of ball which form a transverse line that runs all around the anal canal. This is called pectinate or dentate line. There are small pockets between the inferior extremities of anal columns of morgagni called anal sinuses or anal crypts of morgagni. Into this, anal glands opens by a narrow duct. The duct of glands bifurcates and branches pass outwards to enter the interior sphincter muscle in 60% of the people.

b. Middle part (Transitional Zone or Pecten):

It is next 15 mm of anal canal. It is also lined by mucous membrane, but anal columns are not present here. This mucosa has bluish appearance due to the presence of dense venous plexus that lies between this and the muscle coat. It is less mobile than the mucosa of upper part. The lower limit of pecten often has a whitish appearance so it is referred as white line of Hilton.

c. Lower part (Cutaneous):

It is about 8 mm long. Lined by true skin containing sweat and sebaceous glands.[7]

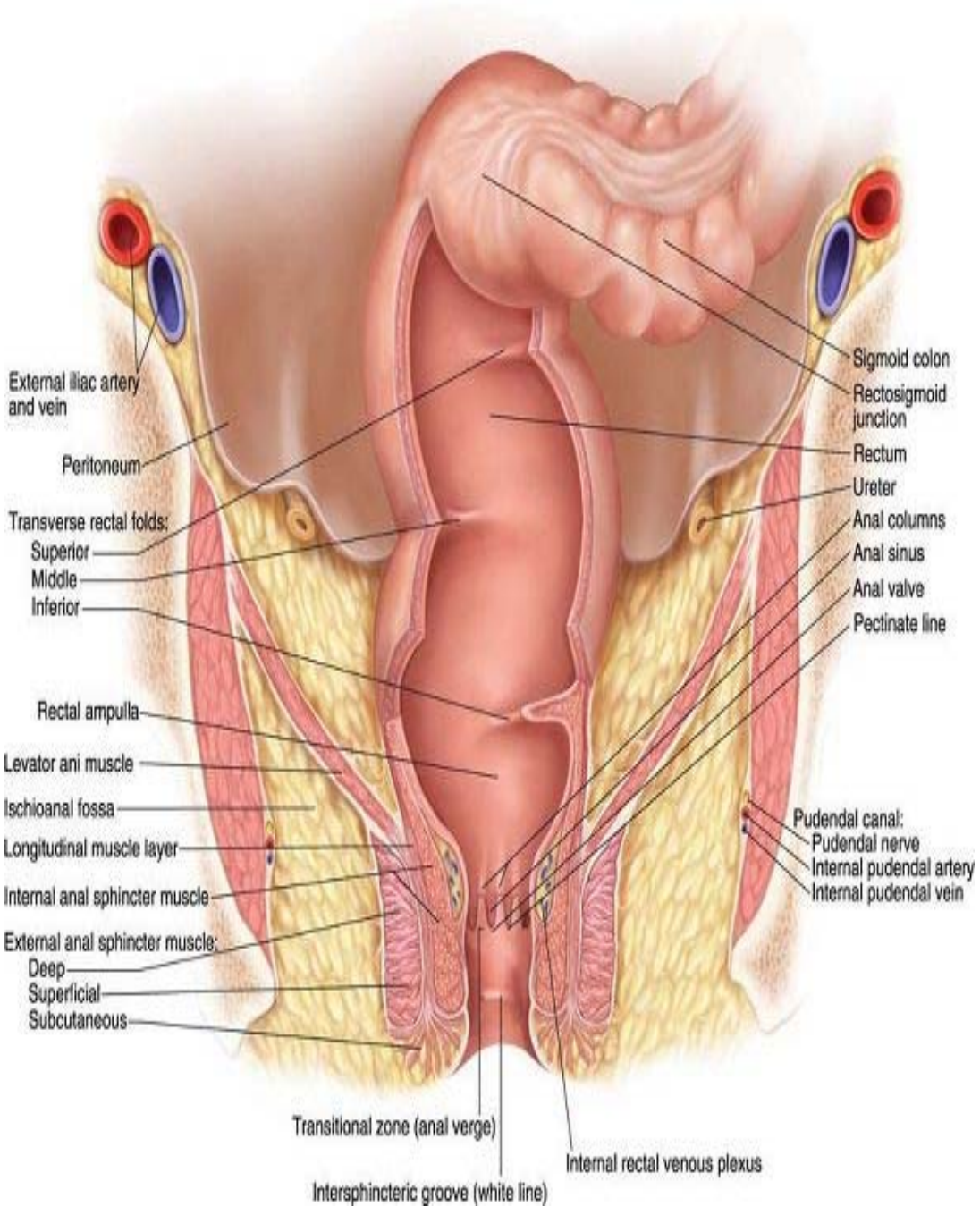


Fig No. 1 : ANATOMY OF RECTUM AND ANAL CANAL

EPITHELIUM OF ANAL CANAL:

Epithelial lining of upper part or mucous part of anal canal is lined by stratified columnar epithelium. Epithelial lining of middle part of transition zone or pectin is lined by stratified squamous epithelium. It is thin and shiny known as Anoderm. Epithelium of lowest part of anal canal resembles that of true skin in which hair, sweat and sebaceous glands are present.

ANAL CUSHIONS

These are small submucous masses comprising of fibroelastic connective tissue, smooth muscle, dilated venous space and arteriovenous anastomoses. Usually anal cushions forms at left lateral (3 o clock), right posterior (7 o clock) and right anterior (11 o clock) positions in the upper anal canal. Smaller cushions may also present between them. The opposition of these anal cushions assists the sphincter in maintaining water tight closure of anal canal. Excessive straining at stools may cause enlargement of these cushions and formation of haemorrhoids.[8]

Haemorrhoids (according to Peter A Hass[9]) have three parts -

1. The lining- either mucosa above or anoderm below.
2. Stroma with blood vessels smooth muscles and supporting connective tissue in the submucosa.
3. Anchoring connective tissue

ANATOMICAL AND SURGICAL IMPORTANCE OF DENTATE (PECTINATE) LINE[10]:

It forms the embryological watershed between visceral structures above and somatic structures below the line. It is the site of attachment of fascia derived from the longitudinal muscle coat of the rectum. Above this dentate line the anal canal is lined by mucous membrane and below by the skin. The fascia Lunata (perianal fascia) ends at this level, by fusing with the fascia over the levator and between the two sphincters. The mucosa above the line has an autonomic nerve supply and is insensitive to cutting and pricking, where as the skin below is supplied by the inferior rectal nerve which is a branch of the pudendal nerve and is sensitive to these stimuli.

The venous drainage of the mucosa is into the inferior mesenteric and portal circulation, where as skin below is into the systemic venous circulation. The lymphatic drainage above the dentate line is upwards and similar to that of rectum, where as below the line lymph drains down and out to the inguinal lymph nodes. Internal haemorrhoids develop just above the dentate line. In the finer control of continence, stimulation of nerve endings in the region of dentate line may initiate reflex or voluntary changes in sphincter tone.

Musculature of anal canal:

Muscles of anal canal can be regarded as forming tube within a funnel. The sides of the upper part of the funnel are the levator ani muscles and the stem of the funnel is the external sphincter, which is continuous with levator ani. The tube inside the stem of the funnel is the internal sphincter.

Internal anal sphincter:

This is involuntary in nature. It is thickened continuation of the circular muscle coat of the rectum. It surrounds the upper 3/4th of the anal canal, which commences where rectum pierces the pelvic diaphragm and ends at the anal orifice. This sphincter is 2.5 cm long and 2.5 mm thick. Spasm and contracture of this muscle play a major role in fissure and other anal affections.

External anal sphincter:

Earlier, it was sub-divided into deep, superficial and subcutaneous portions, which is now considered to be one muscle (Goligher). It is voluntary and is made up of striated muscle. It surrounds the whole length of anal canal and supplied by inferior rectal nerve and perineal branch of 4th sacral nerve.

Anorectal ring:

It is a muscular ring, formed by fusion of puborectalis, deep external sphincter and internal sphincter. It is easily felt by a finger in the anal canal. Surgical division of this ring results in rectal incontinence. This ring is less marked anteriorly where the fibres of the puborectalis are absent.[11]

Conjoint longitudinal coat:

It is formed by fusion of the puborectalis with the longitudinal muscle coat of the rectum at the anorectal junction, between external and internal anal sphincters, soon it becomes fibroelastic and at the level of white line it breaks up into a number of fibroelastic septa which spread out fanwise, pierce the subcutaneous part of external sphincter and are attached to the skin around the anus. The most lateral

septum forms the perianal fascia and most medial one, the anal intermuscular septum, is attached to the white line. In addition, some of the strands pierce obliquely the internal sphincter and end in submucosa below the anal valves.

Surgical significance of the anal musculature:

Continence depends on the integrity of the sphincter mechanism and its nerve supply, and on maintenance of the anorectal angle. Incontinence may result from injury to the pudendal nerve or damage to the sphincter by over stretching, injury or surgical incisions.[8]

Inter sphincteric space:

It is the interval between internal and external sphincters and is known as intersphincteric space. The anal intermuscular glands pass through this space before penetrating the internal sphincter. No essential nerves or blood vessels cross the space and plane of dissection is fairly easily developed.[7]

ARTERIAL BLOOD SUPPLY

The anal canal is supplied by the superior, middle and inferior haemorrhoidal arteries.

Superior haemorrhoidal artery

It supplies the part of the anus derived from the cloaca. The inferior mesenteric artery continues as the superior hemorrhoidal artery in the root of the vertical limb of the sigmoid mesocolon to reach the upper end of rectum opposite the third piece of sacrum. It divides into right and left main branches, with variation at the

level of bifurcation. These branches descend on the rectal wall at first posteriorly, then inclining laterally each one breaking into smaller branches. They penetrate the muscle coat to reach the submucosa on which they proceed as straight vessels, which run in the column of Morgagni. They terminate usually above the anal valves as capillary plexus. The right branch divides into two major- right and left whereas the left one continues undivided down the left lateral aspect (Miles 1939).

The **middle haemorrhoidal** arteries spring from the anterior division of the internal iliac and via the lateral ligaments reach the rectum and anal canal, with many variations including absent, double or triple middle rectal artery.

The **inferior haemorrhoidal artery** - derived from the internal pudendal artery in Alcock's canal, it traverses the ischiorectal fossa and breaks up into branches, which traverse the sphincter to supply the mucosa. The three haemorrhoidal vessels communicate with each other and contribute to a rich sub-mucous and intra mural plexus, so that the interruption of arterial supply from above by the division of the superior and middle rectal arteries does not deprive the anus of its blood supply.

The **median sacral artery**- it arises from the aorta about 1cm above its bifurcation and runs anterior to the last two lumbar vertebrae, sacrum and coccyx. Its terminal branches reach the anococcygeal raphe along which they reach the anal canal.[12]

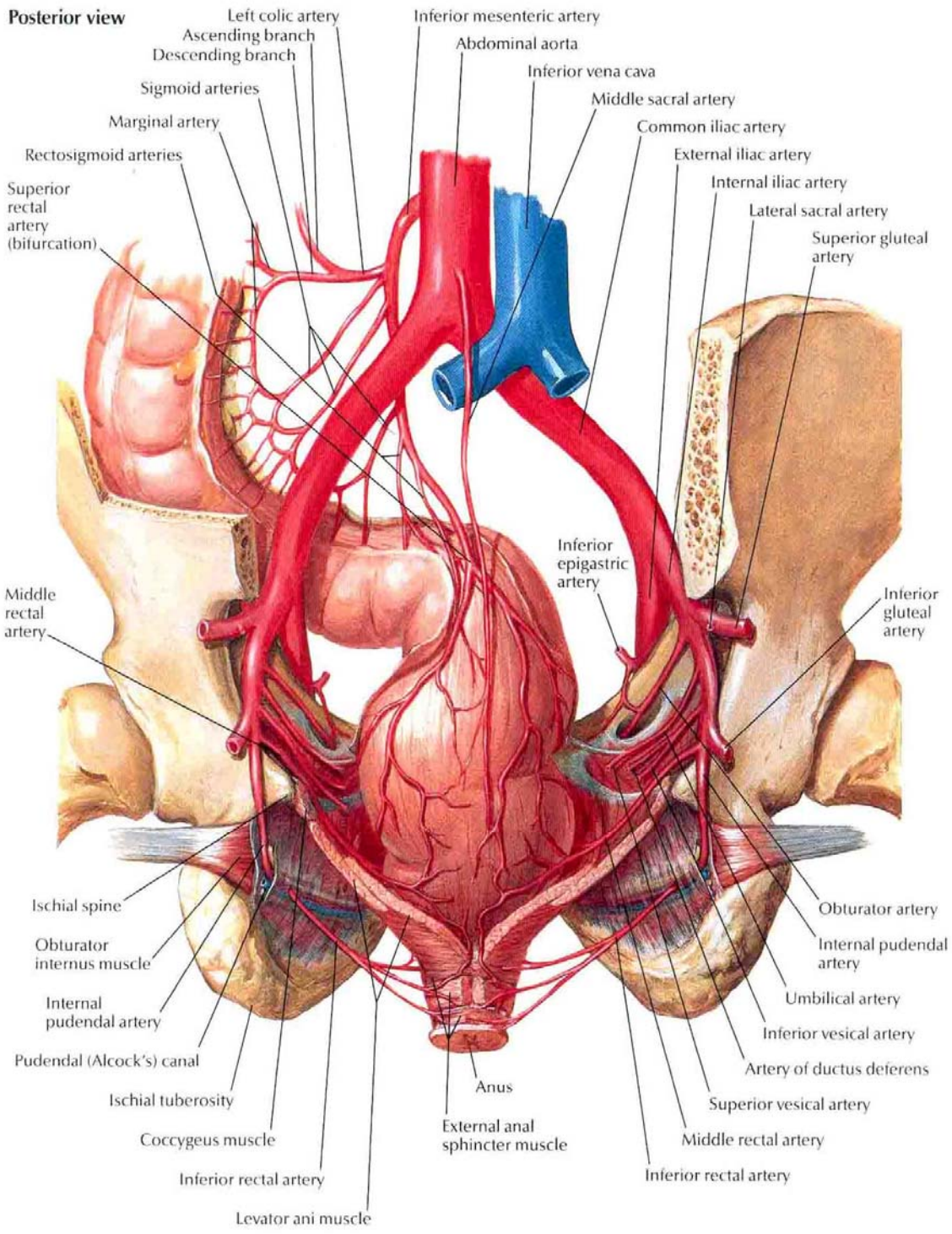


Fig No.2 : ARTERIAL SUPPLY OF RECTUM AND ANAL CANAL

VENOUS BLOOD SUPPLY

Upper part of anal canal and plexus drains via superior rectal and inferior mesenteric veins to the portal system, where as lower part of anal canal drains into internal iliac veins through the inferior and middle rectal veins. Thus anal canal is site of portal systemic anastomosis and the union is in the region of anal columns.

a. **Internal rectal venous plexus (Haemorrhoidal Plexus):** Lies in the sub mucosa of anal canal. It drains mainly into the superior rectal vein but communicates with the external rectal venous plexus thus with the middle and inferior rectal veins. Therefore internal plexus is an important site for communication between portal and systemic veins. Veins present in the 3 anal columns in 3, 7 and 11 ‘o’ clock positions in the lithotomy position and they form potential site for the formation of Internal piles.

b. **External rectal venous plexus*:*** Lies outside the muscular coat of rectum and anal canal and communicate freely with the internal plexus. Lower part of external plexus drains by inferior rectal vein into the internal pudendal vein. Middle part by the middle rectal vein into the internal iliac vein. Anal veins are arranged radially around the anal margin. They communicate with internal rectal plexus with the inferior rectal vein. Straining cause rupture of these veins forming a subcutaneous perianal haematoma known as “External Piles”.[7]

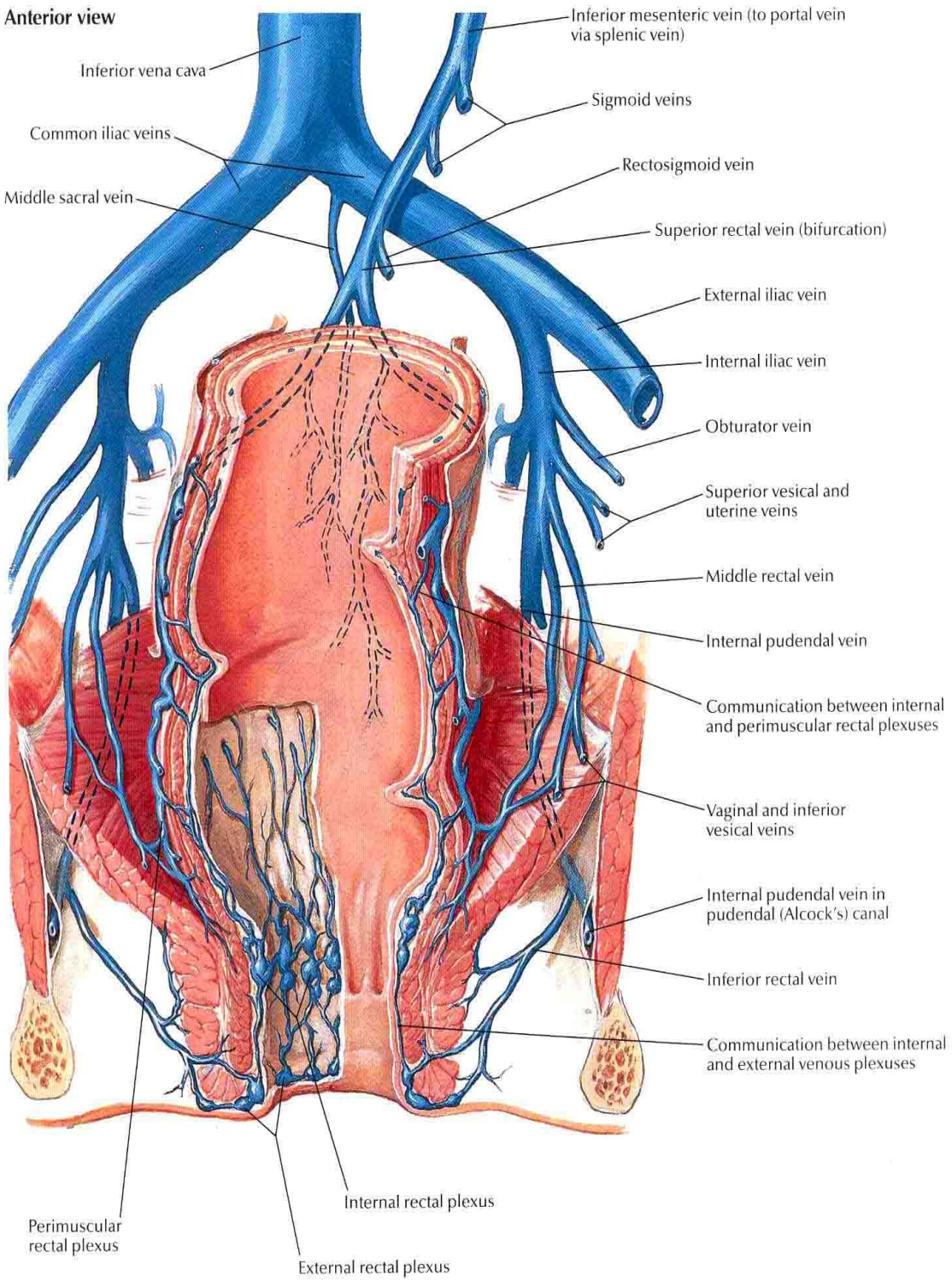


Fig No.3 : VENOUS DRAINAGE OF RECTUM AND ANAL CANAL

LYMPHATIC DRAINAGE

Rectal lymphatic flows are segmental, circumferential and follow the paths of arteries.

1. Upper and Middle rectum: drains into inferior mesenteric nodes
2. Lower rectum:
    a. primarily follow the superior rectal artery and drain into the inferior mesenteric nodes.
    b. it can also flow laterally along the middle and inferior rectal artery to internal iliac nodes.[13]

PHYSIOLOGY

Role of anal cushions in normal rectal evacuation

During the act of defecation, as the internal sphincter relaxes there is an outward rotation of the vascular tissue and the pectin band producing parting of the anorectum. The cushions enlarge dramatically and decongest rapidly once they are returned to their normal position. At end of normal defecation voluntary sphincter contraction returns any residual fecal matter from anal canal into the rectum. Cushions provide a spongy variable volume washer on which the sphincter can contract thereby assisting its closure, loose textured above, tougher below, leading to a watertight seal.[14]

Theories of Anal continence:

I. Pressure zone

Most commonly accepted explanation of anal continence is that the high-pressure zone (25-120 mm Hg) in the anal canal provides an effective barrier against pressure in the rectum (5-20 mm Hg).

II. Angulation between rectum and anal canal

The angle of 80^0 between the axis of the rectum and that of anal canal is maintained except when the hips are flexed more than 90^0 or during defecation. This angulation is maintained by the pull of puborectalis sling.

III. Flutter valve

By manometric and radiological studies of Phillips and Edwards 1965, it is stated that lower rectum is occluded by raised abdominal pressure acting on an area of

rectum above the pelvic floor. Continence is also augmented by the surface tension adherence of the anterior-posterior slit like aperture of anal canal.

IV. Resistance to opening

Differential opposing pressure between rectum and anal canal helps to maintain continence.

V. Forces around the anal canal

Collins et al 1967, showed that the forces on the craniad position are maximal posteriorly, less laterally and minimal anteriorly. These pressures can be maintained with the combined action of puborectalis sling and internal anal sphincter. The external anal sphincter provides the final voluntary guard.[15]

Anorectal manometry in haemorrhoids:

The anal sphincter tone normally ranges from 60-110cms of water with episodes of spontaneous falls in resting anal pressures termed sampling reflexes. Higher sphincter pressures than normal distribution of type 1 muscle fibres in the external sphincter suggest a state of tonic contraction of the muscle in some patients (Teramoto 1981).

Birmingham manometric studies classified patients with haemorrhoidal disease into those with high anal pressures- the so called hypertensive pile patients who are more often young males presenting with symptoms of bleeding; and those with low anal pressures often mulitparous and older women presenting more often with prolapse.[16,17,18]

ETIOPATHOGENESIS

Several theories have been proposed but no single theory has been found satisfactory.

1. Campbell and Cleave identified **dietary factors** resulting in constipation as a cause. Cleave termed it the "Saccharine disease". They found that high fibre intake in rural societies may be the reason for low incidence. Other possible explanations could be that patients are more likely to complain in western societies because medical services and pharmaceutical preparations are more readily available.
2. Virchow and Allingham considered haemorrhoids to be hemangiomatous and erectile in nature.
3. Steltzner called it the **corpus cavernosum recti** (**Vascular Hyperplasia theory)**
4. Graham Stewart[18] suggested that they are **varicosities** of the superior haemorrhoidal plexus of veins divided into vascular haemorrhoids which bleed and mucosal haemorrhoids which prolapse.
5. **Theory of ageing**: Jackson and Robertson[19] and **Wear and Tear theory (Sliding Anal Canal Theory)** of Adams and Gass[20] suggest that age related fragmentation and loss of elastic and anchoring tissue aggravated by daily trauma of staining leads to haemorrhoids.
6. Rangabhashyam and Manohar[21] attributed it to **perineal descent syndrome** especially in patients with constantly prolapsing and in recurrent haemorrhoids. He also found a high incidence of amoebiasis in patients with haemorrhoids.
7. Nesselrod considered anal infection as the principal factor and Mc Givney described high incidence of round cell infiltration as an evidence of infectious process.

8. Haas[22] considered haemorrhoids as normal parts of human anatomy and that symptomatic haemorrhoids must be treated.
9. **Role of heredity[16]**: Leicester found a positive family history in 50% but there is no firm evidence of an inherited predisposition as diet and defecatory habits are usually related to customs and environment.
10. **Role of defecatory habits**: It is a frequent and reliable observation that many patients with haemorrhoidal disease are those who sit for 10-15 minutes on a comfortable lavatory taking with them some reading material. Such patients are obsessed by the necessity to have a regular act of defecation and are determined to sit there till they do.
11. **Venous obstruction** by fecal bolus was suggested by Verneuil.
12. Morgagni attributed it to **erect posture** of man.
13. Secondary haemorrhoids: Congestion and hypertrophy of the anal cushions may occur due to
    - Failure to empty rapidly
    - Abnormal mobility
    - Trapping by a tight anal sphincter

Factors favouring venous hypertension in haemorrhoidal veins:

1. **Veins traverse the anal musculature**: Allgower stated that venous outflow from the haemorrhoidal plexus partially runs through the internal sphincter and that sphincter hyperfunction leads to a vicious circle of venous engorgement, pain at defecation and a further rise in the sphincter tone. Read noted that increased sphincter tone in patients with haemorrhoids disappeared after haemorrhoidectomy suggesting it to be the effect rather than the cause.

2. Absence of valves leading to increase in pressure with rise in intraabdominal pressure as in ascites or pelvic tumors of pregnancy.
3. Hormonal factors like FSH, Prolactin and Glucocorticoids according to Saint Pierre play a role in pregnancy piles.[23] Weakness arising from the influence of progesterone on smooth muscle and elastic tissue possible explains the predisposition to haemorrhoids in pregnancy, although a general increase in pelvic vascularity also contributes. Many women date their haemorrhoids not to actual pregnancy but to parturition when the supporting tissues of the anal cushions may be torn.[24]
4. **Communication between portal and systemic circulations**: Jacobs in 1980[17] in his study showed that incidence of symptomatic haemorrhoids in portal hypertension is 28% whereas that in the general population is 50% (Buie et al, 1937). The prevalence of anorectal varices in cirrhotics without portal hypertension was 19% where as it was 59% in cirrhotics with portal hypertension with history of bleed from esophageal varices.

   Hirschowitz states that haemorrhoids do not necessarily occur in patients with esophageal varices. Swart stated that because of the long distance between the portal and the haemorrhoids veins based on the Hagen-Pouisseuill equation, venous pressure in the haemorrhoids does not increase and they are not an important site of collateral circulation between the venacava and portal system.[9]
5. Faecal mass in rectum may compress these veins – Parks ampullary pump theory.
6. **Relation to carcinoma rectum**: Chronic straining due to obstruction or sensation of incomplete emptying and obstruction to middle rectal vein have been postulated.

CLASSIFICATION

Hemorrhoids are classified according to their origin in relation to dentate line.

External hemorrhoids originate distal to the dentate line, arising from the inferior haemorrhoidal plexus, and are lined with modified squamous epithelium, which is richly innervated with somatic pain fibers that are delta type, unmyelinated.

Internal hemorrhoids originate proximal to the dentate line, arising from the superior haemorrhoidal plexus, and are covered with mucosa. Some hemorrhoids are regarded as mixed hemorrhoids (**Interno-Externo**), arising from the inferior and superior haemorrhoidal plexi and their anastomotic connections, covered by mucosa in the superior part and skin in the inferior part with somatic pain fibers.[25]

Grading of Internal Hemorrhoids

The most common and widely used grading system was developed by Banov.[26]

- **Grade I:** The hemorrhoids protrude into the lumen, do not prolapse.
- **Grade II:** The hemorrhoids prolapse upon defecation but spontaneously reduce.
- **Grade III:** The hemorrhoids prolapse upon defecation, but must be manually reduced.
- **Grade IV:** The hemorrhoids are prolapsed and cannot be manually reduced.

Parts of pile[1] :

Each pile has three parts

a. The pedicle(base)

b. The internal haemorrhoid

c. The external haemorrhoid

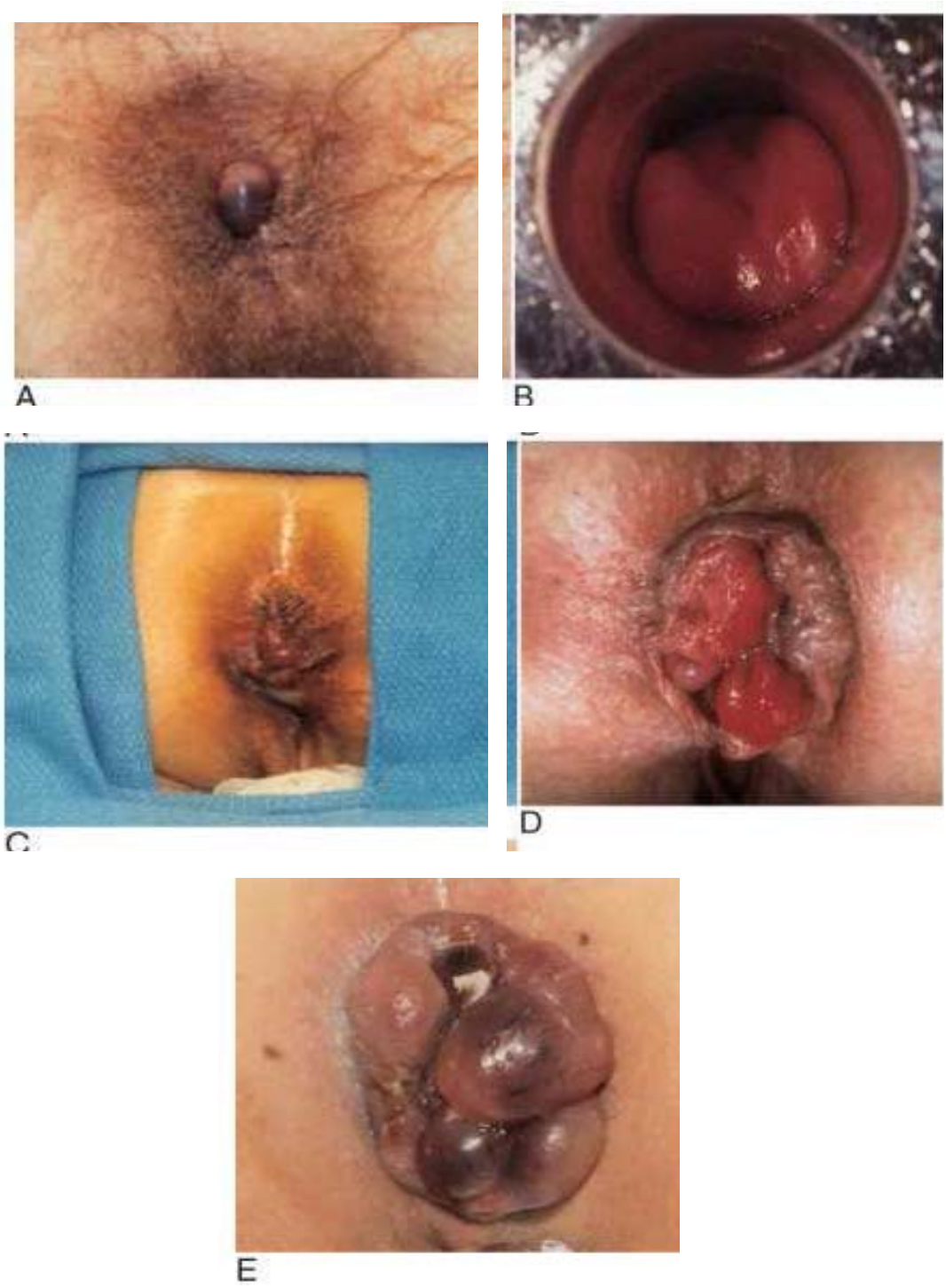


Fig No.4 : Hemorrhoids. A, Thrombosed external haemorrhoid. B, First-degree internal hemorrhoid viewed through anoscope. C. Second-degree internal prolapsed haemorrhoid, reduced spontaneously. D, Third-degree internal prolapsed haemorrhoid, requiring manual reduction. E. Fourth-degree strangulated internal and thrombosed external haemorrhoids.

CLINICAL FEATURES AND EVALUATION

Patients with haemorrhoidal disease may experience any of the following symptoms: bleeding, a painful mass, swelling, discomfort, discharge, constipation, hygiene problems, soiling, and pruritus. Bleeding and prolapse are the two cardinal symptoms. Bennet et al (1963) pain is not usually considered to be a symptom of internal piles, whereas Murie observed that anal pain was also a complaint by 54% of 82 patients with haemorrhoids surveyed.[27]

Internal hemorrhoids usually become symptomatic only when they prolapse, become ulcerated, bleed, or thrombose. Blood that drips, is separate from stools, bright red and is most commonly seen with bleeding internal hemorrhoids.[28] External hemorrhoids may be asymptomatic, or be associated with discomfort, acute pain, or bleeding from thrombosis or ulceration.

1. **Bleeding:**

This is the most common and earliest complaint. The blood is invariably bright red and is often first noticed after passing a non-blood stained hard stool. The type of bleeding in haemorrhoidal disease is different from that produced by a rectal neoplasm or ulcerative proctitis but may be similar to that experienced by patients with fissure in ano or even when there is perianal dermatitis with severely macerated skin.

Haemorrhoidal disease can be generally distinguished from these last two conditions by the absence of pain or pruritis. Later in the development of the disease the bright red bleeding may become profuse, dripping into the pan-like a tap or spattering the sides like a jet to mark the end of the act of defecation. This occurs when the cushions are prolapsed beyond and congested by the sphincter. Such bleeding is pathognomonic of haemorrhoidal disease.

Younger patients with grossly hypertrophied cushions occasionally prolapse and reduce spontaneously during or after defecation, often at times of physical activity, sporting exertion or ecstasy. The higher anal tone in these sufferers often congests the cushions and so bleeding can be embarrassingly profuse. Such patients are the most prone to bleed enough to become anaemic.[16]

2. **Prolapse:**

Prolapse or mass protruding through the anus are the real piles. As a rule, prolapse of haemorrhoids develop in later stages. It occurs initially at defecation in the height of staining effort and slipping immediately afterwards, later the piles tend to be in prolapsed condition even after cessation of staining effort. Patient finds it necessary to replace them digitally into the anal canal. Finally the stage is reached where piles are more or less permanently prolapsed with anal mucosa exposed and in contact with under clothing.[15]

3. Discharge:

A mucoid discharge is a frequent accompaniment of prolapsed haemorrhoids. It is composed of mucous from engorged mucous membrane sometimes augmented by leakage of ingested liquid paraffin.[1] Pruritis almost certainly follows the discharge with excoriation of perianal skin with accompanying discomfort.[2]

4. Anal irritation:

Irritation of the perineal skin, due to becoming moist and sodden from discharge, is an almost invariable accompaniment of large haemorrhoids.

5. **Pain:**

Uncomplicated haemorrhoidal disease is usually painless. Anal pain was also a complaint by 54% of patients with haemorrhoids. Severe pain may occur if the piles become thrombosed and prolapsed.

Symptoms of secondary anaemia:

It is important to remember that bleeding from internal haemorrhoids can be a cause of secondary anaemia. In addition to the local symptoms, the patient may complain of breathlessness on exertion, dizziness on standing, lethargy and pallor due to increasing anaemia.

DIFFERENTIAL DIAGNOSIS

1. Rectal mucosal prolapse
2. Hypertrophied anal papillae
3. Rectal polyps, carcinoma
4. Fissure and fistula in ano
5. Inter sphincteric abscess and perianal endometroma
6. Skin tags, anal warts, crohn's disease.

EXAMINATION

History

The definitive diagnosis of haemorrhoidal disease can be made by a detailed history, paying particular attention to the color and character of bleeding, the relation of discomfort to defecation and the unequivocal history of relief from reduction of the prolapse into anal canal. The importance of detailed assessment by endoscopy in

establishing the diagnosis is to exclude the other causes of rectal discharge, prolapse, anal pain and bleeding.[30] The physical examination include inspection during straining, digital rectal examination and anoscopy.

Position

In most cases, diagnosis is easily made on physical examination. The left lateral position (Sim's position), with the buttocks projecting slightly beyond the edge of the table, and the prone jackknife position are both suitable for evaluation of anal conditions.

Inspection

Inspection with good lighting should precede any other type of examination. First degree haemorrhoids do not actually produce any abnormality of anal region on inspection. With second degree internal haemorrhoids there will be no projection of mucosa, but the skin covered component of the pile may be evident at the anal orifice as a distinct swelling. Large third degree haemorrhoids are recognized as projecting masses, the counter part of which is covered by skin, the inner portion with red or purplish anal mucosa, the junction between the two areas being marked by a linear furrow.

Digital Examination

The examination must be performed slowly, gently, with adequate lubrication and may require local anesthesia. In earlier stages, piles are soft, easily collapsible, venous swellings on palpation. In long standing cases, prolapsed pile mass undergoes fibrosis and pile mass becomes palpable. It can be felt as a longitudinal fold when

finger is swept round the lower rectum. This should not be confused with hypertrophic anal papillae.

Proctoscopy

If the haemorrhoids are present, they tend to bulge into the end of the proctoscope like grapes. To assess, the degree of haemorrhoids, proctoscope has to be introduced and withdrawn till it emerges from the anal orifice while instructing the patient to maintain expulsive effort. If no red anal mucosa is evident at anal orifice the piles are of first degree. If mucosa project, the piles are second / third degree. The second degree piles slip back immediately into the anal canal whereas if they are third degree, the mucosal prolapse persists till it can be reduced digitally.[7]

Sigmoidoscopy

This becomes important when proctoscope fails to reveal any significant haemorrhoids to account for patient's bleeding, since bright red rectal bleeding can come from sigmoid / rectal neoplasm / polyps or solitary rectal ulcer. Sigmoidoscopy is mandatory whenever there is blood mixed with stool especially if the patients are over 40 years of age. If any doubt exists regarding diagnosis, then rest of colon can be examined by colonoscopy / barium enema.[7]

Ano-rectal physiological measurements

To compare different methods of therapy for haemorrhoidal disease based on high or low anal pressure. Acute pain may require an evaluation under anesthesia in the operating room. Most patients with advanced haemorrhoidal disease do not require physiologic evaluation.[29]

Abdomen and General physical Examination

Growth in abdomen and pelvis, hepatosplenomegaly and presence of free fluid in the peritoneal cavity should be assessed by this examination.

COMPLICATIONS

Haemorrhage and Anaemia

Profuse haemorrhage is not rare; most often occurs in second degree haemorrhoids. Mainly bleeding occurs externally but it may continue internally after bleeding haemorrhoid is retracted or returned. Repeated profuse anal bleeding occasionally causes iron-deficiency anaemia.[30]

Strangulation

One or more of the internal haemorrhoids prolapse and become gripped by the external sphincter. Then congestion follows because the venous return is impended. Second-degree haemorrhoids are often complicated in this manner accompanied by considerable pain.[1]

Thrombosis

If the strangulated pile mass is not reduced within 1 or 2 hours, thrombosis takes place Once thrombosis occurs, pain passes off but tenderness persists.

Ulceration

Superficial ulceration of the exposed mucous membrane often accompany strangulation with thrombosis.[30]

Gangrene

Gangrene occurs when strangulation is sufficiently tight to constrict the arterial supply to haemorrhoid. The resulting sloughing is usually superficial and localized. Very occasionally massive gangrene extends to mucous membrane within anal canal and rectum and can cause spreading anaerobic infection and portal pyemia.

Fibrosis

After thrombosis internal haemorrhoids convert into fibrous tissue, which is earlier sessile but repeated traction during defecation causes it to pedunculate to constitute a fibrous polyp. Fibrosis commonly occurs in subcutaneous part of primary haemorrhoid. Fibrosis of an external haemorrhoid favours prolapse of an associated internal haemorrhoid.[1]

Suppuration

It is uncommon. It occurs as a result of infection of thrombosed haemorrhoid.

Portal Pyaemia

This complication is surprisingly infrequent. It can occur when patients with strangulated haemorrhoids are subjected to ill-advised surgery and even reported to follow banding.[30]

INVESTIGATIONS

Blood examination

To rule out anemia, haemoglobin percent is done. Total and differential counts to be noted. ESR, Fasting blood sugar, postprandial blood sugar, blood urea, serum creatinine to be done.

Urine examination

To rule out infection or diabetes, sugar, microscopy of urine to be done.

Stool examination

To rule out occult blood in anemic cases.

Chest x-ray

To rule out causes of chronic cough like chronic bronchitis, pulmonary tuberculosis which may secondarily cause haemorrhoids.

ECG

To rule out cardiovascular diseases.

TREATMENT

Goals of treatment:

1. To correct dietetic factors to avoid straining during defecation and to stimulate production of large, bulky and soft stools.
2. To decrease the reduction of sphincter spasm and intra abdominal pressure.
3. To avoid recurrence.
4. To avoid sequence of natural cause of disease.

5. To reconstruct normal anatomy and physiology of anal canal.

6. To treat any concomitant lesion.

A wide variety of treatment options are available for haemorrhoidal disease, ranging from advise on diet and bowel habit, non-operative methods of mucosal fixation and widening of anus, to different techniques of excision of internal anal vascular cushions and external vascular channels. The choice of method depends on severity & type of symptoms, degree of prolapsed, expertise of the operator& the equipment available.

CONSERVATIVE MANAGEMENT

1. **Medical management**
   - Advice
   - Changing defecation habits
   - Diet manipulation
   - Vasotropic drugs
   - Topical applications

2. Invasive therapy

   - Mucosal fixation
   - Injection or sclerotherapy
   - Rubber band ligation
   - Cryotherapy
   - Photocoagulation

3. **Bipolar diathermy**

4. **Direct current therapy**

Medical management

Advise:

Advise is best directed at those patients who have only minor symptoms and incorrect diet or hygiene habits. It is best to begin with advise about a high fiber diet, avoiding diarrhoeagenic foods or drink and thorough gentle perianal lavage after defecation.

Changing defecation habits:

Three errors of bowel habit that seem to be prevalent in patients with haemorrhoidal disease are:

- Insistence on having atleast one bowel movement daily.
- Neglect the first urge to defecate in the morning because it is not convenient to do so.
- Insistence on trying to pass the last portion of stool from the rectum or anal canal in the belief that, if it is not passed, discomfort will persist all day.

Diet manipulation:

The aim of dietary advice is to increase the bulk of the stool. Natural foods rich in fibre, especially fruits are highly recommended. Psyllium seed preparations, wheat or oat bran products help in normalizing the bowel movements. Patients should be encouraged to drink at least 5-8 ounce of water spaced evenly throughout the day in an attempt to maintain proper stool consistency.[7]

Vasotropic drugs

Hydroxyethylrutosides reduce oedema and inflammatory swelling.[16]

Topical applications

Aim of topical treatment is to lubricate and anaesthetize the anal canal so that it can defecate eventually. Now various preparations available are composed of antiseptic, anaesthetic, anti-inflammatory or anti-thrombotic drugs. Examples include Anusol, Xyloproct and Proctofoam.

Patient followup:

Patients who undergo medical management should be monitored carefully for at least one year to be sure that their progress is improving and that the bleeding has stopped. If the patients, complaints persist then other modalities of treatment should be considered.

INVASIVE THERAPY

Principles

Three broad methods have developed in parallel with each one relating to hypothesis

- Prevention of prolapse by mucosal fixation.
- Prevention of congestion or venous impedance by stretching or by dividing the internal sphincter.
- Excision of the engorged internal vascular cushions.

MUCOSAL FIXATION

Mucosa and the submucosal vascular cushions can be fixed to the underlying muscle coat by creating submucosal fibrosis or full thickness ulceration. The fibrosis

or scarring prevents or minimizes prolapse of the cushions into the anal canal during defecation. The methods of fixation include:

- Ligation or suture
- Injection of an irritant sclerosant
- Creating an ulcer by strangulation, burning or freezing.[16]

SCLEROTHERAPY

John Morgan first attempted Sclerotherapy to obliterate haemorrhoids as early as 1869 by using iron persulphate.[31] Anderson (1924) and Bacon (1949) outlined injection treatment and later Albright used 5% phenol in almond oil in dose of 3.5 ml.

Indications

This is ideal for first-degree internal haemorrhoid, which bleed. Early second degree haemorrhoids are often cured by this method but relapses.

Principle

Injection of sclerosing agents into the haemorrhoid causes fibrosis of vascular cushions due to effect of the irritant solution producing an inflammatory reaction.

Technique

Patient should have an empty rectum, but no special preparation is necessary. A proctoscope is introduced and the haemorrhoids are displayed. The injection is done above the main mass of each haemorrhoid into the submucosa at or just above, the anorectal ring. Using a Gabriel's syringe or a disposable instrument with the bevel of needle directed towards the rectal wall, 3-5 ml of 5% phenol in almond oil is

injected. The injection produces elevation and pallor of the mucosa. The solution spreads in the submucosa upwards to the pedicle and downwards into the internal haemorrhoid and to secondary haemorrhoids if present, but it is prevented reaching the external haemorrhoid. There is slight, transient bleeding from the point of puncture. The injection is painless, but a dull ache is common for few hours. Often three sessions at six weekly intervals are required.[32]

RUBBER BAND LIGATION

Rubber-band ligation is also called Baron's ligation.[34] Rubber band ligation has become one of the most frequently applied methods for treatment of internal haemorrhoids.[31] The instrument was originally described by Blaisdell in 1954 and later modified by Barron in 1963.[33]

Principle

Rubber bands applied to the pedicle of mucosa of internal haemorrhoids causes ischemia, necrosis and scarring preventing further bleeding or prolapse of the haemorrhoids and gradually cuts off through the tissues and within a period of seven to ten days these haemorrhoids slough off.[35]

Preparation and position of patient

- Bowel should be prepared before the procedure. Patient can be kept in either lithotomy or left lateral position.

Instruments required

- Proctoscope
- Light source

- Barron band applicator
- Alligator forceps
- Rubber bands (Barron bands)

Proctoscope

Other than the usual proctoscope with handle and obturator, there are some self illuminating proctoscopes, the added advantage is there is no need for external light source, which usually gives poor illumination when compared to self illuminating proctoscopes.

Light source

The light source for rubber band ligation is provided through a overhead lamp or illumination can be given from a light source attached to a headband of the operating surgeon or though self-illuminating proctoscopes.

Barron band applicator

The barron band applicator consists of a pair of ligating drums at one end, which has a conical rubber band loader, which can be screwed into the inner ligating drum with the help of threading on the distal end. The diameter of the ligating drum is 11 mm. It communicates with the handle through shafts which can be of variable length, the handles are interchangeable which fixes to the trigger with a spring action which brings it back to its original position, once the bands on the drum are fired, the loading principle of Gravlee umbilical cord ligator has been utilized.[2,36]

The Mc Giveny ligator is simpler and cheaper but less sturdy. Von Hoorn's banding equipment makes it a one-handed procedure using a 1.8 cm proctoscope with

a large rubber band stretched over its tip. Thomson's device is a modified Mc Giveny applicator used with a proctoscope. Others include the Preston gun and a complex multi-action machine popular in France.

Alligator forceps

These forceps are used to grasp the internal haemorrhoids to pull it through the hollow of the ligating drums. The grasping surfaces are smooth with atraumatic tooth so that the haemorrhoids do not bleed on grasping them.

Rubber bands (Barron bands)

Black rubber bands with inside diameter of 1/16th of an inch are slid into the inner cylinder of the ligating drum. New version of rubber band applicator are available which makes use of suction pressure from a suction device to pull the internal haemorrhoid into the hollow ligation drum and so there is no need for alligator forceps, but has a disadvantage that it cannot regulate the amount of tissue sucked into the drum as sometimes when patient complains of pain while traction of haemorrhoids into the ligation drum the bands are fired a bit lower down on the pedicle.

Procedure

Rubber band ligation is done as a minor Operation theatre procedure. Soap water or sodium biphosphate enema is given both on night before and the morning of the procedure.

Patient

Ideal for second degree haemorrhoids and some selected cases of third degree haemorrhoids.[36]

Technique

The proctoscope is passed through the anal canal so that the whole of internal cushion to prolapse into the lumen and is easy to recognize base to cushion. This base of each cushion is to be ligated about 6 mm above dentate line. The base of cushion usually lies about 1.5 to 2 cm above dentate line and here mucosal tissue can be grasped with forceps and pulled into cylinder of ligator without causing discomfort. Then gentle traction downwards on forceps and upward pressure with cylinder fill the cylinder with mucosa an underlying vascular tissue. Now handle is squeezed so that two rubber bands slip off the inner cylinder to strangulate approximately 1 cm diameter of the tissue. Barron recommends only one ligature performed in each session. Subsequent ligation should be performed at 3 weekly intervals.[5]

Post-procedure advice

Post procedure pain is relieved with oral analgesia. Warm sitz bath help greatly to relieve the pain.[1] Patient is advised to take liquid and semisolids for one day following the procedure, so that attempts at defecation are minimal. Patients are advised oral intake of bulk forming agents for atleast 6-8 weeks.[2]

Complications

Pain

Pain is the most common complication, it is usually in the form of mild discomfort subsiding with analgesics usually due to anal sphincter spasm.[2] Immediate, severe or progressive pain is an indication of misplaced ligation at or distal to the dentate line and requires immediate removal of the rubber band.

Bleeding

Seen when the necrosed tissue separates. The plane of cleavage between dead and live tissue is vascular granulation tissue that frequently bleeds. Severe bleeding required admission and transfusion in 0.5 to 1% patients.

Urinary retention

Urinary retention occurs in approximately 1% patients and is more likely if ligation has inadvertently included a portion of internal sphincter.[35]

Pelvic cellulitis

In 1980, O'Hara reported a case of fatal clostridial infection resulting from banding haemorrhoids. It is better to prevent this by screening patients for immuno deficiency, rectal washouts prior to banding, prophylactic oral antibiotics and use of meticulous technique.

Acute perianal sepsis (Necrotizing infection)

Acute perianal sepsis is an uncommon life threatening complication. Severe pain, fever and urinary retention are early signs of infection and should prompt immediate evaluation of patient under anaesthesia. Treatment includes debridement of necrotic tissue, drainage of associated abscess and administration of triple antibiotics. Because of this severe complication rubber band ligation should never be done in patients with immune deficiencies as in AIDS.[35]

Fig No.5 : RUBBER BAND LIGATION INSTRUMENTATION

INFRARED COAGULATION

First described by Neiger in 1979.[31]

Principle

Infrared light penetrates the tissue and is converted to heat causing tissue destruction.[31] Infrared light acts by coagulating tissue protein or evaporating water in the cells depending on the intensity and duration of application.[2]

Technique

Through proctoscopy probe tip is pressed directly onto the base of the vascular cushion. The use of 1.5 second pulse generates a tissue temperature of 100^0c, which results in 3 mm depth of coagulated protein[31]. The recommendation is to use for a duration of 1.5 seconds thrice on each haemorrhoid. It is a very fast procedure.

CRYOTHERAPY

"Kryo" is a Greek word for "cold". The use of freezing temperatures for the therapeutic destruction of tissue began in England in 1845 when James Arnott described the used of iced salt solutions about -200^0c to freeze advanced cancers in accessible sites like breast and cervix. Cryosurgery of haemorrhoids was started by Fraser and Gill and popularized by Lewis[37,38,39] and Lloyd Williams.[40]

Principle

When tissues freezes, it becomes solid at -200^0c. Rapid formation of extracellular ice crystals leads to intracellular dehydration, metabolic derangement and sludging of the microcirculation, which leads to hypoxic damage. Subsequent

intracellular ice formation leads to physical disruption of the cell membranes and intracellular compartments finally causing cell death. Permanent destruction of tissue occurs at -220^0c. Upon rewarming the damage caused to the microcirculation leads to increased capillary permeability and tissue swelling, which further compromises the oxygenation of tissues. This is responsible for the profuse discharge that follows cryosurgery as well as the pain that accompany the procedure (cryosurgery destroys nerve fibres and hence is said to be painless). The frozen tissue undergoes infarction and gangrene and sloughs in about 10-14 days. Healing is accomplished by severe fibrosis.[16]

Technique:

The technique involves the application of the cryoprobe in long axis of haemorrhoid while nitrous oxide is circulated through it. Tip of the probe develops white frost and adheres to haemorrhoid which becomes white reaching maximum diameter of 6-7 mm after 2 minutes. Freezing should be continued for 3 minutes and once flow is stopped it takes 10-12 seconds for probe tip to get thawed and haemorrhoidal tissue detaches from the probe.

BIPOLAR THERAPY

Principle

Principle of bipolar therapy is the local application of heat produces tissue destruction, ulceration and fibrosis.

Technique

Disposable non-conductive anoscope is used. The side of the probe is applied directly over haemorrhoid above the dentate line producing coagulation of 3 mm deep. The advantage in this technique is that the depth of penetration is limited even after multiple application.

DIRECT CURRENT THERAPY

Instrument

Monopolar low voltage instrument, which include generator, attachable handle, sterile probes, grounding pad, non-conductive anoscope.

Technique

The probe is placed directly on the haemorrhoid and electric current upto 16 milliamps is passed for 10 minutes. This does not produce heat but Sodium hydroxide at negative electrode.

OPERATIVE TREATMENT OF HAEMORRHOIDS

1. **Overcoming anal canal fibrosis or anal hypertension**
   - Anal stretch procedure
   - Internal sphincterotomy
2. **Suture**
3. **Haemorrhoidectomy**
   - Closed haemorrhoidectomy
   - Open haemorrhoidectomy
   - Whitehead haemorrhoidectomy
   - Laser haemorrhoidectomy
   - Diathermy haemorrhoidectomy

ANAL STRETCH OR MAXIMAL ANAL DILATATION (LORD'S)

Lord, suggested in 1968 that internal haemorrhoids are caused by circular constricting fibrous bands in the wall of lower rectum or in anal canal leading to abnormal raise of intrarectal pressure during the act and consequent venous congestion.

Procedure

Lord claims that bands are broken down under anesthesia by vigorous stretching of anal canal and lower rectum with fore fingers of both the hands inserted, so that they reach into the bowel and dilate in all directions. As soon as dilatation is done a plastic sponge is immediately packed into lower rectum and anus to prevent development of submucous and perianal haematoma.[5]

Complications

1. Anal incontinence
2. Splitting of anal and perianal skin
3. Mucosal prolapse.

INTERNAL SPHINCTEROTOMY

Internal sphincterotomy has been used in a selected group of patients with haemorrhoids with high resting anal pressures. The operation is performed as a subcutaneous technique using a cataract knife under local or general anaesthesia

Complications

- Prolapse
- Perianal haematoma

SUTURE[16,26]

Farag (1978) revived an ancient technique and described suture as perforating veins at the base of the cushion.

A 3-0 non-absorbable mattress suture is placed at base of vascular cushions occluding the perforating veins and attaining mucosal fixation as well. All three are ligated at one session.

HAEMORRHOIDECTOMY

Indications

- Third degree haemorrhoids.[1]
- Fourth degree haemorrhoids[1]
- Second-degree haemorrhoids which have not been cured by non-operative treatment.[1]
- Fibrosed haemorrhoids
- Interno external haemorrhoids when external haemorrhoid is well defined.
- Haemorrhoids complicated by ulceration, fissure, fistula, large hypertrophied and papilla and extensive skin tags.[2]

FERGUSON'S (CLOSED) HEMORRHOIDECTOMY

In 1931 Fansler described a technique where intra anal anatomic dissection was conducted which was later developed and modified by Ferguson and Heaton in 1959.

Indications

- Excessive bleeding, uncontrolled with rubber band ligation.
- Severe prolapse or pain.

- Symptomatic haemorrhoids in patients who have other anorectal conditions requiring operation.

Technique

After a packaged sodium biphosphate enema is given 1 to 2 hours before procedure. Under General or spinal anaesthesia the patient is put in Jacknife position with buttocks taped apart. A suitable retractor as Hill Ferguson type is used. With scissors an elliptical excision is started at the perianal skin to include external and internal haemorrhoids and is ended at the anorectal ring. The mucosa and submucosa are dissected from the underlying internal sphincter with care taken not to injure the muscle. The pedicle is transfixed and ligated with 3/0 vicryl or Dexon. The entire wound is closed with running 3/o chromic catgut. The strip of excision should not be more than 1 – 1.5 cm so that closure is without tension. If too much tissue is excised, wound should be marsupialized and left open. The largest and most redundant haemorrhoid should be excised first. With this approach, three quadrants may be modified so that only two-quadrant haemorrhoidectomy is necessary.

Variations in technique include – use of left lateral position by Ferguson, prone jack knife position by Khubchandani, adjuvant sphincterotomy and marsupialisation by Ruiz-Moreno.

MILLIGAN-MORGAN (OPEN) HEMORRHOIDECTOMY

The first descriptions of open haemorrhoidectomy are from two centuries ago. The technique was made popular in the United Kingdom by Milligan and Morgan in 1937 and is still widely used in Europe. Because of location, technical difficulties or extensive disease with gangrenous haemorrhoidal tissue, an open approach is

required. This technique also may be more useful for avoiding subsequent anal stenosis. Operation is done usually under spinal or general anaesthesia.

In this procedure, haemorrhoidal tissue and vessels involved are excised in the same manner as in Ferguson's procedure, including the placement of a suture at the hemorrhoid pedicle, but the incisions are left open.

Indications

1. Third degree or Fourth degree haemorrhoids
2. Failure of conservative treatment of second degree haemorrhoids
3. Fibrosed haemorrhoids due to thrombosis or injection treatment
4. Intero external haemorrhoids
5. Anaemia

Position of patient

The patient is placed in lithotomy position with buttocks projecting well beyond the end of table. The anal region is cleaned and draped.

Technique

Infiltration of subcutaneous tissues of the perianal region with a 1/1, 00,000 solution of adrenaline hydrochloride is done for haemostatic purpose. The skin covered component of each pile are seized in artery forceps and retracted outwards. The purple anal mucosa of each pile is taken in forceps and drawn downwards and outwards. The traction of three piles is maintained till pink rectal mucosa shows not only the upper part of pile but also the mucosal folds between the piles.[5]

Isolation and ligation of pedicle

The two forceps applied to the pile mass are taken in the palm of operator's left hand and drawn downwards and to the opposite side, while the operator's index finger rests in the anal canal and exerts pressure on the upper pole of the pile, with the scissors in the right hand a 'v' shaped cut in the anal and perianal skin is made corresponding to the pile. The limbs of 'v' abutting on the mucocutaneous junction not extending into mucosa, the point of 'v' lying 2.5-3 cm distal to the junction. Now skin forceps in drawn to expose raw surface of pile. Longitudinal strands of fascia and muscle is seen from the region immediately internal to the inferior margin of the internal sphincter. These strands are termed as "Muscularis submucosae ani". In the classic operation described by Milligan these are not divided. Further dissection of pile consists of making a slight nick in the mucosa above and below to narrow the mucosal pedicle before applying the ligature, excision of piles and cutting of tails of ligatures. Now a finger is passed to determine the size of the lumen and anal canal. The dressing applied in gauge swab is soaked in Milton and placed on anal orifice and external wounds. And the dressing is maintained by means of firm 'T' bandage.

Fig No.6 : HAEMORRHOIDECTOMY INSTRUMENTATION

Post operative care

- The dressings are left undisturbed for 24 hrs, later they are changed twice daily.
- The patient should take bath and reapply the dressing after each bowel action.
- A laxative of 15 ml should be given 8th hourly to make evacuation easier; which is advised to start on the day after surgery if patient not passed stools by 3rd post-operative day and sodium hydrogen phosphate enema is administered.
- On 5th day a finger should be passed to check the healing is proceeding satisfactorily.
- The patient can be discharged between 6th to 10th post-operative days. But finer healing of external wounds will not occur for 6 weeks.

- On discharge, patient is advised to take high fiber diet, plenty of oral fluids, laxatives and Sitz bath daily.
- The patient should return for examination 3 weeks after surgery. Per rectal examination is done to check any stenosis has developed.
- Proctoscopy should not be done as it is liable to break down healing wounds and precipitate development of acute fissure.[5]

Variations of technique

Addition of sphincterotomy and anal dilation- critical evaluation of the two has not substantiated any benefit with added risks to continence.

Complications

1) Pain- the severity of pain experienced is patient dependent. Various suggestions as to the cause include

i. Ligation of sensitive epithelium below dentate line, so the submucosal technique was introduced but no benefit has been observed on comparative studies.

ii. Spasm of the sphincter- addition of four finger stretch or sphincterotomy was recommended but no benefit has been demonstrated.

iii. The most plausible cause is the exposed raw areas in the anal canal; thus the closed techniques by Parks and Ferguson-Heaton were introduced. With the former there is apparently no pain relief due to the open wound below the dentate line while the latter remains to be tested.[41]

2) Acute retention of urine - The risk factors[42] identified include four quadrant excision/ three quadrant excision, male gender. Other risk factors are more than one operation, older age, intra operative fluids and post operative fluids.

3) Reactionary or secondary hemorrhage

a. Reactionary haemorrhage: It is due to opening up of small bleeding in one of the anal wound. Haemostasis can be achieved with artery forceps and ligature in the ward or return to theatre and general anesthesia may be used to secure haemostasis.

b. Secondary haemorrhage: It usually occurs between 7th and 10th post operative days. It is due to occurrence of sepsis in pile pedicles with resulting softening of main arterial wall. The bleeding follows defecation. If bleeding is small, conservative management with bed rest and sedation may suffice. If bleeding is severe, patient should be shifted to theatre. Under general anesthesia, proctoscopy to be done to identify the bleeding point and achieve haemostasis by ligating it.

4. Rare complications include:

- Anal stenosis
- Anal fissure
- Absces
- Fistula in ano
- Long-term incontinence[43]

Other complications include skin tags, pseudopolyps and epidermal cysts. Anal leakage and soiling is common (50%) during early postoperative period but settles in 6-8 weeks. Causes include anal dilatation, loss of sensation and transient reduction in anal canal pressures.

CIRCULAR HAEMORRHOIDECTOMY[44,45,46]

In 1882, Whitehead described excision of entire pile bearing area upto the muscle with primary closure. Similar techniques have been described for prolapsed fourth degree haemorrhoids in the form of circular haemorrhoidectomy with anoplasty using the Hospital Leopold Bellan technique, also called radical haemorrhoidectomy. More recently, circular staplers have been used for the same purpose with advantages of reduction in time and blood loss.

STAPLED HAEMORRHOIDOPEXY

Most recently a modified circular stapler approach has been advocated for surgical management of haemorrhoids. The so-called procedure for prolapsed haemorrhoids was described initially by Longo in1998.[47]

Technique

The technique involves placement of a purse string suture using nonabsorbable monofilament material approximately 2-4 cm cephalad to the dentate line. The suture is placed into the mucosa and sub mucosa of the lower rectum avoiding the muscular layer and vagina. Care must be taken to place the purse string sufficiently high so that when fired it does not incorporate the anal mucosa and underlying internal sphincter. Severe pain might ensure, in addition to the risk of stricture and mucosal ectropion. These complications are avoided if purse string is placed atleast 2 cm above the dentate line. The single advantage of stapled haemorrhoidopexy is reduction in postoperative pain.

LASER HAEMORRHOIDECTOMY

Use of carbon dioxide laser for haemorrhoidectomy has been described recently. It is less painful as the laser burns and seals vessels and nerves simultaneously but according to others[48] and offers no advantage over conventional haemorrhoidectomy. Its role is still being evaluated.

Other surgical procedures:

Park's (submucosal) haemorrhoidectomy

Includes removal of the hemorrhoidal tissue through an incision in the anal and rectal mucosa and anoderm. The rationale of this surgical method is to minimize the injury to the anoderm and mucosa, causing less damage to somatic nerve fibers.[49] This technique is not frequently used, because offers a solution to the external component of the haemorrhoidal bundle or to the excess of mucosa that is often a part of the disease.

Harmonic and LigaSure haemorrhoidectomy

The Harmonic Scalpel (Ethicon Endo-Surgery) uses ultrasonic waves that allow cutting and coagulation of haemorrhoidal tissue at low temperatures in a specific point, with reduced lateral thermal effect. When using electrocautery, coagulation is achieved at temperatures higher than 150°C, resulting in formation of an eschar that covers and seals the bleeding area. The Ligasure vessel sealing system for sutureless haemorrhoidectomy is a relatively new technique that uses bipolar electrothermal device. This procedure offers surgical treatment with short operative time and less postoperative pain.[50]

MATERIALS AND METHODS

MATERIAL

This prospective parallel group comparative study included 60 patients with second degree haemorrhoids admitted in Sri Devaraj Urs Medical College and attached teaching hospitals, Kolar, from January 2012 to June 2013 satisfying all the inclusion criteria mentioned below after the clearance from the ethical committee was obtained.

INCLUSION CRITERIA:

- All cases of second degree haemorrhoids presenting to the outpatient department of General Surgery.

EXCLUSION CRITERIA:

- Patients with other causes of bleeding per rectum (secondary haemorrhoids)
- Patients with bleeding diathesis
- Pregnant women
- Intercurrent anal pathology (like fistula in ano and anal fissure)

METHODS

- Total of 60 patients who were diagnosed to have second degree haemorrhoids were included in the study.
- Patients were subjected to detailed enquiry regarding the mode of presentation, clinical examination and routine laboratory investigations preoperatively.
- Informed written consent was obtained from patients.
- Patients are then divided into two groups – RBL and EH.

- RBL: All even number patients are allocated to Barron's banding group.
- EH: All odd number patients are allocated to haemorrhoidectomy group.
- Rubber band ligation was done in 30 patients and Milligan-Morgan (Open) Haemorrhoidectomy in 30 patients.
- All patients were operated on an inpatient basis. The hospital stay of patients for analysis was calculated starting from the day of surgery.
- The patients were followed up closely in the wards for any complications.
- All patients are issued a questionnaire pertaining to post operative pain, control of haemorrhoidal symptoms, post operative complications, number of days off-work and overall assessment of the treatment.
- Cost effective analysis was done using cost scoring based on obvious expenditure of following :
    a) Cost of surgery
    b) Cost of investigations
    c) Cost of hospital stay including dressings
- **Follow up :**At the time of discharge patients were asked for review at OPD on seventh post operative day, after one month and after 6 months, then weekly for first four weeks after surgery and there after once a month for the next five months.
- The parameters used to compare Barron's banding and Haemorrhoidectomy were :

    a) Post operative complications like pain, bleeding, discharge and recurrence
    b) Duration of hospital stay
    c) Cost effectiveness

    Cost score : 1 = <2000 INR
    2 = 2000 to 4000 INR
    3 = 4000 to 6000 INR
    4 = >6000 INR

- Student t test was used for comparing the two groups.

Fig No.7 : PICTURE OF RUBBER BAND LIGATION APPLICATION

Fig No.8 PICTURE OF HAEMORRHOIDECTOMY

RESULTS AND OBSERVATIONS

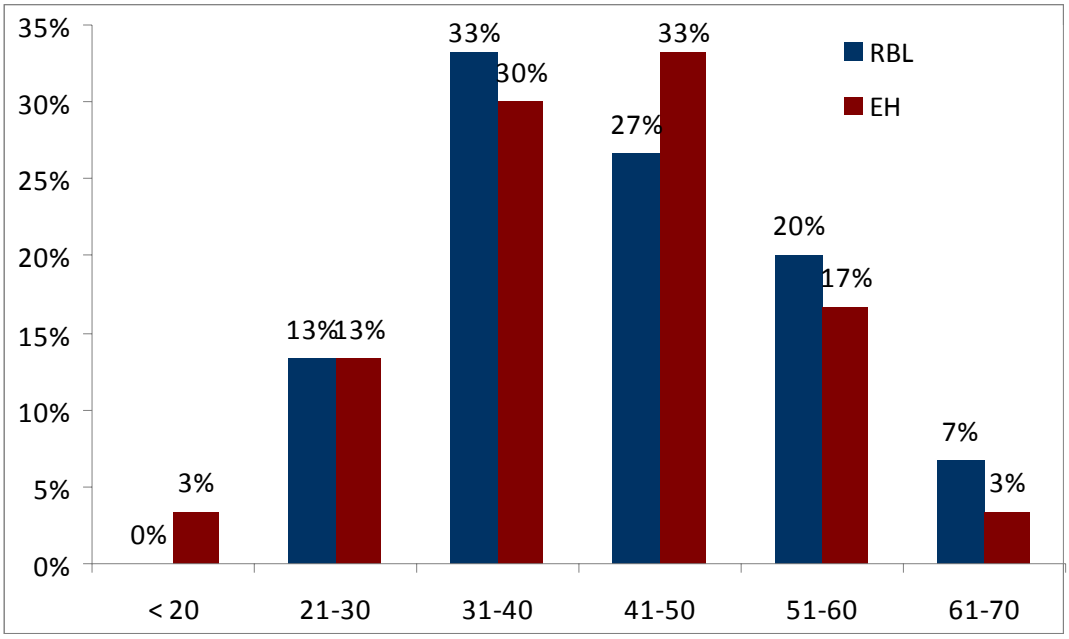
During the present study between January 2012 and June 2013, total of 60 patients who were admitted in the department of surgery with history and clinical examination suggestive of second degree haemorrhoids were analysed. Out of 60 patients, 30 patients were treated with Barron's banding and remaining 30 with open haemorrhoidectomy.

Table No.1 Distribution of patients in both the groups according to age

Age in years	Group RBL		Group EH	
	No	%	No	%
< 20	0	0.0	1	3.3
21-30	4	13.3	4	13.3
31-40	10	33.3	9	30.0
41-50	8	26.7	10	33.3
51-60	6	20.0	5	16.7
61-70	2	6.7	1	3.3
Total	**30**	**100.0**	**30**	**100.0**
Mean ± SD	**43.33±10.94**		**41.57±10.83**	

p=0.532

In the present study, haemorrhoids were commonly seen at the age group of 31-40 & 41-50 years. The mean age of presentation was 42.45 years. The maximum age of the patient recorded was 65 years and minimum age was 19 years. The mean age was 43.33 yrs with standard deviation of 10.94 in RBL group and 41.57 yrs with standard deviation of 10.83 in EH group.



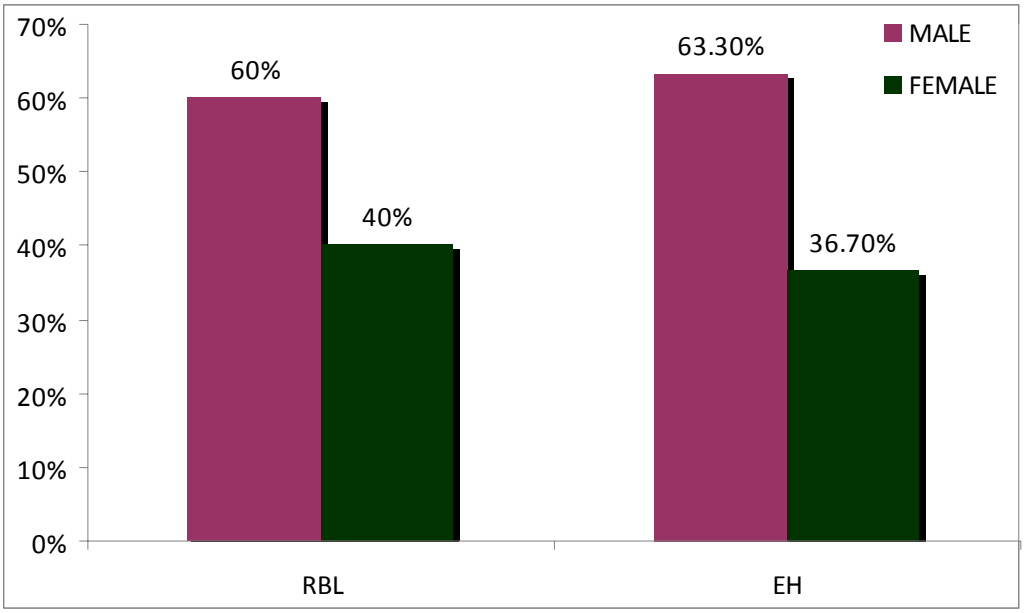
Graph No.1: Distribution of age in both the groups

Table No.2 : Distribution of patients according to Gender

Gender	Group RBL		Group EH	
	No	%	No	%
Male	18	60.0	19	63.3
Female	12	40.0	11	36.7
Total	**30**	**100.0**	**30**	**100.0**

p=0.791

In the present study, 61.6% of patients were males and 38.4% were females. The incidence in males is 60% and in females is 40% in RBL group, 63.3% in males and 36.7% in females in EH group.

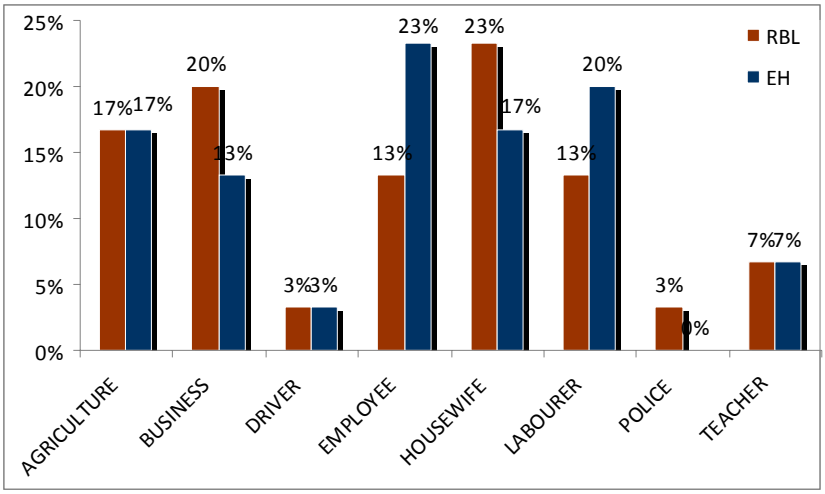


Graph No.2 Distribution of sex in both the groups

Table No.3 Distribution of patients in both the groups according to occupation

Occupation	Group RBL		Group EH	
	No	%	No	%
Agriculture	5	16.7	5	16.7
Business	6	20.0	4	13.3
Driver	1	3.3	1	3.3
Employee	4	13.3	7	23.3
Housewife	7	23.3	5	16.7
Labourer	4	13.3	6	20.0
Police	1	3.3	0	0.0
Teacher	2	6.7	2	6.7
Total	**30**	**100.0**	**30**	**100.0**

Above table shows that predominance of disease is seen in people who are subjected to sedentary occupation(business, house wife, teacher, police, driver) which is about 66.6% and strenuous occupation(agriculture, labourer) about 33.3% cases.



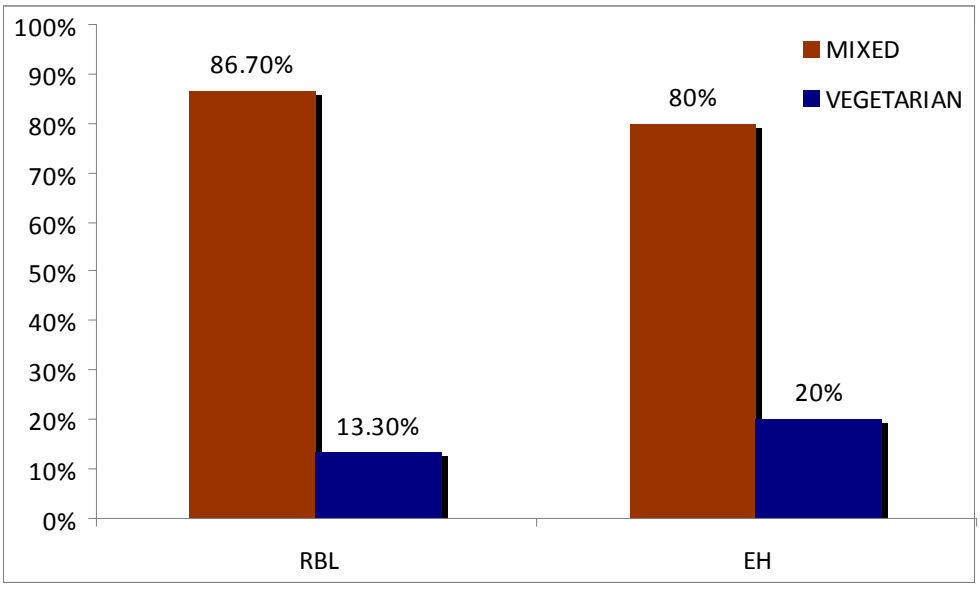
Graph No.3 : Distribution of occupation in both the groups

Table No.4 Distribution of patients in both the groups according to dietary pattern

Diet	Group RBL		Group EH	
	No	%	No	%
Mixed	26	86.7	24	80.0
Vegetarian	4	13.3	6	20.0
Total	**30**	**100.0**	**30**	**100.0**

p=0.488

The above table reveals that most of the patients in both the groups are having mixed dietary habits i.e., 86.7% in RBL group and 80% in EH group and 13.3% in RBL group and 20% in EH group are vegetarians.

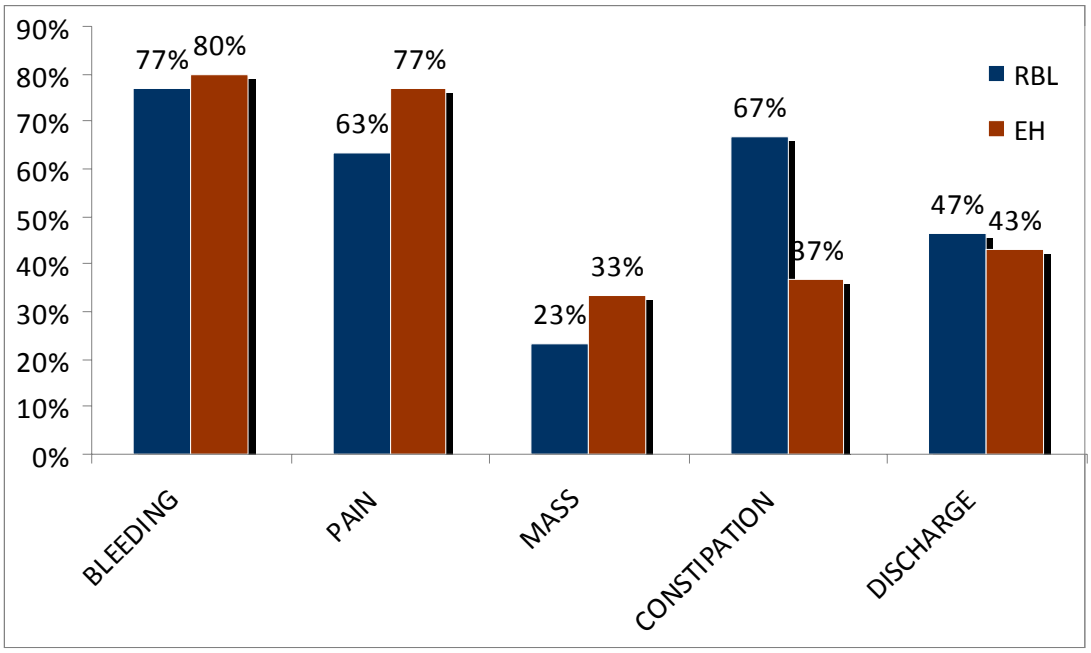


Graph No.4 Distribution of dietary in both the groups

Table No.5 Distribution of patients in both the groups according the mode of presentation

Presenting Symptoms	Group RBL (n=30)		Group EH (n=30)		p value
	No	%	No	%	
Bleeding	23	76.7	24	80.0	0.754
Pain	19	63.3	23	76.7	0.260
Mass	7	23.3	10	33.3	0.390
Constipation	20	66.7	11	36.7	0.020*
Discharge	14	46.7	13	43.3	0.795

In the present study, majority .i.e. 23 (76.7%) presented with history of bleeding followed by 20 (66.7%) patients presenting with constipation in RBL group and in EH group majority of them .i.e. 24 (80%) patients presented with history of bleeding followed by 23 (76.7%) patients presenting with pain. The other presenting complaints such as pain, mass & discharge were present in 19 (63.3%), 7 (23.3%) and 14 (46.7%) patients in the RBL group and complaints such as mass, constipation & discharge were seen in 10 (33.3%), 11 (36.7%) and 13 (43.3%) patients respectively in the EH group.

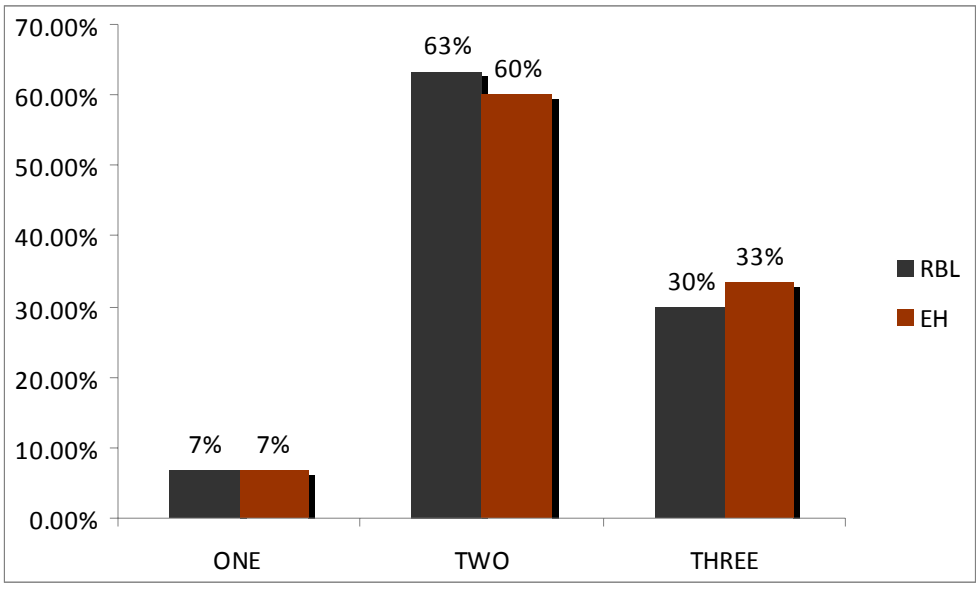


Graph No.5 : Distribution of mode of presentation in both groups

Table No.6 Distribution of patients in both groups according to number of masses

Number of masses	Group RBL		Group EH	
	No	%	No	%
1	2	6.7	2	6.7
2	19	63.3	18	60.0
3	9	30.0	10	33.3
Total	**30**	**100.0**	**30**	**100.0**

In the present study 2 (6.7%) patients presented with 1 mass in each group, 19 (63.3%) patients presented with 2 masses and 9 (30%) presented with 3 masses in RBL group. In EH group 2 (6.7%) patients had 1 mass, 18 (60%) patients had 2 masses and 10 (33.3%) patients had 3 masses.



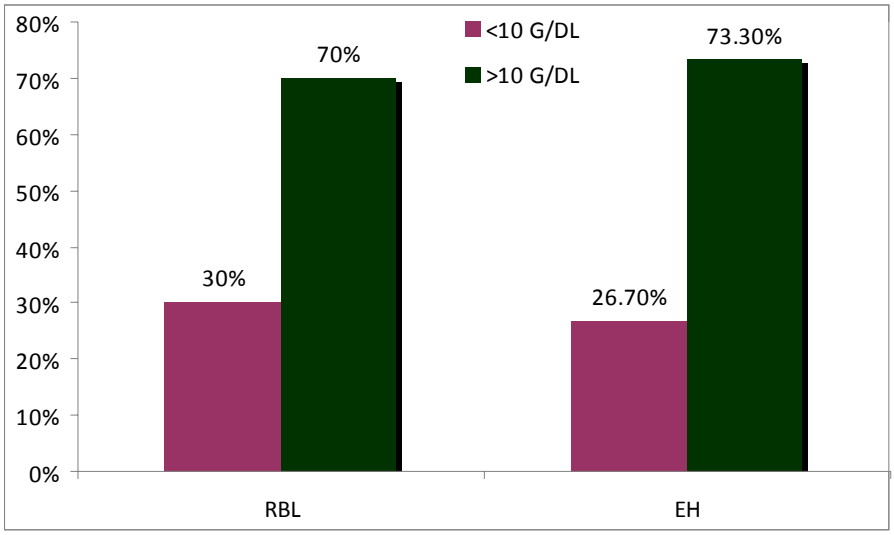
Graph No.6 Distribution of patients according to presentation with number of masses

Table No.7 Distribution of patient in both the groups according to Haemoglobin level

Anaemia(g/dl)	Group RBL		Group EH	
	No	%	No	%
<10	9	30.0	8	26.7
>10	21	70.0	22	73.3
Total	**30**	**100.0**	**30**	**100.0**

p=0.774

Above table reveals that 9 (30%) patients in RBL group & 8 (26.7%) patients in EH group were anemic.



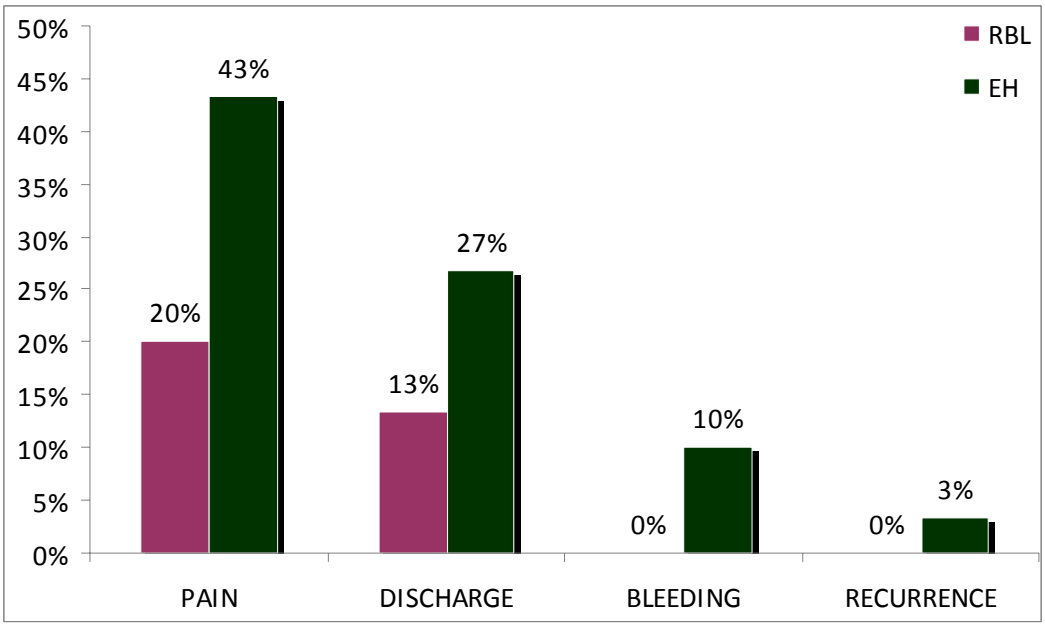
Graph No.7 Distribution of patients according to haemoglobin level

Table No.8 Distribution of patients in both groups according to post operative complication

Post Operative complications	Group RBL (n=30)		Group EH (n=30)		p value
	No	%	No	%	
Pain	6	20.0	13	43.3	0.052+
Discharge	4	13.3	8	26.7	0.197
Bleeding	0	0.0	3	10.0	0.237
Recurrence	0	0.0	1	3.3	1.000

In the present study, out of 30 patients who underwent rubber band ligation 6 (20%) patients had post operative pain and discharge was seen in 4 (13.3%) patients, bleeding and recurrence were not seen in this group.

Out of 30 patients who underwent haemorrhoidectomy, 13 (43.3%) patients had post operative pain, discharge was seen in 8 (26.7%) patients post operatively, bleeding was seen in 3 (10%) patients which was not significant, subsided by packing and recurrence was seen in 1 (3.3%) patient.



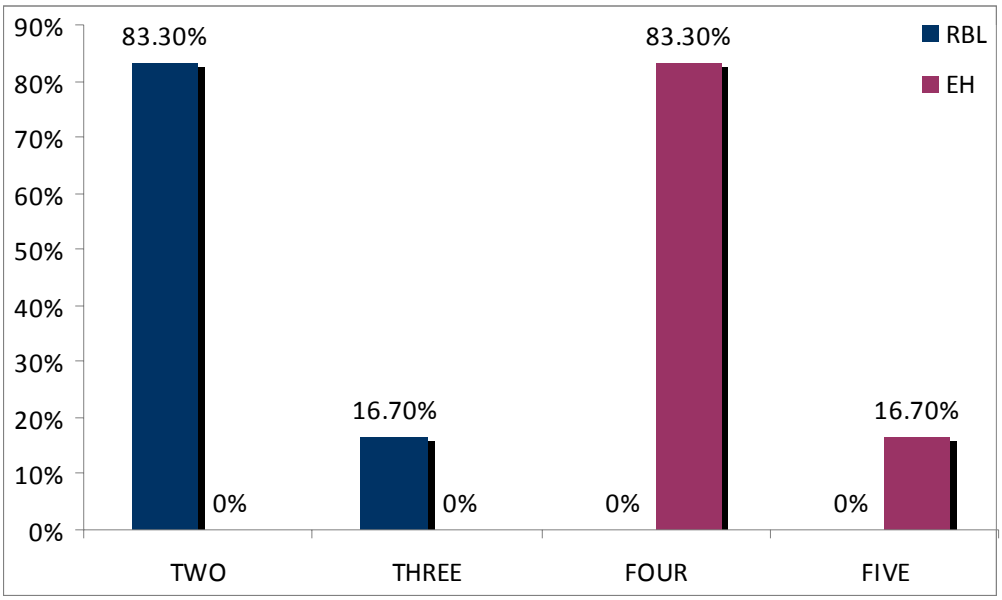
Graph No.8 : Distribution of post operative complications in both groups

Table No.9 Distribution of patients of both groups according to no. of days of hospital stay

Days of hospital stay	Group RBL		Group EH	
	No	**%**	**No**	**%**
2	25	83.3	0	0.0
3	5	16.7	0	0.0
4	0	0.0	25	83.3
5	0	0.0	5	16.7
Total	**30**	**100.0**	**30**	**100.0**
Mean ± SD	**2.17±0.38**		**4.17±0.38**	

p= <0.001**

In the present study, out of the 30 patients in RBL group, 25 (83.3%) patients stayed in the hospital for 2 days and the remaining 5(16.7%) patients stayed for 3 days. And in the EH group, 25(83.3%) patients stayed for 4 days and remaining 5(16.7%) patients stayed for 5 days in the hospital. The mean duration of stay was 2.17 days with standard deviation of 0.38 in the RBL group and 4.17 days with standard deviation of 0.38 in the EH group.



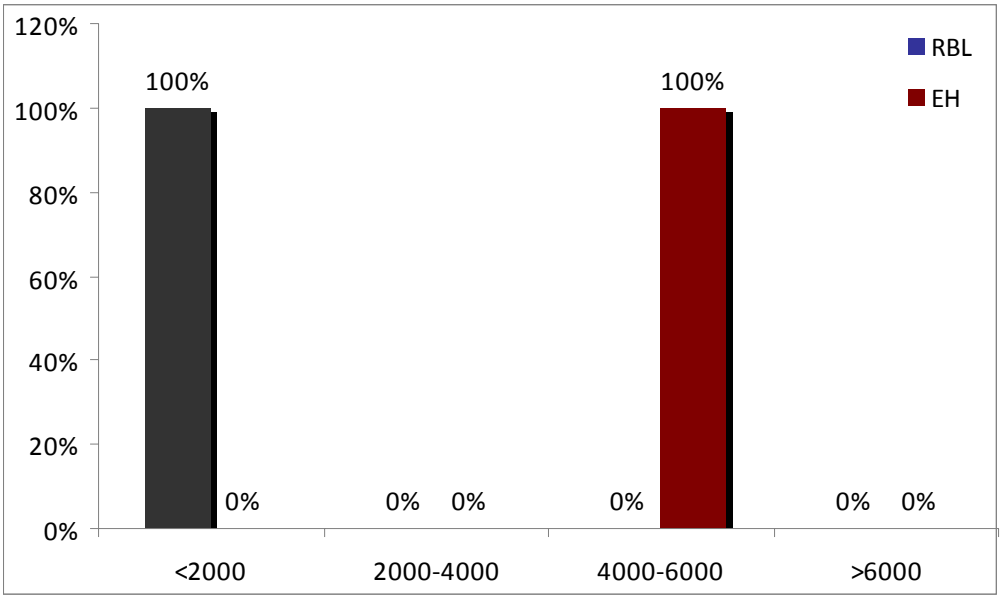
Graph No.9 : Distribution of number of days of hospital stay in both groups

Table No.10 Distribution of patients of both groups according to the cost of hospital stay

Cost	Group RBL		Group EH	
	No	%	No	%
<2000	30	100.0	0	0.0
2000-4000	0	0.0	0	0.0
4000-6000	0	0.0	30	100.0
>6000	0	0.0	0	0.0
Total	**30**	**100.0**	**30**	**100.0**

p= <0.001**

The above table reveals that cost of hospital stay for patients in RBL group was below 2000 INR and between 4000 – 6000 INR in the EH group.

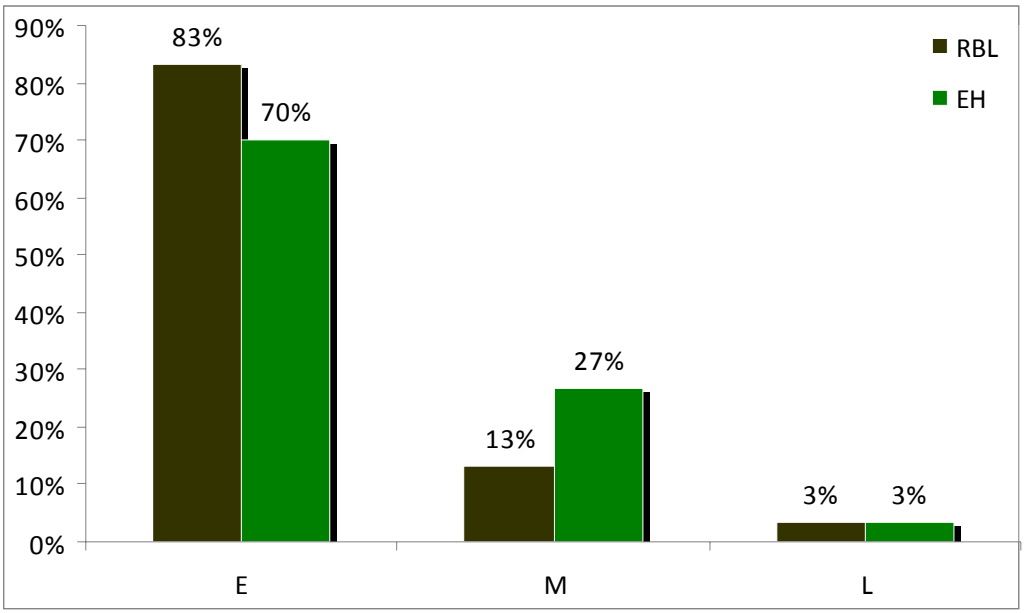


Graph No.10 Distribution of patients of both groups according to cost of hospital stay

Table No.11 Distribution of patients according to assessment of patients

Patient Assessment	Group RBL		Group EH	
	No	**%**	**No**	**%**
E	25	83.3	21	70
M	4	13.3	8	26.7
L	1	3.3	1	3.3
Total	**30**	**100.0**	**30**	**100.0**

In the present study out of 30 patients in RBL group, 25 (83.3%) patients assessed treatment as excellent help, 4 (13.3%) patients assessed as moderate help and 1 (3.3%) patient assessed as little help. In EH group out of 30 patients 21 (70%) patients assessed treatment as excellent help, 8 (26.7%) patients assessed as moderate help and 1 (3.3%) patient assessed as little help.



Graph No.11 Distribution of patient's assessment in both groups

DISCUSSION

Haemorrhoids is one of the oldest diseases suffered by mankind, though most of the times not life threatening still it causes significant discomfort. The search for a simple, outpatient based, convenient and cost effective treatment for haemorrhoids still continues.

The present study was done to know the efficacy of rubber band ligation and haemorrhoidectomy in the treatment of second degree haemorrhoids.

1) Age – Incidence

In the present study, the mean age of presentation was 42.45 years. This is in accordance with study conducted by R Shalaby 2001[52] where the mean age of presentation was 44 years.

Author	**Mean age(yrs)**
M C Mishra 2000[51]	33.3
R Shalaby 2001[52]	44
H Oritz 2002[53]	46.6
E Ganio 2001[54]	48
N Kumar 2002[55]	56
Present study	**42.45**

2) Sex – Incidence

Haemorrhoids affect both the sexes, but is more common in males. In the present study, 61.6% of patients were males and 38.4% were females which is comparable with that of R. Shalaby[52] 2001 whose study showed male:female ratio of 60:40 and Antony R 1971[56] where the male:female ratio was 62:38.

Author	**Male(%)**	**Female(%)**
Ruffin Hood[57]	75	25
Antony R 1971[56]	62	38
N Kumar 2002[55]	51	49
R Shalaby 2001[52]	60	40
Present study	**61.6**	**38.4**

3) Occupation

In the present study, predominance of disease is seen in people who are subjected to sedentary occupation (business, house wife, teacher, police, driver) which is about 66.6% and strenuous occupation (agriculture, labourer) about 33.3% cases.

4) Dietary pattern

In this study, 83.3% of cases had mixed dietary habits and the remaining 16.7% of cases were vegetarians.

5) Mode of presentation

In the present study, out of the 60 patients, majority i.e., 47 (78.3%) presented with bleeding as chief complaint, followed by pain 42 (70%), 17 (28.3%) patients

presented with mass and 31 (51.6%) and 27 (45%) patients presented with constipation and discharge as complaint respectively.

Complaints	R Shalaby[52]	OJ Traynor & AE Carter[58]	H Ortiz[53]	Present study
Bleeding(%)	69	89	86	78.3
Pain(%)	28	49	46	70
Mass(%)	34	92	58	28.3
Constipation(%)	60	15	0	51.6
Discharge(%)	39	6	0	45

6) Number of haemorrhoidal masses

In the present study, majority of the patients i.e., 19 (63.3%) in RBL group & 18 (60%) in EH group presented with 2 masses and 11 (36.7%) patients in RBL group and 10 (33.3%) patients in EH group presented with 3 masses and 2 (6.7%) in each group presented with 1 mass.

7) Distribution of patients according to hemoglobin level

In our study, 9 (30%) patients in RBL group & 8 (26.7%) patients in EH group were anemic.

8) Post operative complications

In the present study, out of 30 patients who underwent rubber band ligation 6 (20%) patients had post operative pain and discharge was seen in 4 (13.3%) patients, bleeding and recurrence were not seen in this group. Out of 30 patients who underwent haemorrhoidectomy, 13(43.3%) patients had post operative pain, discharge

was seen in 8(26.7%) patients post operatively, bleeding was seen in 3(10%) patients and recurrence was seen in 1(3.3%) patient.

In a study conducted by H. Hetzer, Nowalas Demarines, Alexander[59] – E series 4.0% of patients after open haemorrhoidectomy had recurrence.

Post operative complications	Cheng FC[60]		Cheng FC[60] Lee[61]		Murie JA[62]		Present study	
	RBL%	**EH%**	**RBL%**	**EH%**	**RBL%**	**EH%**	**RBL%**	**EH%**
Pain	30	100	29	-	7	100	**20**	**43.3%**
Bleeding	-	-	1	11	-	13.4	**-**	**10%**

9) Duration of hospital stay

In the present study, out of the 30 patients in RBL group, 25 (83.3%) patients stayed in the hospital for 2 days and the remaining 5 (16.7%) patients stayed for 3 days. And in the EH group, 25 (83.3%) patients stayed for 4 days and remaining 5 (16.7%) patients stayed for 5 days in the hospital. The mean duration of stay was 2.17 days with standard deviation of 0.38 in the RBL group and 4.17 days with standard deviation of 0.38 in the EH group.

In a study conducted by Anthony R Groves[56], 16% had 1-3 days off work comparable to 12% of Arabi et al[63] and patients taken > 4 days off work were 5.8% in Arabi et al and 6% in Anthony R. Groves.

In a study conducted by R Shalaby[52], the post operative hospital stay for haemorrhoidectomy was 2.2 days. In a study conducted by Murie JA[61], the patients were treated as outpatients for Barron's Banding and none of the patients were kept for more than 1 day.

10) Cost of hospital stay

In our study, the cost of hospital stay for patients in RBL group was below 2000 INR and between 4000 – 6000 INR in the EH group.

11) Patient's assessment

In the present study out of 30 patients in RBL group, 25 (83.3%) patients assessed treatment as excellent help, 4 (13.3%) patients assessed as moderate help and 1 (3.3%) patient assessed as little help. In EH group out of 30 patients 21 (70%) patients assessed treatment as excellent help, 8 (26.7%) patients assessed as moderate help and 1 (3.3%) patient assessed as little help.

Assessment	**Present study**		**Ruffinhood[57] (RBL)**	**Murie JA[62]**	**Anthony R[56] (RBL)**
	RBL	**EH**			
Excellent help(%)	**83.3**	**70.0**	58	72	66
Moderate help(%)	**16.3**	**26.7**	42	16	25
Little help (%)	**3.3**	**3.3**	-	11	9

SUMMARY

- In the present study, the mean age of presentation was 42.45 years.
- Haemorrhoids affect both the sexes, but is more common in males. In the present study, 61.6% of patients were males and 38.4% were females
- In the present study, haemorrhoids is seen in majority (66.6%) who are subjected to sedentary occupation followed by those subjected to strenuous occupation i.e., 33.3% cases.
- Majority (83.3% of cases) had mixed dietary habits and the remaining (16.7%) were vegetarians in our study.
- Out of the 60 patients, most of the patients i.e., 47 (78.3%) presented with bleeding as chief complaint, followed by pain 42 (70%), 17 (28.3%) patients presented with mass and 31 (51.6%) and 27 (45%) patients presented with constipation and discharge respectively.
- In the present study, 19 (63.3%) patients in RBL group & 18 (60%) in EH group presented with 2 masses and 11 (36.7%) patients in RBL group and 10 (33.3%) patients in EH group presented with 3 masses and 2 (6.7%) in each group presented with 1 mass.
- In our study, 9 (30%) patients in RBL group & 8 (26.7%) patients in EH group were anemic.
- Out of 30 patients who underwent rubber band ligation 6 (20%) patients had post operative pain and discharge was seen in 4 (13.3%) patients, bleeding and recurrence were not seen in this group. In the remaining 30 patients who underwent haemorrhoidectomy, 13 (43.3%) patients had post operative pain, discharge was seen in 8 (26.7%) patients post operatively, bleeding was seen in 3

(10%) patients and recurrence was seen in 1 (3.3%) patient. Post operatively less number of patients had pain in RBL group compared to EH group showing statistical significance with p value of 0.052. Other post operative complications, when compared in both the groups did not show any statistical significance.

- In this study, out of the 30 patients in RBL group, 25 (83.3%) patients stayed in the hospital for 2 days and the remaining 5 (16.7%) patients stayed for 3 days. And in the EH group, 25 (83.3%) patients stayed for 4 days and remaining 5 (16.7%) patients stayed for 5 days in the hospital. The mean duration of stay was 2.17 days with standard deviation of 0.38 in the RBL group and 4.17 days with standard deviation of 0.38 in the EH group. The duration of hospital stay was prolonged in EH group with p value of <0.001 showing statistical significance between both the groups.
- The cost of hospital stay for patients in RBL group was below 2000 INR and between 4000 – 6000 INR in the EH group. The cost of hospital stay was higher in EH group with p value <0.001 which shows statistical significance between the two groups.
- In the present study out of 30 patients in RBL group, 25 (83.3%) patients assessed treatment as excellent help, 4 (13.3%) patients assessed as moderate help and 1 (3.3%) patient assessed as little help. In EH group out of 30 patients 21 (70%) patients assessed treatment as excellent help, 8 (26.7%) patients assessed as moderate help and 1 (3.3%) patient assessed as little help.

CONCLUSION

Haemorrhoids is an affliction of mankind since times immemorial and a number of procedures have been described to treat haemorrhoids.

Rubber band ligation is a simple cost effective procedure for second degree haemorrhoids.

Haemorrhoidectomy (Milligan-Morgan and Ferguson) is the most widely used Surgical management and considered as standard method for the management of haemerrhoids.

The findings of this study conclude that Rubber band ligation has shown efficacy over haemorrhoidectomy for the treatment of second degree haemorrhoids, in terms of least post operative complications, control of haemorrhoidal symptoms, short hospital stay and being economical.

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ANNEXURES

PROFORMA

Name: **IP No.**

Age: **Date of surgery:**

Sex: **Date of discharge:**

Occupation: (Sedentary Worker /Manual Worker)

Address:

History of presenting illness

1. Bleeding per rectum

- Mode of onset
- Amount of bleeding
- Nature of Blood Lost
- Frequency
- Relation to defecation

2. Discharge per rectum

- Mucous
- Purulent
- Sero Purulent

3. Pain

- Nature of pain
- Relation to defecation

4. Bowel Habits

- Constipation / Diarrhoea/Straining at stool

5. Mass per rectum – Duration

- When appeared : During / after defecation
- Reduction : Spontaneous / manual / not possible
- Pain in mass : Present / absent

6. Dietary habits

- Vegetarian / non vegetarian / mixed

PAST HISTORY

- Treatment of piles
- Conservative / Surgeries
- Medical conditions: Diabetes/Hypertension/Tuberculosis/Asthma.

FAMILY HISTORY

PERSONAL HISTORY

- Smoking : Yes / No
- Appetite : Good / Impaired
- Loss of weight : Yes / No

EXAMINATION

GENERAL PHYSICAL EXAMINATION:

- Pallor, Icterus, Cyanosis, Clubbing, Lymphadenopathy or edema
- Vitals: Pulse rate: Blood pressure:

SYSTEMIC EXAMINATION:

- Per abdomen:
- Cardiovascular System:
- Respiratory System:
- Central Nervous System:

LOCAL EXAMINATION:

INSPECTION

- External haemorrhoids
- Prolapsed internal haemorrhoids
- Fissure in ano
- Fistula in ano
- Skin tags
- Dermatitis
- Any other finding

PER RECTUM

Sphincter

Palpable mass :

- Present / absent
- Number
- Position
- Bleeding
- Tenderness

PROCTOSCOPY

- Number of pile masses
- Position of pile masses
- Degree of pile masses
- Bleeding / discharge
- Other masses / ulcer / ulcerative growth

INVESTIGATIONS

Blood :	Hb%	TC	DC
	FBS		RBS
	Blood urea		Serum creatinine
Urine :	Alb		Sugar Microscopy
Chest x-ray			ECG
Sigmoidoscopy:			Colonoscopy:

PREOPERATIVE PREPARATION

Overnight fasting; Injection TT; Shaving of relevant parts; soap water enema; previous night and in the morning.

PROCEDURE

Anaesthesia: Position:

Postop:

- Antibiotic:
- Analgesic:

- Laxatives
- Dressing

POST OPERATIVE COMPLICATIONS

- Pain : Yes / No
- Bleeding : Reactionary / Secondary / No
- Discharge : Profuse / Mild / Absent
- Recurrence : Yes / No

TIME OFF WORK:

COST OF HOSPITAL STAY:

FOLLOW UP

SYMPTOMS AT FOLLOW UP

- Bleeding
- Pain
- Discharge
- Recurrence

FOLLOW UP PERIOD

- Symptoms at follow up - Day 3
- Symptoms at follow up - Day 7
- Symptoms at follow up - 4 Weeks
- Symptoms at follow up - 3 months
- Symptoms at follow up - 6 months

PATIENT ASSESMENT OF TREATMENT

- Excellent help
- Moderate help
- Little help

ABBREVATIONS USED

RBL	Rubber Band Ligation
EH	Excisional Haemorrhoidectomy

KEY TO MASTER CHART

RBL	Rubber Band Ligation
EH	Excisional Haemorrhoidectomy
M	Male
F	Female
Y	Yes
N	No
Veg	Vegetarian
INR	Indian National Rupee
E	Excellent help
M	Moderate help
L	Little help

MASTER CHART - RBL GROUP

SL.No.	Name	Age	Sex	IP.No.	Occupation	Diet	Presenting							Procedure	Date of Surgery	Date of Discharge	Post Operative				Days of hospital stay	Cost of Hospital stay in INR	Patient assesment
							Bleeding	Pain	Mass	Constipation	Discharge	Number	Anaemia g/dl				Pain	Discharge	Bleeding	Recurrence			
1	RP	40	M	728828	Agriculture	Mixed	Y	Y	N	Y	Y	3	<10	RBL	12/1/2012	14/1/2012	N	N	N	N	2	1500	E
2	NP	65	M	769118	Agriculture	Mixed	Y	Y	N	N	N	3	>10	RBL	27/1/2012	29/1/2012	N	N	N	N	2	1600	E
3	NM	59	F	749396	Housewife	Mixed	N	Y	N	Y	Y	2	>10	RBL	14/2/2012	16/1/2012	N	N	N	N	2	1600	E
4	UH	25	F	15564	Teacher	Mixed	Y	N	N	N	Y	2	>10	RBL	13/3/2012	15/3/2012	N	N	N	N	2	1500	E
5	SY	23	F	669255	Housewife	Mixed	Y	N	N	Y	Y	2	>10	RBL	19/3/2012	21/3/2012	N	N	N	N	2	1600	E
6	SP	48	M	12221	Business	Mixed	Y	Y	Y	Y	Y	2	<10	RBL	17/4/2012	20/4/2012	Y	N	N	N	3	1800	M
7	ST	45	F	1483	Labourer	Mixed	Y	N	N	Y	N	3	>10	RBL	21/5/2012	23/5/2012	N	N	N	N	2	1600	E
8	RD	46	M	786228	Business	Mixed	N	Y	N	N	N	2	>10	RBL	14/6/2012	16/6/2012	N	N	N	N	2	1700	E
9	KR	44	M	819810	Business	Veg	Y	Y	N	N	N	2	>10	RBL	13/7/2012	15/7/2012	N	N	N	N	2	1600	E
10	CP	53	M	821983	Police	Mixed	Y	Y	Y	Y	Y	3	<10	RBL	16/7/2012	19/7/2012	Y	N	N	N	3	1700	E
11	RK	36	F	1791	Housewife	Mixed	Y	Y	N	Y	N	2	>10	RBL	16/7/2012	18/7/2012	N	N	N	N	2	1500	E
12	SR	29	M	827713	Teacher	Veg	Y	N	N	Y	Y	2	>10	RBL	2/8/2012	4/8/2012	N	N	N	N	2	1500	E
13	AF	31	M	4004	Driver	Mixed	Y	Y	Y	N	Y	2	<10	RBL	23/8/2012	25/8/2012	Y	Y	N	N	2	1900	M
14	MJ	29	F	5883	Labourer	Mixed	N	Y	N	Y	N	3	>10	RBL	19/9/2012	21/9/2012	N	N	N	N	2	1500	E
15	TV	61	M	826406	Business	Mixed	Y	Y	N	Y	N	2	>10	RBL	26/10/2012	29/10/2012	N	N	N	N	3	1500	E
16	RM	38	M	851519	Employee	Veg	Y	N	Y	N	Y	2	>10	RBL	19/11/2012	21/11/2012	N	Y	N	N	2	1800	E
17	SK	53	M	8341	Agriculture	Mixed	Y	Y	N	N	N	1	>10	RBL	23/11/2012	25/11/2012	N	N	N	N	2	1500	E
18	AC	58	F	861637	Housewife	Mixed	Y	Y	N	Y	N	3	<10	RBL	27/11/2012	30/11/2012	N	N	N	N	2	1600	E
19	RH	32	M	865414	Business	Mixed	Y	N	N	Y	N	2	>10	RBL	11/12/2012	13/12/2012	N	N	N	N	2	1600	E
20	SR	38	F	866140	Employee	Mixed	N	Y	N	Y	Y	2	>10	RBL	12/12/2012	14/12/2012	Y	N	N	N	2	1700	L
21	PP	50	M	7468	Labourer	Mixed	Y	Y	N	N	N	2	<10	RBL	22/1/2013	24/1/2013	N	N	N	N	2	1600	E
22	RG	54	F	883403	Housewife	Veg	N	N	Y	Y	N	2	>10	RBL	12/2/2013	14/2/2013	N	N	N	N	2	1500	M
23	DS	37	M	7793	Employee	Mixed	Y	Y	N	Y	Y	2	<10	RBL	9/3/2013	12/3/2013	N	Y	N	N	3	1700	E
24	TD	47	F	9608	Housewife	Mixed	Y	N	N	N	Y	3	>10	RBL	16/4/2013	18/4/2013	Y	N	N	N	2	1800	E
25	AP	33	M	903689	Business	Mixed	N	Y	N	Y	N	1	>10	RBL	24/4/2013	26/4/2013	N	N	N	N	2	1700	E
26	SA	45	M	905253	Agriculture	Mixed	Y	N	N	Y	N	2	>10	RBL	8/5/2013	10/5/2013	N	N	N	N	2	1500	E
27	CP	40	M	11548	Labourer	Mixed	Y	Y	Y	Y	N	2	>10	RBL	22/5/2013	25/5/2013	Y	Y	N	N	3	1900	M
28	SV	39	F	922062	Housewife	Mixed	Y	N	N	Y	N	3	<10	RBL	26/6/2013	28/6/2013	N	N	N	N	2	1600	E
29	SS	35	F	924864	Employee	Mixed	N	Y	N	N	Y	2	>10	RBL	4/7/2013	6/7/2013	N	N	N	N	2	1500	E
30	NS	56	M	941157	Agriculture	Mixed	Y	N	Y	Y	Y	3	<10	RBL	6/7/2013	8/7/2013	N	N	N	N	2	1600	E

MASTER CHART - EH GROUP

SL.No.	Name	Age	Sex	IP.No.	Occupation	Diet	Presenting Symptoms							Procedure	Date of Surgery	Date of Discharge	Post Operative complications				Days of hospital stay	Cost of Hospital stay in INR	Patient assesment
							Bleeding	Pain	Mass	Constipation	Discharge	Number	Anaemia g/dl				Pain	Discharge	Bleeding	Recurrence			
1	PV	59	M	754143	Agriculture	Mixed	Y	Y	N	Y	N	3	>10	EH	22/1/2012	26/1/2012	Y	Y	N	N	4	5500	M
2	RG	49	M	13742	Labourer	Mixed	Y	Y	Y	Y	N	3	>10	EH	9/2/2012	13/2/2012	Y	N	N	N	4	5400	E
3	VK	27	M	783137	Employee	Mixed	Y	N	N	N	Y	2	<10	EH	7/3/2012	11/3/2012	N	N	N	N	4	4500	E
4	ST	63	F	782334	Housewife	Mixed	Y	Y	N	Y	N	2	>10	EH	14/3/2012	19/3/2012	Y	N	N	N	5	4500	M
5	LM	39	F	15178	Labourer	Mixed	N	Y	Y	N	N	2	>10	EH	15/3/2012	19/3/2012	N	N	N	N	4	4600	E
6	RD	45	F	784606	Housewife	Mixed	Y	N	Y	Y	Y	3	>10	EH	16/3/2012	20/3/2012	Y	N	N	N	4	5000	E
7	NG	41	M	16504	Business	Veg	Y	N	N	N	Y	3	>10	EH	24/4/2012	28/4/2012	N	Y	N	N	4	4800	E
8	RJ	35	M	799824	Driver	Mixed	Y	Y	N	N	N	2	>10	EH	16/5/2012	20/5/2012	N	N	N	N	4	4400	E
9	KP	55	M	8127	Teacher	Mixed	Y	Y	Y	N	Y	2	<10	EH	21/5/2012	25/5/2012	Y	N	N	N	4	5000	M
10	RM	45	M	756634	Business	Mixed	Y	Y	N	N	Y	1	<10	EH	5/6/2012	10/6/2012	N	N	Y	N	5	5200	E
11	PP	34	F	1609	Labourer	Veg	Y	Y	N	N	N	2	>10	EH	16/7/2012	20/7/2012	N	N	N	N	4	4500	E
12	KK	29	M	807550	Employee	Mixed	N	Y	Y	N	Y	3	>10	EH	1/8/2012	6/8/2012	Y	Y	N	N	5	5800	L
13	BY	38	F	3055	Labourer	Mixed	Y	N	N	Y	N	2	>10	EH	18/8/2012	22/8/2012	N	N	N	N	4	4700	E
14	SK	29	M	4586	Employee	Mixed	Y	Y	N	N	Y	3	>10	EH	23/9/2012	27/9/2012	Y	Y	N	N	4	5600	M
15	SM	60	M	853448	Agriculture	Mixed	Y	Y	N	Y	N	3	<10	EH	29/10/2012	2/11/2012	N	N	N	N	4	4600	E
16	NV	32	F	855644	Teacher	Veg	N	Y	Y	N	Y	2	>10	EH	6/11/2012	10/11/2012	N	Y	N	N	4	4800	E
17	AP	48	M	856366	Business	Mixed	Y	N	N	N	N	2	<10	EH	7/11/2012	11/11/2012	N	Y	N	N	4	5000	E
18	SW	38	F	856686	Housewife	Mixed	Y	Y	N	Y	N	2	>10	EH	8/11/2012	12/11/2012	N	N	N	N	4	4500	E
19	NR	33	F	5397	Employee	Veg	Y	Y	N	N	N	2	>10	EH	14/11/2012	18/11/2012	Y	N	N	N	4	5300	M
20	MG	56	F	864116	Housewife	Mixed	Y	Y	N	N	Y	3	<10	EH	5/12/2012	9/12/2012	Y	N	N	Y	4	5000	M
21	MJ	42	F	869034	Employee	Mixed	Y	Y	N	N	N	2	>10	EH	20/12/2012	24/12/2012	Y	N	N	N	4	5000	E
22	NN	36	M	869726	Employee	Mixed	Y	Y	N	N	Y	3	>10	EH	27/12/2012	31/12/2012	N	N	N	N	4	4400	E
23	CH	43	M	877296	Labourer	Mixed	Y	N	Y	N	N	2	>10	EH	22/1/2013	26/3/2013	N	Y	N	N	4	4800	E
24	ML	46	M	6547	Agriculture	Mixed	N	Y	N	Y	N	2	>10	EH	26/1/2013	30/1/2013	Y	N	N	N	4	5200	E
25	JY	53	F	885334	Housewife	Veg	Y	Y	Y	N	N	2	<10	EH	18/2/2013	23/2/2013	N	Y	Y	N	5	5500	M
26	SB	44	M	10599	Agriculture	Mixed	Y	Y	N	N	N	3	>10	EH	8/3/2013	12/3/2013	N	N	N	N	4	4500	E
27	DV	36	M	889386	Agriculture	Veg	Y	Y	N	N	Y	1	<10	EH	11/3/2013	15/3/2013	Y	N	N	N	4	5600	E
28	LK	46	M	891445	Labourer	Mixed	Y	N	Y	Y	Y	2	>10	EH	19/3/2013	23/3/2013	N	N	N	N	4	4600	E
29	KR	27	M	7477	Business	Mixed	N	Y	N	Y	Y	2	>10	EH	21/5/2013	25/5/2013	N	N	N	N	4	4800	E
30	RH	19	M	932523	Employee	Mixed	N	Y	Y	Y	N	2	>10	EH	3/7/2013	8/7/2013	Y	N	Y	N	5	5800	M