EFFECTIVENESS OF CYANOACRYLATE GLUE IN THE MANAGEMENT 0F LOW ANAL FISTULA

Dissertation submitted to

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In partial fulfillment of the

Regulations of the award of degree of

M.S. General Surgery

(Branch – I)

Department of General Surgery

Coimbatore Medical College Hospital

Coimbatore – 641014

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CERTIFICATE

Certified that this is the bonafide dissertation done by **DR.S.MURUGESAN** and submitted in partial fulfillment of the requirement for the Degree of M.S.General surgery, Branch I of The TamilnaduDr.M.G.R. Medical University, Chennai

Date; Unit Chief

Date; Professor & Head

Department of surgery

Date; Dean

Coimbatore Medical College

Coimbatore-641014

DECLARATION

I solemnly declare that the dissertation titled **''EFFECTIVENESS OF CYANOACRYLATE GLUE IN THE MANAGEMENT OF LOW ANAL FISTULA''** Was done by me from 2012 onwards under the guidance And supervision of **Prof.Dr.D.N.RENGANATHAN, M.S.**

This dissertation is submitted to theTamilnaduDr.MGR Medical University towards the partial fulfillment of the requirement for the award of M.S Degree in General Surgery (Branch I).

Place :

Date :

Dr.S.MURUGESAN

Coimbatore Medical College

COIMBATORE, TAMILNADU, INDIA - 641 014

(Affiliated to The Tamilnadu Dr. MGR Medical University, Chennai)

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Name of the Candidate : DR. MURUGESAN.S

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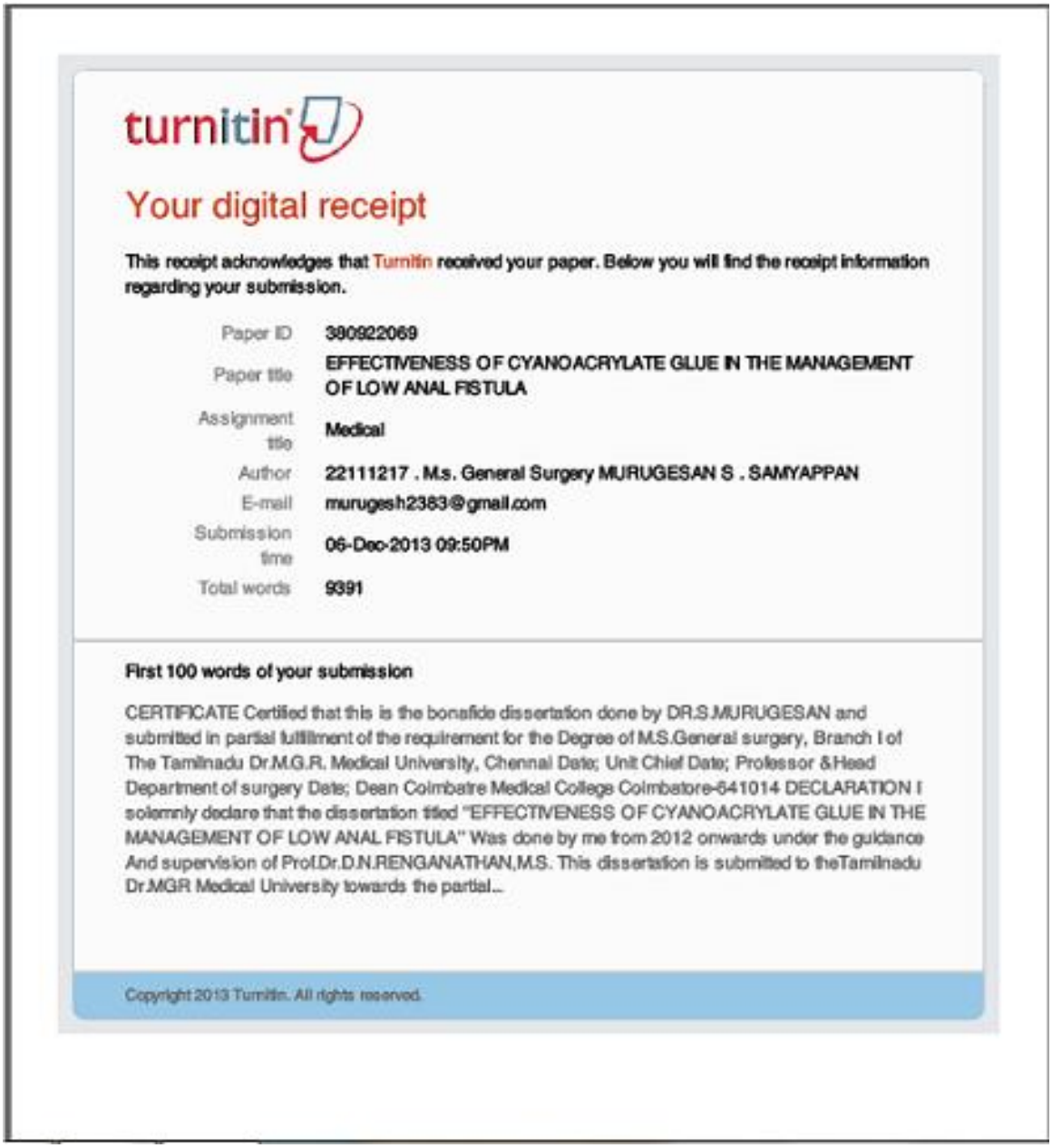

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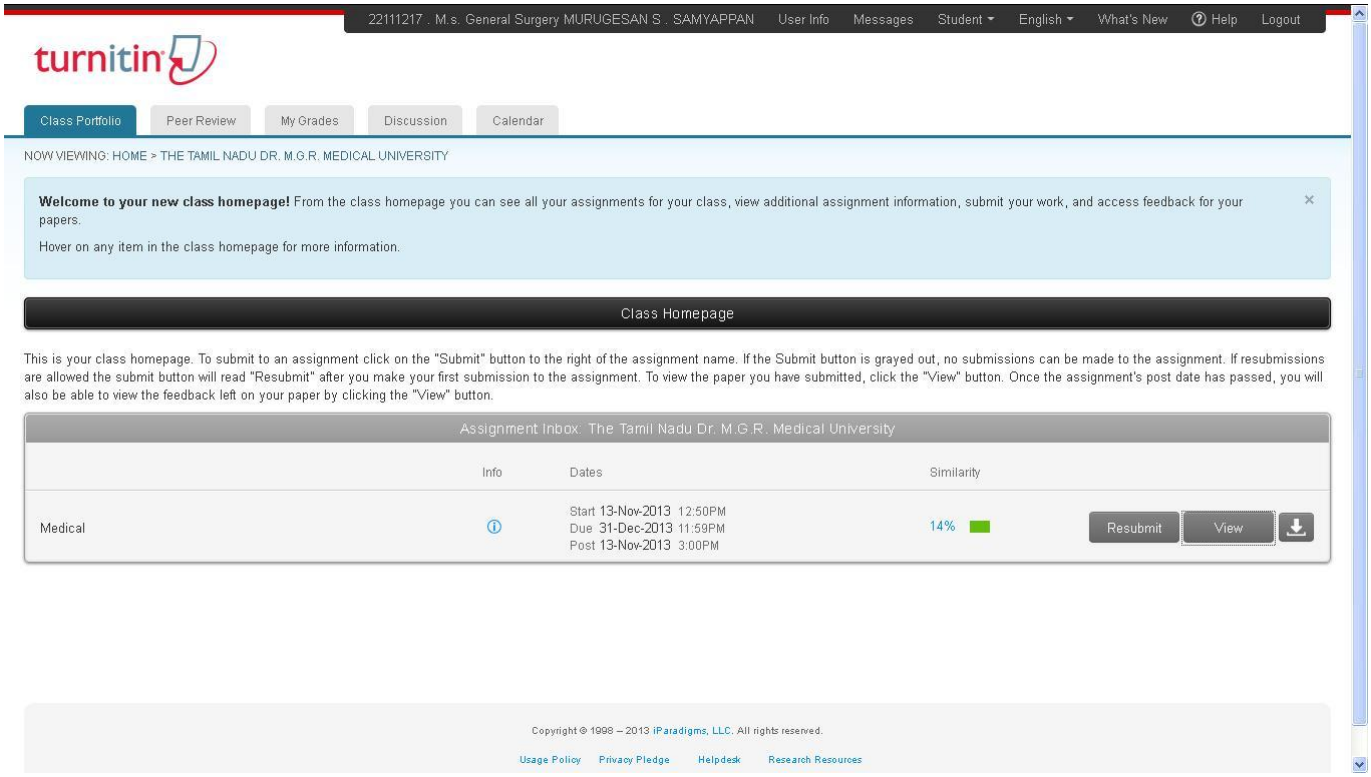
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DATE: Signature of the Candidate

PLACE: COIMBATORE Dr. S. Murugesan

TABLE OF CONTENTS

ABSTRACT

Background and objectives:

Fistula in ano is a commonly seen surgical problem; fistulotomy is the gold standard treatment in the management of low anal fistula. But fistulotomy is associated with discomfort and incontinence. This study was designed to evaluate the effectiveness of cyanoacrylate glue in the management of low anal fistula. We present our short term results with a 6 month follow up.

Materials and methods:

Thirty patients were enrolled in our study. Patients were analyzed clinically and then subjected to fistulogram. The fistula tracks were probed and washed with saline and excessive granulation tissue was curetted. The glue was then injected in to fistulous track from a syringe nozzle through an infant feeding tube. Patients were further examined in the outpatient department until 6 months.

Results;

Five of thirty patients (16.6%) healed with glue treatment. Twenty of thirty (66.7%) patients got recurrence; five patients are lost follow up.

Conclusion:

Patients were followed up for a period of 6 months after glue instillation. Post operative pain, discomfort, incontinence were absent in case of glue instillation.

Early ambulation and less time of stay in hospital were added advantage in case of glue instillation.

Recurrence rate is high in case of cyanoacrylate glue instillation in our study.

INTRODUCTION

Fistula in ano is a commonly seen surgical problem. Fistulotomythe is gold standard treatment in management of low fistula in ano. But considerable discomfort and incontinence, which has great socialembracement in society is associated with fistulotomy.

There are various methods in treatment of fistula in ano,for example1. stagedfistulotomy, 2.anoplasty,3. mucosal advancement flap. But these procedures associated with increased duration in healing and discomfort and pain.

During 1990 introduction of fibrin glue caused reasonable impact in treatment of low anal fistula which had success rate varying from 50-80% and lesser complications comparing to fistulotomy.

But because of higher cost of fibrin and low self-life, cyanoacrylate glue has been tried in treatment of fistula in ano. N –butyl cyanoacrylate glue produces an exothermic reaction when it comes in contact with tissues and polymerises and acts as a plug in fistula tract.

In this study we decided to evaluate the efficacy of cyanoacrylate glue in treatment of low fistula in ano for a period of 6 months.

AIM OF THE STUDY

To evaluate the effectiveness of N-BUTYL-2 CYANOACRYLATE to treat LOW FISTULA IN ANO

OBJECTIVES

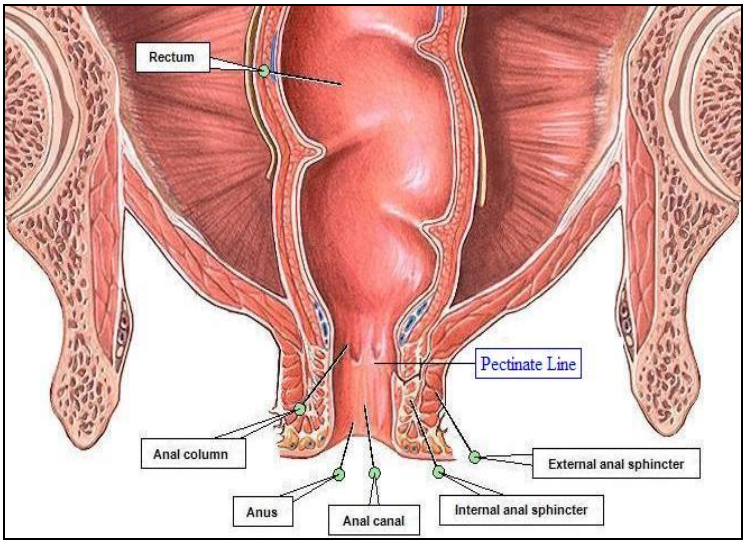
1. To study post operative pain, discomfort & glue sequlae

2. To assess recurrence

REVIEW OF LITERATURE

ANAL CANAL

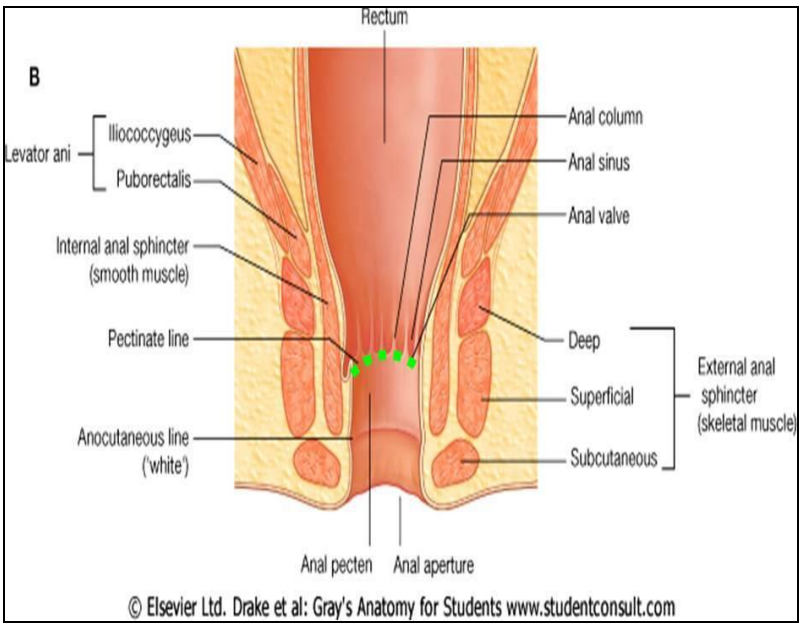
Anal canal is relatively shorter segment and is anatomically unique. Surgical anal canal extends approximately 4 cm from the anal verge to the anorectal ring. The anatomical anal canal is shorter, which is 2 cm in length extending from the anal verge to the dentate line which corresponds to proctodeal membrane.



Anal orifice is an anteroposterior cutaneous slit; and it remains virtually closed at rest, due to tonic contraction of two sphincters and the anal cushions circumferentially.

RELATION

Anteriorly anus is related to bulbar and membranous urethra in males and perineal body and posterior wall of distal vagina in females. Posteriorly relates to coccyx, separated by fibrous fatty and muscular tissue. Laterally it is related to ischiorectal fossa. The fossa rich in fat and contains inferior rectal vessels and nerves, which cross it to enter the anal canal.



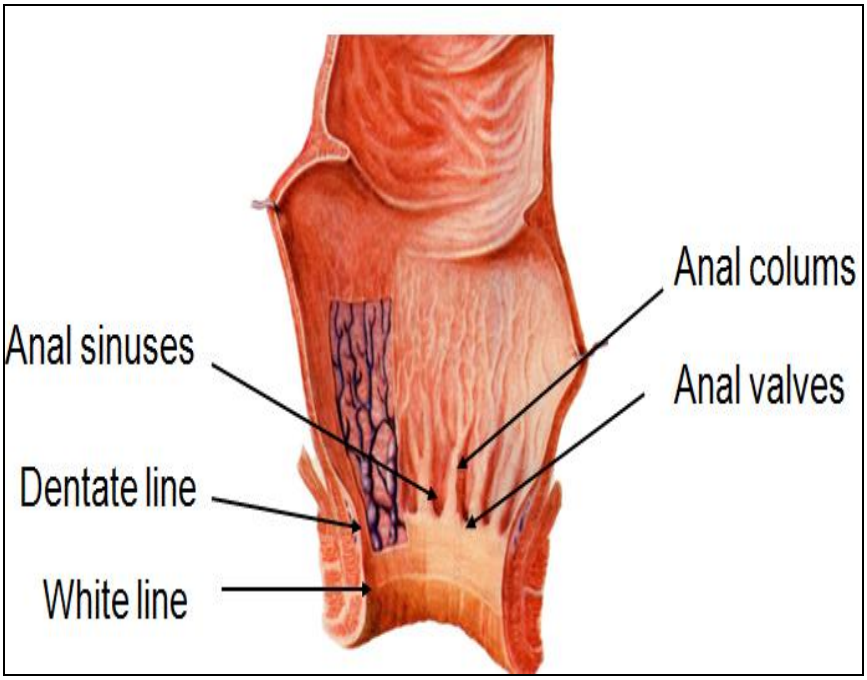
Epithelium

The anal canal consists of an upper mucosal segment and a lower cutaneous segment, which is separated by dentate (pectinate) line and is "saw-toothed" junction, which represents junction of embryological ectoderm and endoderm. It therefore has two distinct origins of venous and

lymphatic drainage, nerve supply.

Above the dentate line, it is supplied by the sympathetic and parasympathetic systems, with blood supply from the hypogastric vessels. Below the Dentate line is by the somatic nervous system, with blood supply and drainage from the inferior hemorrhoidal system. These differences are important in treatment of hemorrhoids.

The pectinate or dentate line, is remnant of the proctodeal membrane and corresponds to a line of anal valves. Above each valve, there is a little pocket called as anal sinus or crypt which are connected to a variable number of glands, with an average of six, and are more concentrated in the posterior quadrants. The ducts of these gland open into the sub-mucosa in an outward and downward fashion; two thirds enter the IAS, and half of them terminate in the inter-sphincteric plane. These anal glands were first described by Chiari in 1878, but it was in 1961 that Park described their role in the pathogenesis of fistulous abscess. Obstruction of these ducts, probably by accumulation of foreign material , may lead to abscesses and fistula.



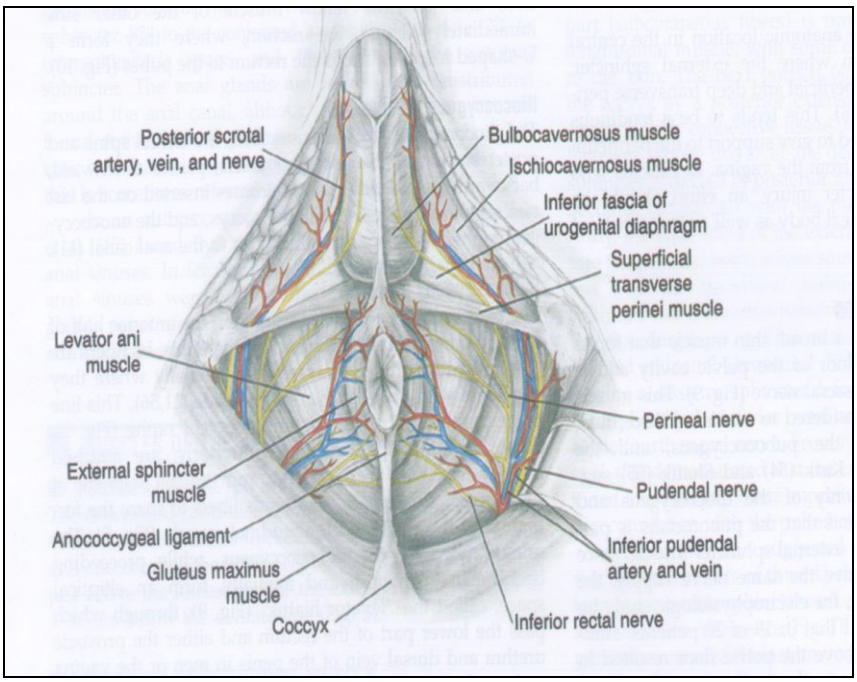
Cranial to the dentate line, eight to 14 longitudinal folds called rectal columns (columns of Morgagni) are seen. They have their bases connected in pairs to each anal valve at the dentate line. At the lower end of each column are the anal papillae. The mucosa of the columns consists of several layers of cuboidal cells. The lining is deep purple color, because of the underlying internal hemorrhoidal plexus.

The cutaneous part of the anal canal has modified squamous epithelium and its devoid of hair and glands and is called as pectenor*pecten band.* The round band of fibrous tissue called as pecten band, which is divided in case of anal fissure, representing spastic IAS. The anal verge marks the lowermost edge of the anal canal. Distal to the anal verge, the lining becomes thicker and more pigmented and is arranged

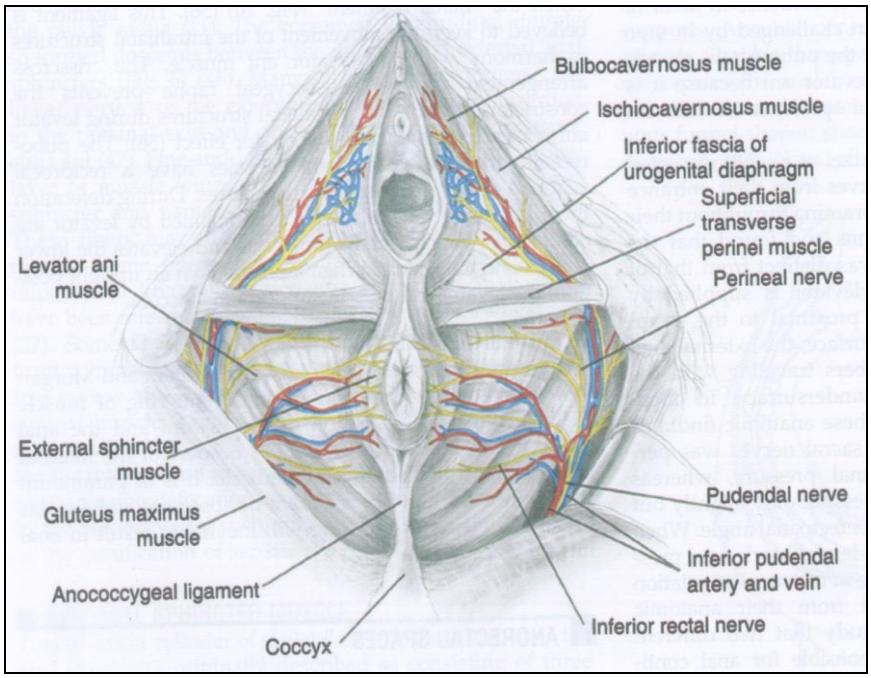
in radiating folds around the anus. The epithelium then acquires features of normal skin, like hair follicles, glands (including apocrine glands).

Anal Canal and Pelvic Floor Musculature

There are three categories of muscles within the pelvis, and its divided into: the pelvic floor muscles; the anal sphincter complex, and the muscles that line the walls of the osseous pelvis. The latter forms the external boundary of the pelvis. It includes the obturatorinternus and piriform muscles.



The anal sphincter and pelvic floor muscles are derived from two different embryonic cloaca groups, sphincter and lateral compressor.

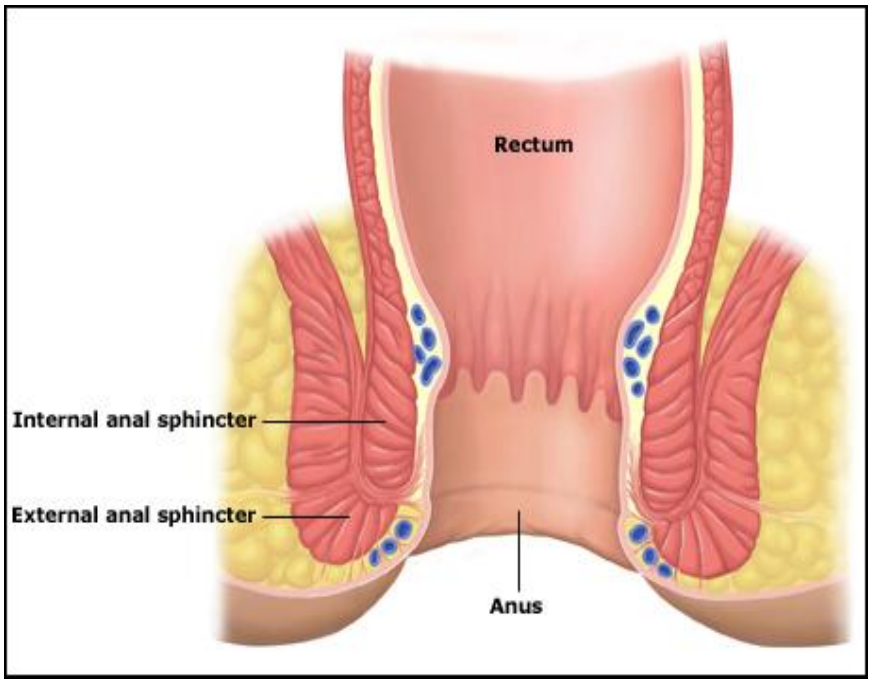


Internal Anal Sphincter

The IAS is the distal (2.5 to 4.0 cm) condensation of the circular muscle fibres of the rectum. When it is in a state of continuous maximal contraction due to both intrinsic myogenic and extrinsic autonomic neurogenic properties, it acts as a natural barrier to the involuntary passage of stool and gas.

The IAS is responsible for 50% to 85% of the resting tone, and the EAS accounts for 25% to 30%, and the remaining 15% is by the expansion of the anal cushions.

The lower edge of the IAS can be felt on physical examination as a round band and is about 1.2 cm distal to the dentate line. The groove between IAS and the EAS is the inter-sphincteric sulcus.



Conjoined Longitudinal Muscle

The inner circular layer of the rectum gives rise to the IAS, the outer longitudinal layer, mixes with fibers of the levatorani muscle to form the conjoined longitudinal muscle (CLM) , at the level of the anorectal ring. This muscle descends between the IAS and the EAS, and some of its fibers traverse the lowermost part of the EAS to insert into the perianal skin, called as the corrugator cutis ani muscle.

Lunniss and Phillips,in a review of the CLM, explored the controversy of both the anatomy and physiology of this muscle. Other sources for the striated component of the CLM include the deep EAS and puborectalis. The pubococcygeus and top loop of the EAS, and the lower fibers of the puborectalis also contribute.

In its descending course, the CLM may give rise to medial extensions that cross the IAS and contribute to the smooth muscle of the submucosa (musculuscanalisani, Treitz muscle, sustentator tunicae mucosae, musculussubmucosaeani). Others say, outward filamentous extensions of the CLM crossing the EAS to enter the fat of the ischiorectal fossa.

Probable functions of the CLM are attaching the anorectum to the pelvis, acting as a skeleton to support and bind the IAS and EAS together.Shafik considers only a minimal role is played by the CLM in the maintenance of continence, and that is to maintain an anal seal, by potentiating the action of the base loop. He describes its primary responsibility as causing shortening and widening of the anal canal and eversion of the anal orifice. He proposed the term, "evertorani muscle," for the CLM.

Finally, the CLM and its extensions divide the adjacent tissues into subspaces and it plays a role in the containment of sepsis. They are also responsible for the septation of thrombosed external hemorrhoids. Therefore, treatment of such a thrombus requires excision of this septated region.

External Anal Sphincter

The EAS is elliptical cylinder in shape. It consist of striated muscle that, covers the entire length of the inner tube of smooth muscle, it ends slightly more distal to the end of the IAS. The EAS has three divisions: subcutaneous, superficial, and deep. However, Goligher and colleagues describe the EAS as a, continuous sheet that forms, with the puborectalis and levatorani, a single tunnel-shaped skeletal muscle.

The deepest part of the EAS is closely related with the puborectalis muscle; they say that the latter is actually a component of both the levatorani and the EAS muscle complexes. Others consider the EAS is composed of a superficial compartment (subcutaneous and superficial sphincter), and a deep compartment (deep sphincter and puborectalis).

Oh and Kark noted differences in the EAS between the sexes. In male, the upper half of the EAS is covered anteriorly by CLM; the lower half is crossed by it. But in the female, the entire EAS covered by a mixture of fibers derived from longitudinal and IAS muscles. Based on embryology, the EAS divided into two parts, superficial and deep, neither having any connection with the puborectalis. The EAS is one muscle unit, attached by the anococcygeal ligament posteriorly and anteriorly to the perineal body, not divided into layers. However, there is some degree of

anatomic asymmetry, which accounts for functional asymmetry observed during anal manometry.

The EAS, along with the pelvic floor muscles, maintains a resting tone through a reflex arc at the caudaequina level. Histologic studies have shown that these muscles have a predominance of type I fibers, which are a peculiarity of tonic contractile activity. In response to conditions of threatened incontinence, like increase in intra-abdominal pressure, the EAS and puborectalis reflexively contract to prevent fecal leakage.

Because of fatigability, maximal voluntary contraction can be sustained for only 30seconds to 1 minute. The automatic continence mechanism is by the resting tone of IAS, magnified by reflex arc of EAS contraction. Garavoglia and team suggest three types of striated muscles function as the mechanism for continence: one is lateral compression from the pubococcygeus, then the circumferential closure from the deep EAS, and also the angulation from the puborectalis.

LevatorAni

The levatorani muscle, or pelvic diaphragm, comprises of a pair three striated muscles: iliococ-cygeus, pubococcygeus, and puborectalis. The ischiococcygeus or coccygeus, is rudimentary in human.

Ileococcygeus muscle arising from the ischial spine and posterior part of the obturator fascia and courses downwards and medially and is inserted to the lateral aspects of S-3, S-4 vertebrae, the coccyx, and the anococcygeal raphe.

The pubococcygeus arising from the posterior aspect of the pubis and the anterior part of the obturator fascia courses dorsally alongside the anorectal junction and to decussate with fibers of the opposite side at the anococcygeal raphe and getting inserted into the anterior surface of the 4th sacral and 1st coccygeal segments.

The pelvic floor is not complete in the midline and is called levetor hiatus through which the lower rectum, urethra, and the dorsal vein of the penis in men, or the vagina in women, passes through.

The puborectalis muscle is a U-shaped loop of striated muscle which runs around the anorectal junction to the posterior aspect of the pubis. The puborectalis is the medial most part of the levatorani muscle and is situated just above the deep component of the external sphincter. Because the junction between the two muscles is not clearly distinct and have similar nerve innervation (pudendal nerve), the puborectalis has been considered as a part of the EAS.

Two anatomic structures are related to the puborectalis muscle: the anorectal ring and the anorectal angle. The anorectal ring is a strong muscular ring which represents the upper border of the IAS, around the anorectal junction.

Anorectal is important boundary of the anal canal and is of clinical importance because accidental cut of this structure during surgery for abscess or fistula leads to fecal incontinence.

The anorectal angle results because of U-shaped sling of puborectalis muscle around the anorectal junction and has significant role in maintaining gross fecal continence. Whereas the anal sphincters are responsible for retaining gas and liquid stool in rectum.

Arterial Supply

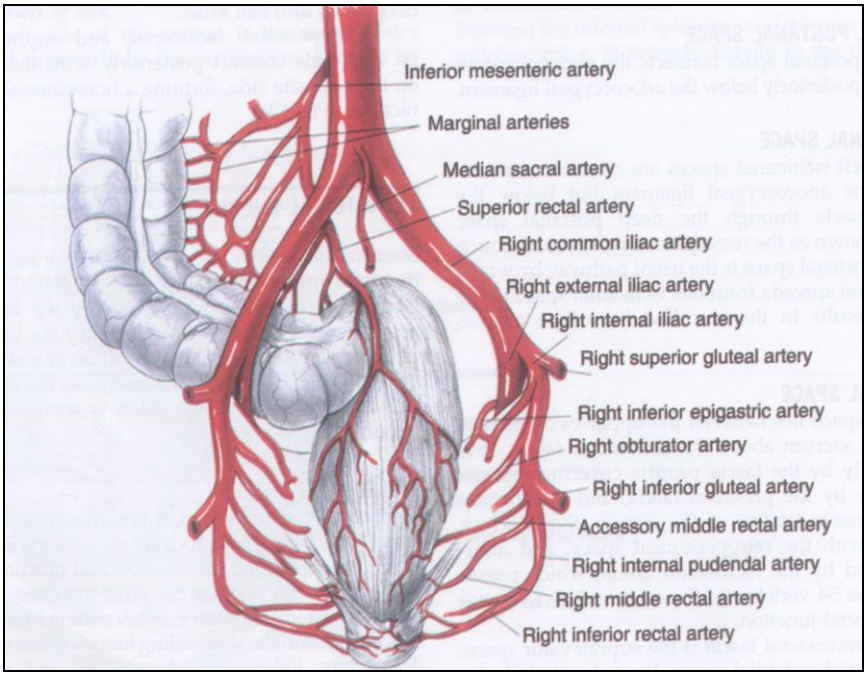
The superior and inferior mesenteric arteries, supplies the entire large intestine. The junction between the proximal two thirds and the distal third of the transverse colon is the limit of blood supply between and superior and inferior mesenteric arteries which represents the embryological division between the midgut and the hindgut.

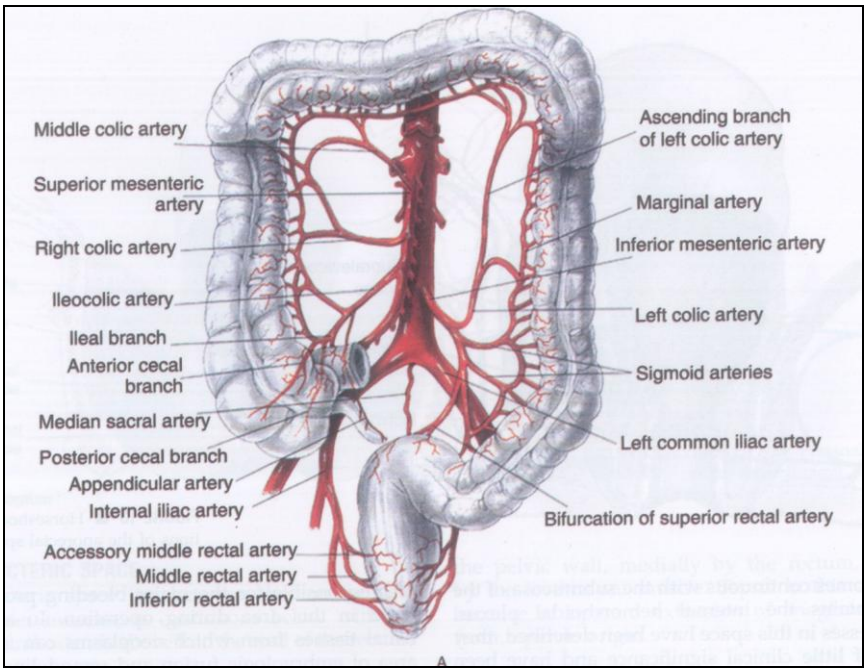
Continuous communicating arcade of collateral circulation is formed between branches of superior and inferior mesenteric artery along the mesenteric border of the colon, from which it supply the bowel by

means of vasa recta. The colon is less vascular than small bowel and more prone to ischemia because of lesser communications between both adjacent and opposite-sided vasa recta. The anorectum is supplied by the internal iliac arteries.

Superior Mesenteric Artery

The superior mesenteric artery arises from the aorta at the level L1 behind the superior border of the pancreas supplying upto proximal 2/3rd of transverse colon. After passing behind the neck of the pancreas and anteromedial to the uncinate process, the superior mesenteric artery crosses the third part of the duodenum, descending down and to the right and along the base of the mesentery. From left side of SMA, there are 12 to 20 jejunal and ileal branches. From the right side arise the colic branches: right, middle and ileo colic arteries.





The ileocolic is the most constant vessel and it bifurcates into a superior and inferior branch. The superior branch communicates with right colic artery and the inferior branch gives off 3 arteries namely anterior

ceca, posterior cecal and appendicular branches and supplies the distal ileum.

The right colic artery supplies the ascending colon and hepatic flexure via its ascending and descending branches, both of which join with nearby vessels to contribute to the marginal artery.

The middle colic artery is the highest of the three colic branches of the superior mesenteric artery. Its right branch by, anastomosing with the ascending branch of the right colic artery, supplies the right transverse colon and hepatic flexureIts and the left branch of middle colic artery supplies the distal half of the transverse colon. The middle colic artery is the main supply in one third of individulas to the splenic flexure of colon.

Inferior Mesenteric Artery

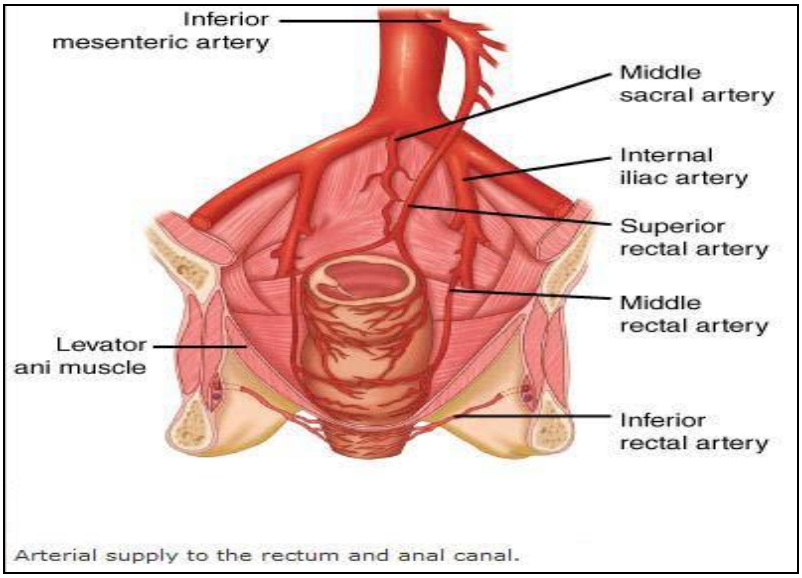
The inferior mesenteric artery originating from the left anterior surface of the aorta, 3 cm above its bifurcation at the level of L2-3, and descends downward and to the left to enter the pelvis. The inferior mesenteric artery branches into the left colic artery and two to six sigmoidal arteries. After it crosses the left common iliac artery, it is called as superior hemorrhoidal artery.

The highest branch of the inferior mesenteric artery, the left colic artery, branches into an ascending branch which contribute to the arcade of

Riolan at splenic flexure and a descending branch, which supplies descending colon. The sigmoidal arteries form arcades similar to small bowel within the sigmoid mesocolon and anastomose with divisions of the left colic artery proximally and superior hemorrhoidal artery distally.

The marginal artery terminates within the arcade of sigmoidal arteries. The inferior mesenteric artery continues as superior hemorrhoidal artery after it has crossed the left iliac vessels. The artery descends in the sigmoid mesocolonupto the level of S-3 and to the posterior aspect of the rectum. In 80% of cases, it bifurcates into right (usually wider) and left terminal branches and within the submucosa of the rectum, it run straight downward to supply the lower rectum and anal canal.

The branches which reaches the level of the rectal columns (approximately five) condensate in capillary plexuses, mostly at the right posterior, right anterior, and left lateral positions which relates to the position of the major internal hemorrhoid groups.



Arterial supply to the rectum and anal canal.

The major blood supply of anorectum is by the superior and inferior hemorrhoidal arteries. The contribution from middle hemorrhoidal artery varies. This vessel originates more commonly from the anterior division of the internal iliac or the pudendal arteries and reaches the rectum.

The middle hemorrhoidal artery reaches the lower third of the rectum anterolaterally, close to the level of the pelvic floor and deep to the levator fascia. Contrary to popular misconception, it therefore does not run in the lateral ligaments (inclined posterolaterally). The middle hemorrhoidal artery is more prone to be injured during low anterior resection, when anterolateral dissection of the rectum is performed close to the pelvic floor, and the prostate and seminal vesicles or upper part of the vagina are being separated.

The anorectum has a profuse intramural anastomotic network, which probably accounts for the fact that division of both superior and middle hemorrhoidal arteries does not result in necrosis of the rectum. This tenet is fundamental to ileoanal reservoir surgery and restorative procto-colectomy.

The paired inferior hemorrhoidal arteries are branches of the internal pudendal artery, which, in turn, is a branch of the internal iliac artery. The inferior hemorrhoidal artery arises within the pudendal canal and is throughout its course entirely extrapelvic. It traverses the obturator fascia, the ischiorectal fossa, and the EAS to reach the submucosa of the anal canal, ultimately ascending in this plane. The inferior rectal artery needs to be ligated during the perineal stage of abdominoperineal resection. Klosterhalfen and coworkers performed postmortem angiographic, manual, and histologic evaluations, identifying two topographic variants of this vessel.

In the so-called type I, the most common type (85%), the posterior commissure was less well perfused than were the other sections of the anal canal. In addition, the blood supply could be jeopardized by contusion of the vessels passing vertically through the muscle fibers of the IAS when sphincter tone was increased. These authors postulated that in a pathogenetic model of primary anal fissure, the resulting decreased blood

supply may lead to ischemia at the posterior commissure.

Collateral Circulation

Drummond proved that the sigmoidal vessels that following injection with contrast material in the ileocolic artery and ligation of colic arteries at their origin there is filling up of contrast material in sigmoidal vessels, following which the marginalarteryof Drummond was named.Following that some noticed discontinuity of marginal artery at the lower ascending colon and mainly at the splenic flexure and sigmoid colon. This hypovascular area is of clinical concern during colonic resection.

The splenic flexure forms the watershed area between midgut and hindgut blood supply which is called Griffiths' critical pointbecause of this reason ischemic colitis affects or is most severe in and around the splenic flexure. Apart from this there is also another area called Sudeck's critical point, which is an area of discontinuity in the marginal artery between the superior hemorrhoidal and the distal sigmoid arteries. Further there is also an anastomosis between superior and middle hemorrhoidal arteries which prevents the gangrene of pelvis.

Jean Riolan (1580-1657) first described the communication between the superior and inferior mesenteric arteries, and the term arc of Riolanwas

vaguely defined in his work. Later because of marginal artery explained by Drummond, confused the concept.

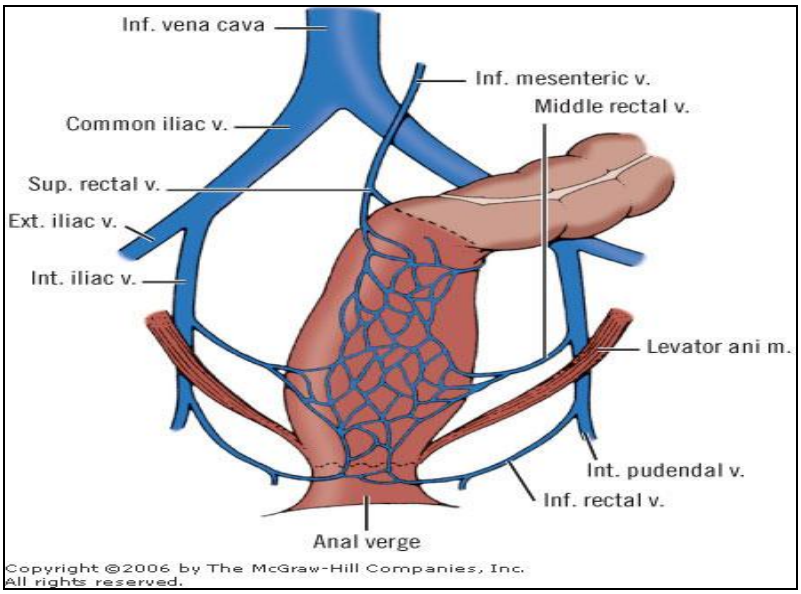
In 1964, Moskowitz and coworkers termed, meandering mesenteric artery. The meandering mesenteric artery is a tortuous and thick vessel that makes communication especially in advanced atherosclerotic disease between the middle colic artery and the ascending branch of the left colic artery. Its presence indicates severe stenosis of either the inferior mesenteric artery (antegrade flow) or superior mesenteric artery (retrograde flow).

Fisher and Fry explained that the meandering mesenteric artery could be easily made out either preoperatively by arteriography or intraoperatively. If the flow is retrograde necrosis of the right colon and entire small bowel can occur, and if the flow is antegrade necrosis of the sigmoid colon and upper rectum, as well as vascular insufficiency in the lower extremity can occur.

Venous Drainage

The venous drainage of the large bowel basically follows its arterial supply. Blood from the right colon through the superior mesenteric vein, and from left colon and rectum through the inferior mesenteric vein, reaches the intrahepatic capillary bed through the portal vein. The

anorectum also drains through middle and inferior hemorrhoidal veins to the inferior vena cava, via internal iliac vein.



Originating from the three anorectalarteriovenous plexuses, the paired inferior and middle hemorrhoidal veins and the single superior hemorrhoidal vein, situated subcutaneously around the anal canal below the dentate line, when is dilated constitutes the external hemorrhoids. The internal hemorrhoidal plexus is situated submucosally, and above the dentate line. The internal hemorrhoids originate from this plexus. The peri-rectal plexus drains to the middle and inferior hemorrhoidal veins.

Lymphatic Drainage

The lymphatic drainage of the colon also follows its vascular supply. The colon and rectum have a rich network of lymphatic plexuses

in its submucous and subserous layers, which drain into an extramural lymph channels and nodes.

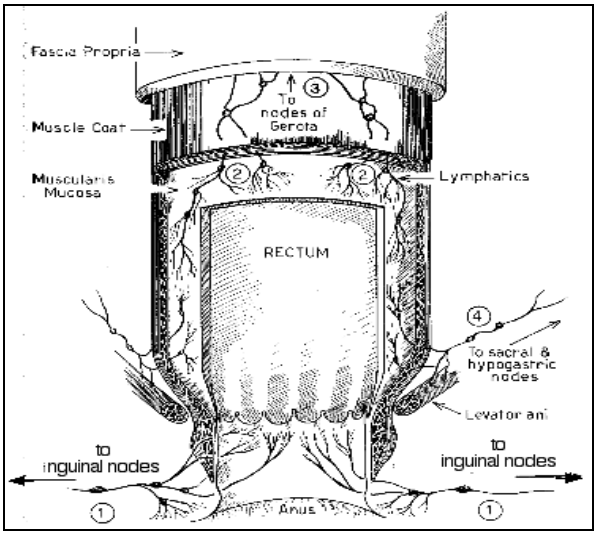
Colorectal lymph nodes are divided into four groups: epiploic, paracolic, principal and intermediate.

The epicolic group present on the bowel wall beneath the peritoneum and in the appendices epiploicae. They are more in number in the sigmoid colon and are called as the nodules of Gerota.

The paracolic nodes have many filters and are located along the marginal artery and on the arcades.

The intermediate nodes are present on the primary colic vessels, and the main or principal nodes are present on the superior and inferior mesenteric vessels. The lymph from principal nodes via the paraortic nodes then drains to the cisterna chyli. Colorectal carcinoma staging systems are based on involvement of these lymph node groups.

Lymph from the upper 2/3rd of the rectum drains exclusively upward through the inferior mesenteric nodes and then to the paraaortic nodes. Lymphatic drainage from the lower third of the rectum occurs cranially via the superior hemorrhoidal and inferior mesentery nodes, and also laterally, along the middle hemorrhoidal vessels to the internal iliac nodes



The dentate line marks the lymphatic drainage of anal canal. Those above the dentate line drains to the inferior mesenteric and internal iliac nodes and below the dentate line along the inferior rectal lymphatics to the superficial inguinal nodes, or less frequently along the inferior hemorrhoidal artery

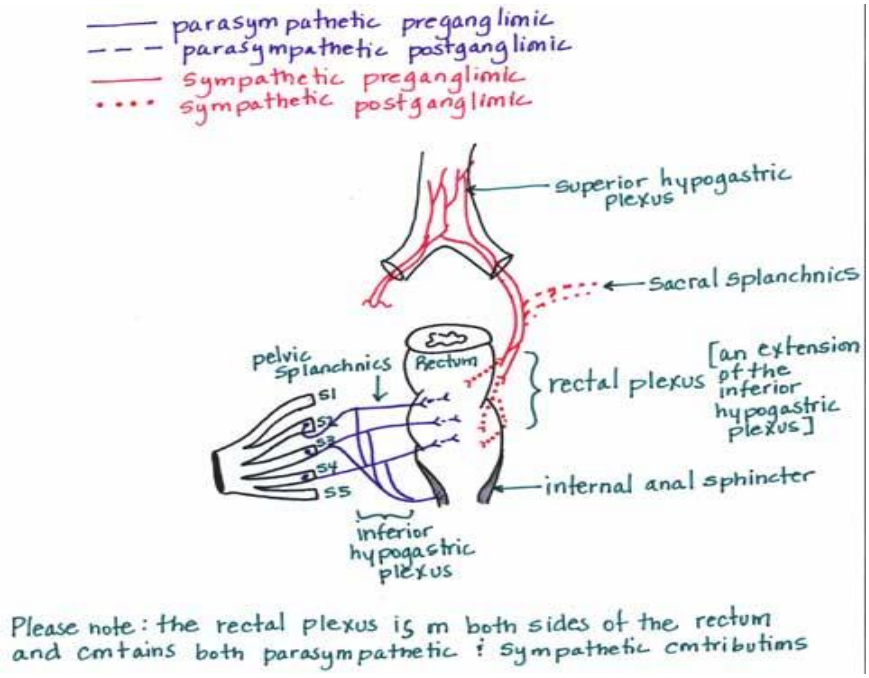
ANAL CANAL

Motor Innervation

The Internal Anal Sphincter is supplied by both sympathetic (L5) and parasympathetic nerves (S-2, S-3, and S-4). The levatorani on its pelvic surface is supplied by sacral roots (S-2, S-3, and S-4) and on its inferior surface the perineal branch of the pudendal nerve.

The puborectalis muscle also receives innervation from the inferior rectal nerves. The EAS is supplied on both side by the inferior rectal branch of the pudendal nerve (S2 and S3) and by the perineal branch of

S-4. EAS function is preserved in cases of unilateral transection of pudendal nerve because of the crossover of the fibers at the spinal cord level.

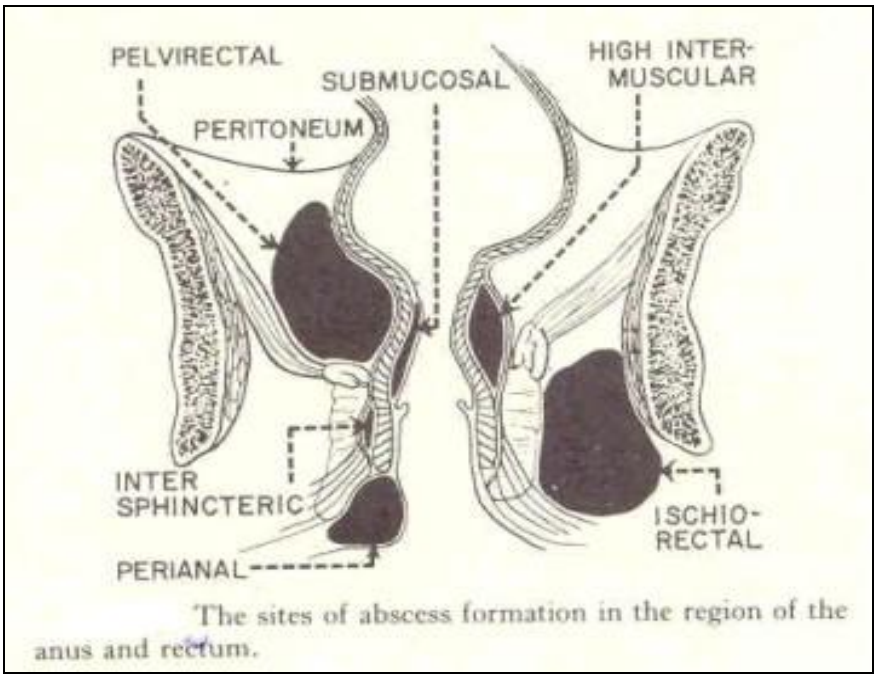


Sensory Innervation

The upper anal canal mainly near the anal valves contains a rich profusion of sensory nerve endings. Anal sensation is carried via the inferior rectal branch of the pudendal nerve and is thought to play an important role in maintaining fecal continence.

Anorectal abscess

It is the infection that originates in the intersphincteric plane in one of the anal glands. This can lead to simple intersphincteric abscess or it extends horizontally or vertically or circumferentially.



The sites of abscess formation in the region of the anus and rectum.

Clinical presentation

Intersphincteric abscess is confined to primary site of origin. It may be asymptomatic or results in throbbing type of pain. It may also present as if it was thrombosed external hemmorhoids if the abscess extends vertically between the intersphincteric plane and present as tender swelling in the anal margin.

In case of vertical spread of abscess, it may result in intermuscular abscess within rectal wall or as a supralevetor abscess. These result in vague discomfort for the patient and without any external manifestations.

In case of horizontal spread of infection it may traverse through internal spincter into the anal canal or it may also extend in opposite direction through external sphincter to ischiorectal fossa to form

ischiorectal abscess. It may also result in levetor abscess if it traverses through levetorani muscle.

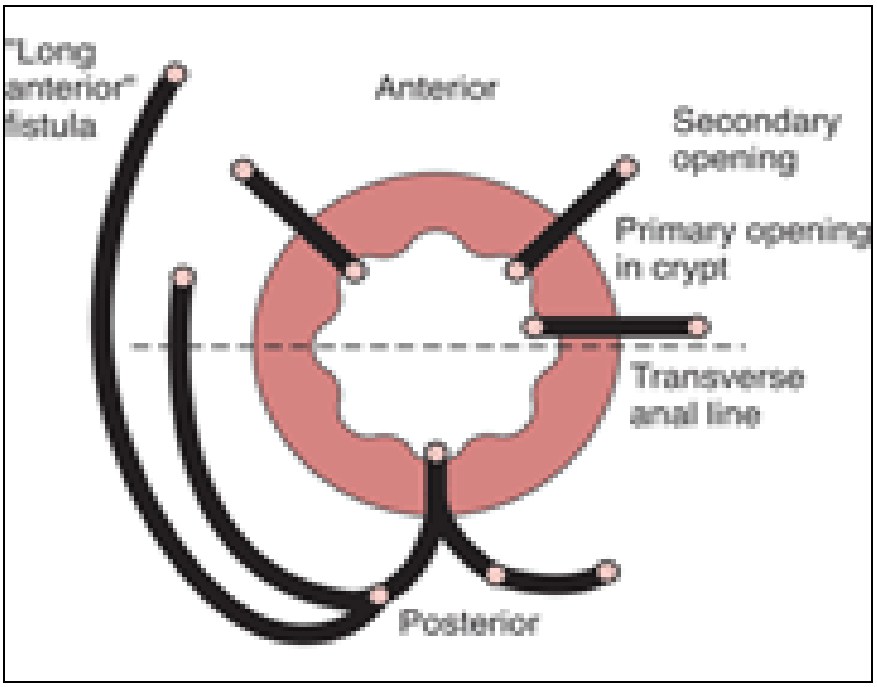
These abscesses can extend circumferentially from one side to other side resulting in horse shoe abscess. Patient initially complains of pain and fever later they develop erythematous mass finally resulting in fluctuant red mass.

Fistula in ano

Fistula in ano result following sepsis originating in anal glad at the dentate line. It may also result following acute phase of sepsis in anorectal sepsis in 25% or within 6 months of infection. Fistula extends through fascial or fatty plane through internal and external sphincters into ischiorectal fascia. Circumferential spread from ischiorectal fossa results in horseshoe fistula.

Goodsalls rule

This rule tells that if an transverse line is drawn across the anus, external opening anterior to this line leads to straight radial tract, on contrary if the opening is in the posterior to this line lead to curved path. And there is an internal opening in posterior commissure. Exception to this rule is long anterior fistula.



Classification of anorectal fistula

Parks classification

It explains fistula as 6 types and again each has subtypes.

1) Intersphincteric

Simple low track

High blind track

High track opening in to rectum

High fistula without perineal opening

High fistula with extrarectal or pelvic extension

Fistula due to pelvic diseases

2) Transsphincteric

Uncomplicated

High blind track

3) Suprasphincteric

Uncomplicated

High blind track

4) Extrasphincteric

Secondary to transsphincteric fistula

Secondary to ttrauma

Secondary to anorectal diseases

Secondary to pelvic inflammation

5) Combined

6) Horseshoe

Intersphincteric

Transsphincteric

In general, most surgeons classify to 5 types and they are

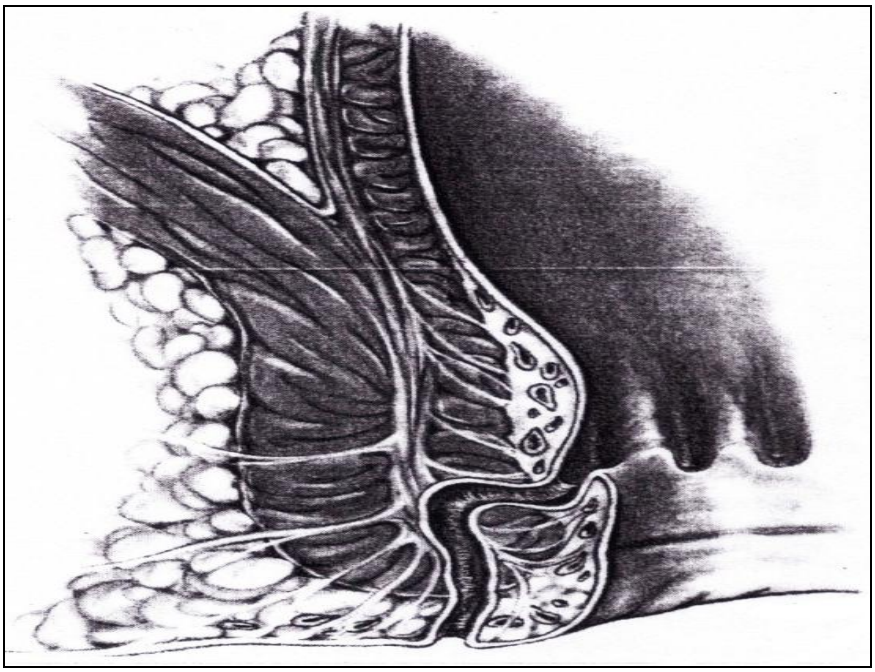
1) Submucous

2) Intersphincteric

3) Transsphincteric

4) Suprasphincteric

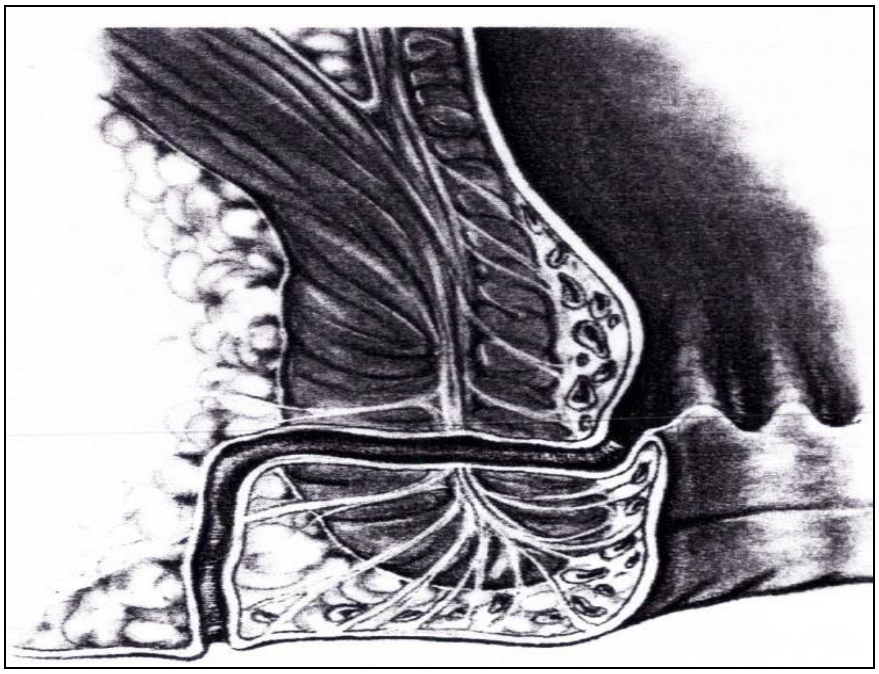
5) Extrasphincteric Intersphincteric (most common type): confined to intersphincteric plane



INTERSPHINCTERI FISTULA

Transsphincteric:

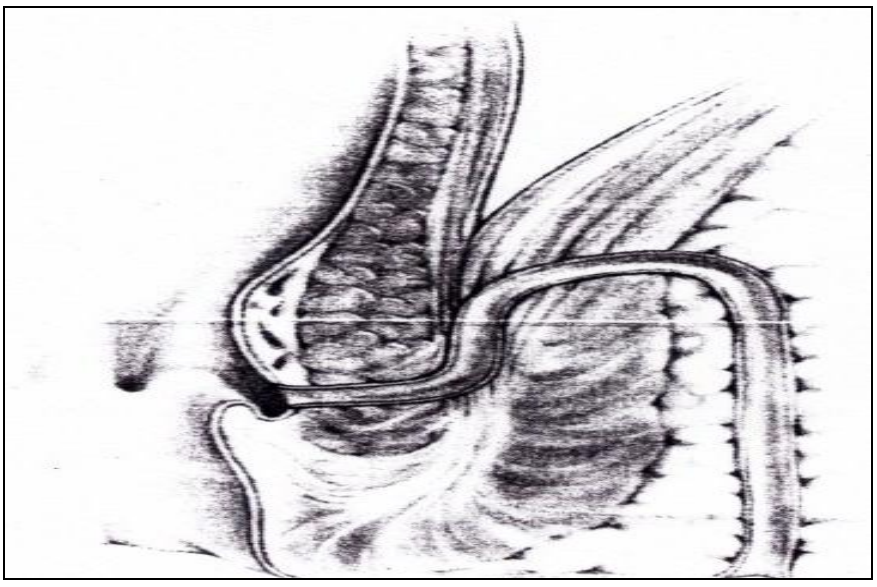
It extends between intersphincteric planes to ischiorectal fossa by piercing external sphincter



TRANSSPHINCTERIC FISTULA

Suprashincteric:

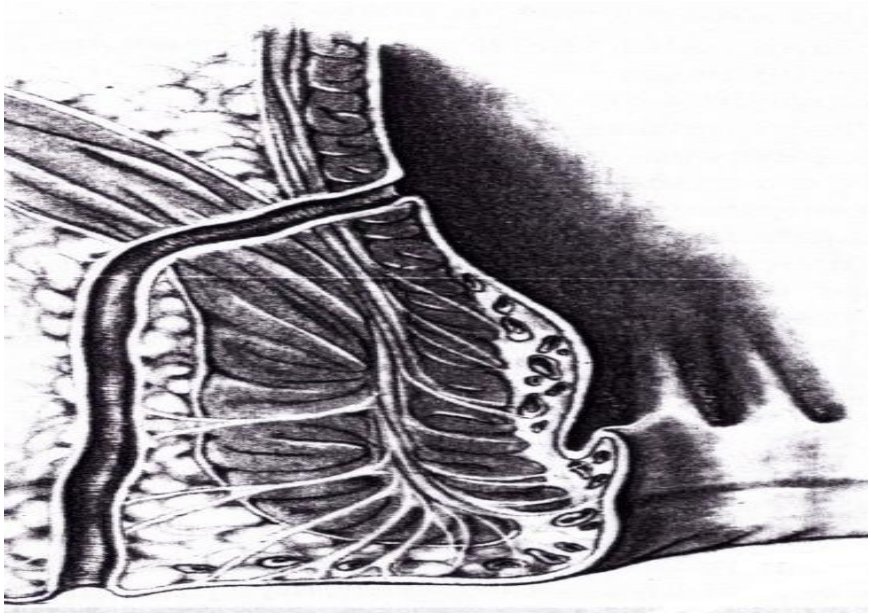
More or less like transsphicteric but loops above external sphincter and pierces levetorani



SUPRASPHINCTERIC FISTULA

Extrasphincteric:

Extends from rectum to perineal skin without involving sphincteric complex.



EXTRASPHINCTERIC FISTULA

Clinical presentations

- Seropurulent discharge
- Skin irritation
- External opening with induration of skin
- Impaired anal hygiene and soiling
- Recurrent anorectal sepsis

SPECIAL SITUATIONS

Managementof skin defects;

Advancement or rotation flaps if scarring needs anoplasty

DUAL ANAL FISTULA;

Patient with two anal fistulas with separate internal and external opening Incidence is 2-4%.

Treatment option is simultaneously identifying both internal and external opening and fistulotomy.

But we should consider the preservation of sphincter muscle by means of advancement flap or fibrin glue,

Because risk of incontinence. Horseshoe fistula is associated with only one internal opening.

TUBERCULAR FISTULA;

History of fistula for many years,multipleopening,failure to wound heal after 6 months following surgery,

Inguinal adenopathy, with caseating necrosis on histology. Diagnosed by identifying acid fast bacilli by Ziehl-Neelsen

Stain and culture

Anal Fistula and Crohns Disease

The difficulty in managing crohns disease is abscess and fistula. Mostly it is associated with colonic inflammation

Clinical Features

Often painless, chronic indurated and cyanotic lesions present. Fistulous tract may be low lying, more commonly tract is with a deep ulcer with either inapparent internal opening or supralevator extension.

Indication and Treatment

Metranidazole will give symptomatic relief in some perianal disease. fistula operation with active inflammatory bowel disease

Produces difficulty in wound management.however superficial fistula successfully managed by fistulotomy.

Long term drainage by insertion of a Pessar or Malecotcatheter,or by seton drainage.

Alternatively, adequate drainage can be done through the internal opening.

Another option is use of fibrin glue. Alternatively proctectomy will cure the fistula.

Long term seton drainage;

This method is mainly applicable for extra sphincterицfistula withcrohns disease. Sometimes used for low transsphincteric and intersphincterицfistula.mean duration is one year.disadvantage is discomfort to the patient. If seton is in proper position it will prevent an abscess.

FISTULOTOMY WITH SPHINCTER REPAIR;

Complete division of extra sphincteric fistula is dangerous.direct repair performed immediately leads to breakdown are common.

Technique;

The entire tract is divided.after excising epithelial lining wound is irrigated.using 2-0 vicryl rectal wall is closed and sphincter muscles reconstructed.ischio rectal fossa is well drained externally.this procedure is mainly used for patients with recurrent fistula.

Internal opening closure and drainage of the extrasphincterицfistulos tract.

This procedure is less destructive and gives more failure rate.throughtrans anal operation with external drainage and supra levatorarea curettage.

A concomitant colostomy is needed for success treatment.

Endorectal Advancement Flap;

This approach is advocated for preserving sphincter muscle by extra sphincterictistulectomy,closure of the sphincteric defect and endorectal advancement flap.

Steps;

1. Internal opening should be excised
2. Excision or curettage
3. Closure of internal opening by anal or ano rectal or rectal or ano cutaneous flap
4. External drainage

TRANSPOSITION OF THE FISTULA TRACT;

Rerouting extra sphincteric tract in to intersphincterictract.External sphincter is repaired; newer intersphincteric fistula is treated later.

PRINCIPLES OF MANAGEMENT

1. Patient without symptoms; no treatment
2. Active disease; systemic treatment and drainage or long term drainage.
3. Anal and rectal sparing, with superficial,intersphincterictwith low

anal fistula; fistulotomy

4. High anal or complex fistula;advancement flap or fibrin glue

Anal fistula and carcinoma;

Chronic inflammation in anal glands sometimes leads to malignant degeneration. Bleeding PR with mucin secretion with tumor mass suggest malignancy changes. It should be differentiated from anal canal carcinoma, ca rectum, carcinoma from anal duct, carcinoma colon. Biopsy from long standing fistula is needed.

Histologic examination from tissues of fistulous track is extremely important. It requires abdominoperineal resection and pre-operative chemo radiation.

Anal fistula in infants and children;

It is associated with imperforate anus. It presents with loose stools, inguinal adenopathy and proctitis. Most of the fistulas are superficial and itersphincteric. Treatment is usually standard fistulotomy. Non healing fistula after fistulotomy considers the presence of crohns disease.

PHYSICAL EXAMINATION AND ENDOSCOPY

Palpation identifies the thickened tract entering the anal canal if it is superficial and an intersphincteric fistula.

Bi digital palpation also reveals the course of the tract. If palpation

fail to track the course mean more likely it is transphincteric fistula. By means of probing the tract may be confirmed. It is mainly useful for radially located fistula.

Sometimes the track may extend into the perenium, scrotum, labia or thigh. In angulation or narrowing of the tract needs examination under anaesthesia.

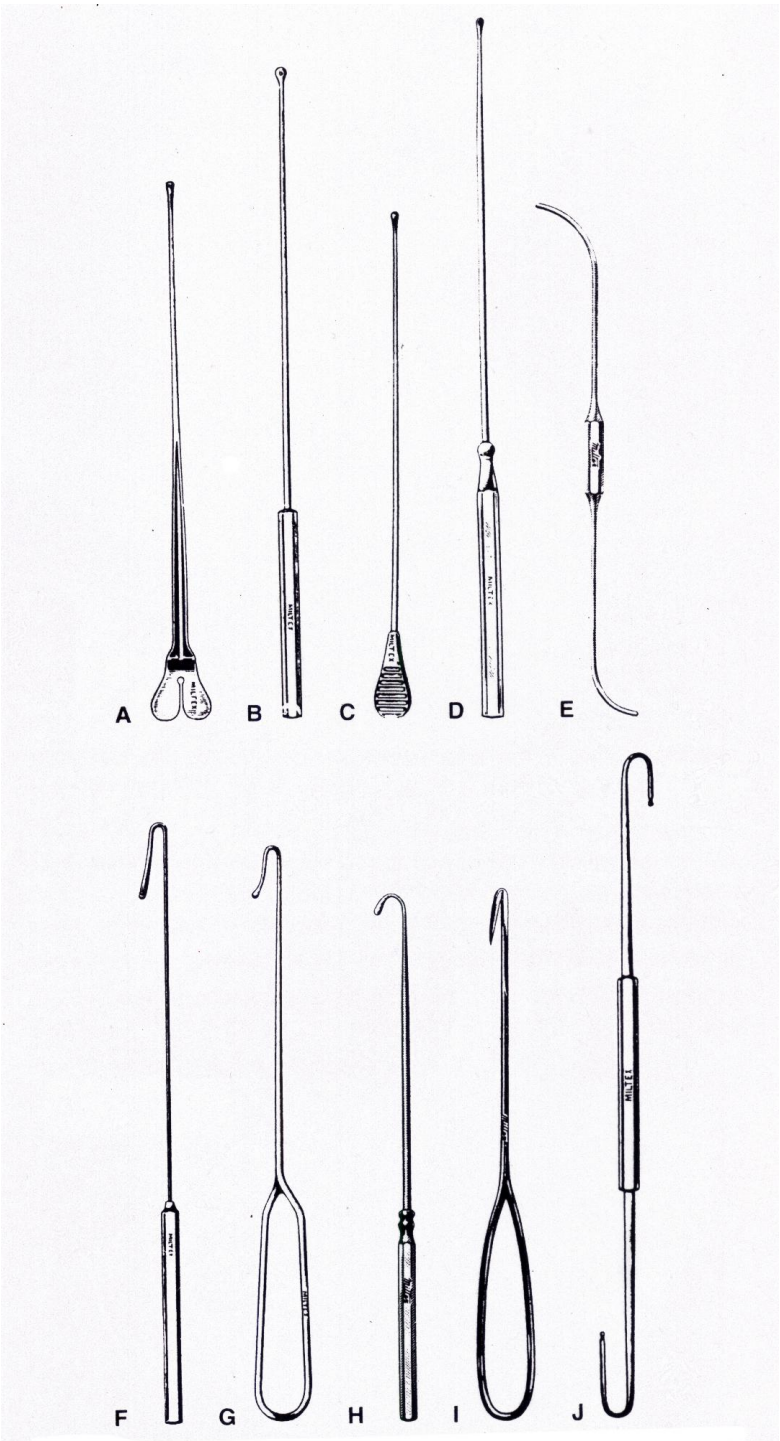
Passing probe;

A probe can be entered from both internal and external opening. It is easy to identify the track from the internal opening .

Simultaneous passage of probes from both opening confirms the tract. Probe should never forced.

Traction on the tract

Traction gives the site of internal opening. But curvilinear course of complex fistula are less beneficial from this traction.



Anorectal probes. **(A)** Larry. **(B)** Barr. **(C)** Buie. **(D)** Pratt. **(E)** Barr double-ended. **(F)** Pratt crypt hook. **(G)** Stewart crypt hook. **(H)** Rosser crypt hook. **(I)** Blanchard cryptotome. **(J)** Barr crypt hook.

INJECTION TECHNIQUES;

Dye;

Methylene blue or indigo carmine is injected through the external opening .

Milk;

It is wiped away without staining of the tissues,to repeatedly inspect the internal opening. Failure to see the milk in internal opening gives the evidence of stenosis of fistula track.

Hydrogen peroxide;

Oxygen bubble may be seen through internal opening. Even stenotic tract also identified, without staining the tissues.

Fistulography;

It is demonstration of fistula tract, by means of water soluble contrast agent. It is useful in crohns disease, previous unsuccessful surgery, those with unidentified internal opening.

Anal endosonography;

It is used for imaging anal canal and perianal region pathologic abnormalities. Mainly to identify internal opening, muscle defect, course of the tract and abscess. It is a least invasive method for delineating fistula

tracts and sphincter mechanism, and also for locating deeper sepsis.

It is mainly for internal opening sites, differentiating abscess cavities, granulating tracts, and scars.

Uses;

Fistula without internal opening

Recurrence or presistence fistula after surgery

Crohns disease

Patients with complex clinical manifestations.

MAGNETIC RESONANCE IMAGING

Dyanamic contrast enhanced MRI is used to identify more secondary tracts and accurate to identify complex fistulas.

Endoanal MRI provides accurate relationship of collections, tracts and evaluation of complex and recurrent fistula and perianal sepsis.

Colonoscopy and small bowel series in case of suspected inflammatory bowel disease

NEUROPHYSIOLOGY OF ANAL CANAL

Physiologically Gorsch described that defecation is on the basis of a modified somatic autonomic reflex. It is under cortical control where defecation desire distinguished from the act of defecation. Sensory

stimuli, in which desire to defecate, arisises from sites known as trigger zones. These trigger zones are situated in rectal musculature and ano rectal line.

Threshold stimuli arise from ano rectal junction areas from which impulses conveyed by spinal nerves, to initiate the defecation.

Distension of rectal wall also give desire to defecate via the sympathetic afferent nerves. It is assosciated with relaxation of internal sphincters with contraction of rectal musculature. This act may be inhibited by the will.

Voluntary anal sphincters relaxation with voluntary colonic contraction with its complementary muscles, with expulsion of the rectal contents is the act of defecation.

In adult life defecation is voluntary act; it is no longer a reflex, once the summation of sensory stimuli is triggered.

Constipation is related to sensory motor response of the rectum and whole gastro intestinal tract.

In rectal prolapse trigger zones may be extra rectal gives a constant stimulus for tenesmus

Defecation is entirely cortical response. Stimulation of vagus gives the defecation reflex, contraction of the rectum with relaxation of anal

sphincters.

Segmental movements of intestine are myogenic in origin, Meissnerintrinsic plexus and auerbach plexus controls peristalsis.

Regulatory function is controlled by sympathetic and parasympathetic innervation; Diarrhoea is based on intrinsic myogenic basis.

Mean length of anal canal is 4 cm which get lengthened by squeezing of external sphincter ,get shortens with straining.

Resting pressure of the anal canal depends mainly on the internal sphincter, averages 90 cm water. It is higher in men and younger individualslower in women and older individuals. The mechanism behind continence is pressure difference between rectum (6 cm water) and the anal canal (90 cm water)

Surgical approaches;

Treatment of conventional fistula

After identifying external and internal openinng tract is incised, completeness of operation confirmed by epithelial lining continuation. Granulation tissues removed by curettage. Part of the tract sent for histopathological examination.

Widen the external wound cut edge of anal mucosa and underlying

sphincters oversewn by absorbable suture for hemostasis. Wound is left open and gently packed. Consequent sitz baths advised, if a large part of external sphincter divided, primary sphincter repair or seton division may be needed.

Horseshoe fistula;

May be intersphincteric but more frequetlytranssphincteric. Multiple external openings connected by horseshoe shape but internal opening in the posterior midline. Rarely, a horseshoe fistula presented with internal opening in the anterior midline.

This case managed by identification of all the tracts and internal opening and unroofing or exicion of each tract. This results in large, gaping wound with prolonged healing time with disability for many months.

If fistula is transsphincteric type, the deep post anal space entered, curetted and irrigated. This includes incision of both internal and part of external sphincter, unroof the external opening, curette the tract and drain the wound, cut edges of anal canal sutured with underlying internal sphincter. Then deep post anal space is packed.

In this method healing is generally rapid, less deformity is considered. Duration of disability also reduced. Postoperatively packing is

removed in 24 to 48 hours and sitzbath advised.

Treatment of Suprasphincteric Fistula;

It includes endorectal advancement flap, primary closure and drainage and seton division.

Fistulotomy is accomplished distal to the internal opening,cepphalad component is treated by seton division.

Treatment of Extrasphincteric fistula

If the internal opening is to lie above the levators, division of the tract may leads to fecal incontinence. If puborectalis sling is completely divided, incontinence will ensue. When in doubt about the level of internal opening, a seton can be used as a diagnostic tool.

This includes passing suture through the tract and out the anal canal. Suture is loosely tied. If seton is below the levatoresfistulotomy can be performed, if the internal opening is above the levatores alternative procedure needed.

Seton division;

It was described by Hippocrates in 5th century B.C. It is the simplest method for treatment of extrasphincteric fistula; bowel control may be less satisfactory. The principle involved in this method is wire cutting through a block of ice. the skin and anal canal mucosa initially

incised.

Then the suture is passed.eg no 2 silk or elastic bands or penrose drain. Seton is securely tied with moderate tension. The patient can be discharged on the same day. First follow up in after one week, then two weeks later, the seton erodes through the tissue needed to be divided.

It is a one stage procedure and assosciated with pain due to ischemia and necrosis.

VARIOUS TYPES OF TREATMENT:

Fistulotomy

It is inappropriate for simple intersphincteric fistula & low transphincteric fistulae.

Not good for extrasphincteric&suprasphincteric fistulae became the fistula track located outside the sphincter mechanism.

Principle of fistulotomy is identification of the fistula track, so that the track can be laid open.

Probing used to define the track & used to identify blind tracks. Course of simple fistula follows Goodsall's rule.

External opening located posterior to the horizontal plane is opening into the anal canal at posterior midline. External opening located anterior to the horizontal line is likely to run directly in to the anal canal.

This procedure divides the sphincter complex & gives incontinence to the patient.

Fistula probe is gently passed through the fistula; with diathermy the perianal skin & anal epithelium are divided.

The internal sphincter if involved is identified and divided. If striated mucous is involved superficial to the fistula track, mucous division not needed, Seton is inserted.

High blind fistula is found, track curetted loosely & drained. Bleeding from edges secured by cautery & gauze dressing applied.

If there is more than one external opening & many anterior opening, then they may have separate internal opening, treated by same manner, by identifying all fistula tracks and opening them, without division of large amount of striated muscle.

For multiple posterior fistulas, the fistula track open at midline posteriorly; there may be a small supralevetor collection noted in the posterior anal space.

SETON FISTULOTOMY:

Principle is striated muscle located superficial to the track is encircled by a soft rubber or latex tuving or by using a prolene or silk tie. The seton is loosely tied and it is left in situ.

Over weeks, striated muscle is slowly divided by seton. The muscledoesnot spring apart, leaving a defect because muscle division is relatively slow. Consequently fibrous tissue is laid down over the fistula track bed. This avoids gutter deformity, which is associated with soiling and minimizes the incontinence.

Treatment may take many weeks and followup is needed. In case of mid or high transphincteric fistula presentation of continence is better.

The fistula track is identified by probing; the perianal skin and anal canal skin are divided. The internal sphincter is also divided; the striated muscle lying superficial to the fistula is preserved.

Thus a fistula is laid open.

A vascular rubber sling (S loop) used as seton, it is threaded around the striated muscle, Seton is tied with multiple knots and beyond the last knot, end is secured , so that Seton become secured when the patient moves.

On first followup Seton remains in situ; application of rubber band beyond the first knot tightens the Seton. Commonly 5or 6 bands can be applied.

Usually at the end of one track, seton has fallen out of completely divides the striated muscle. If it is not fallen out Seton is replaced and

followup continues until track getting divided. Fistula track will be slowly divided in 1 to 6 weeks. Followup is needed for recurrent fistula.

FISTULECTOMY AND ANORECTAL ADVANCEMENT FLAP:

It preserves continence and avoids fecal soiling, but sepsis and recurrent fistula are common.

First part involves fistulectomy, means fistula track excision. Side tracks also excised. External sphincter defect need closure. Internal opening needed to be closed with an anorectal advancement flap.

Curvilinear flap, includes mucous and sub mucous, rectal wall and Closing the internal component without tension with draining.

COMPLETE LAY OPEN AND REPAIR:

Extrasphincteric and suprasphincteric fistula can be managed by fistulotomy and divided. Striated muscle is marked so that it can be identified at later. One infection cleared. Sphincter repair is then performed. Otherwise sphincter repair is done at the time of Lay open procedure. But this procedure is associated with sepsis.

ANAL PLUG:

Principle is preserve the sphincter with avoidance of a gutter by fistula track filled with fibrin and increased fibroblastic activity it forms collagen matrix in the fistula. After irrigation of fistula track, Anal plug

inserted and sutured. It avoids open wound, setons, preserves continence without soiling.

Gluing of fistula:

Fibrin glue is injected into fistulous tract and is allowed to harden.

LIFT technique:

(Ligation of intersphincteric fistula tract) Through transverse incision intersphincteric space is reached. Fistula passing across is identified and ligated using vicryl on both side. Inner part is excised and outer part is curreted via external opening.

VAAFT technique:

(video assisted anal fistula tract ligation) fine endoscope passed through outer opening of fistula tract and its wall cauterised and the inner opening is ligated.

COMPLICATIONS OF OPERATION FOR FISTULOUS ABSCESS

1. Urinary retention
2. Haemorrhage
3. Incontinence
4. Thrombosed external haemorrhoids
5. Cellulitis

6. Inadequate drainage and pocketing

7. Recurrent fistua

8. Persistent sinus

9. Bridging

10. Stricture

CAUSES OF RECURRENCE

Failure to identify and treat internal orifice, intersphincteric anal gland sepsis.

Failure to identify lateral or outward extension.

Fear of incontinence.

When associated with crohns disease.

CAUSES OF ANAL INCONTINENCE AFTEROPERATION

Division of ano rectal muscle

Severence of motor nerve to shincter mechanism

Prolonged packing

RELEVANT STUDIES

CYANOACRYLATE GLUE IN THE TREATMENT OF ANO-RECTAL FISTULAS

Background and aims:

The treatment of fistula in ano is debatable.many treatment options are available; none of them is free from complications like incontinence and perianal pain. This study evaluates the giue composed of N-butyl-2-cyanoacrylate and methacryloxysuifonate to treat anal fistula.

Patients and method:

Twenty-one patients (14men and 7women) with fistula in ano were subjected in the study and treated as day cases. Prior to the glue injection patient were assessed by clinically and Trans rectal uitrasound using 10 MHz 360 endoscopic probe .Assessment of continence was also done.

The fistula was identified, curreted and washed with saline and hydrogen peroxide, then the glue was injected from syringe nozzle through a catheter previously inserted into the fistula.

Results:

With primary glue treatment five out of seven patients (71.4%) healed, the other two needed repeat injections and both healed. Out of 14 complex fistulas 10 patients got healed with primary treatment and one among the four showed signs of intolerance to glue injection. There was a healing rate of 71.4% after single injection of glue and 90.2% in case of more than one session. There were no signs of recurrence after 18 months

of follow up.

ROLE OF CYANOACRYLATE GLUE IN THE MANAGEMENT OF LOW FISTULA IN ANO: A PROSPECTIVE STUDY

Aims:

To evaluate the effect of cyanoacrylate glue in treatment of low anal fistula for a period of 6 months

Materials and methods:

20 Patients were selected and examined clinically and were subjected to Trans anal ultrasound. The fistula tracts were probed and washed with saline and granulation tissue was debrideded. The glue was then injected into the tract through an infant feeding tube from a syringe nozzle. Patients were followed for a period of 6 months.

Results:

Out of 20 patients 17 got healed with primary injection of glue. Out of remaining three patients 2 got healed after second injection and third patient continued to to discharge from 2nd opening of the fistula tract even after two injections.

EFFICACY OF ANO RECTAL FISTULA PLUG VS FIBRIN GLUE IN TREATMENT OF ANORECTAL FISTULA

By Eric k johnson, janette in diseases of colon and recum

Aim:

Fibrin glue in treatment of anal fistula has higher recurrence in long term and so the prosthetic plug is used to close the primary opening of fistula. In this prospective study the efficacy of anal plug with fibrin glue was compared.

Methods:

In the study patients with high transsphincteric fistula were enrolled. Under GA and in prone jack knife position the fistula tract is irrigated with hydrogen peroxide and fistula tract occluded with fibrin glue or fistula plug.

Results:

25 patients with fistula were enrolled and 10 were injected fibrin glue and 15 were treated with fistula plug. In glue injected patients 6 patients had persistence of fistula after 3 months whereas in fistula plug patients only 2 had persistence of fistula.

Conclusion:

Closure with fistula plug is effective in treating anal fistula and more reliable than fibrin glue.

The higher efficacy of fistula plug is due to the ability to suture the primary opening of the fistula and thereby resulting in closing the primary

opening more effectively.

TREATMENT OF CHRONIC FISTULA IN ANO BY USING FIBRIN GLUE

Omer Elfaroug, Y. TinaySaudii med J; vol 24 (10): 1116-1117

Objectives:

To find out the outcome of fibrin glue, which is commercially available in closing fistula in ano.

Methods:

During the period of December 2000-November 2001 nonrandomized.

Trial was conducted among 19 patients (with 2 patients having multiple fistula) making total of 21 fistula. Patients were prepared for procedure according to protocol and the fibrin glue were injected after curetting the fistula tract. Follow-up visits were done at the end of one week, one month, 3 month and one year.

Results:

Among nineteen patients 3 patients lost follow up making total fistula count to 18. Among 18 fistula 14 (78%) got healed and had successful closure. Among 4 failure cases 2 reported symptomatic improvements. There was no evidence of complications.

Conclusion:

There was healing rate of about 78% in chronic fistula in ano following commercial fibrin glue.

FISTULA IN ANO ADVANCES IN TREATMENT:

Samir Deeba, Omar Aziz, Parvinder s jains

Background:

Many techniques used for management of fistula in ano. Each one carry own risk mainly recurrence and incontinence. Recent advances in treatment helped the surgeons in facing these troublesome complications.

Methods:

On doing online search using many databases various outcomes were identified using surgery alone, fibrin glue and fibrin plugs. Forty one articles were referred and and the success rate of each article were discussed.

Results:

Regular fistula surgery has their own place while new methods like fibrin glue and fistula plug were alternative approach. With initial study using glue reported good success rates.

Conclusion:

Newer methods in treatment of fistula like fibrin glue and fistula plug gives promising reports in outcome. However these require high quality randomised trials.

CYANOACRYLATE GLUE

N-Butyl cyanoacrylate is a butyl ester of 2-cyano-2-propenoic acid (C8H11NO2). It is a colorless liquid having an irritating odor. It is water insoluble. It is a chief component in medically available cyanoacrylate glue. It is also called as Enbucrilate.

Butyl cyanoacrylate which is present in monomeric form polymerisesrapidl when it comes to contact in presence of ionic substances like blood, moisture and tissue fluids. It is solule in nitromethane, acetone and methyl ethyl ketone.

Butyl esters provide strong rigid bond. It also has quicker polymerisation rate and good tensile strength and also has bacterriostatic properties for which it is used in closing surgical and wound infections.

Butyl cyanoacrylate has slow degradation in body which made it a useful to create nano particles for delivery of drug inside the body.

Heating the glue in higher temperature causes pyrolysis and depolymerisation and gases causing irritation to lungs and eyes.

Medical applications

As an adhesive for laceration of skin which is cosmetically better because of less scarring

In gastroenterology to treat gasricvarices and esophageal varices in case of ciirhosis and thromosis of spleenic veins by injecting glue into the varices

In treatment of enterocutaneous fistula.

MATERIALS AND METHODS

Design of study:

Prospective study

Place where study conducted:

Department of General surgery,

Coimbatore medical college hospital

Study period:

Nov- 2012 –Nov 2013

Study population:

Patients with low anal fistula

Sample size:

30

Inclusion criteria:

Patients with low anal fistula above the age of 18 yrs attending general surgery OP in Coimbatore medical college hospital.

Exclusion criteria:

Patients with either of the following

1) High fistula in ano

2) TB

3) Crohns disease

4) Rectovaginal fistula

5) malignancy

Preoperative evaluation:

Patient with fistula in ano were admitted in the surgical unit. They were thoroughly examined by digital rectal examination followed by proctoscopy. External and internal opening of the fistula were made out. Fistulogram was done in cases were internal opening was not visulised.

Preoperative preparation:

Patient who are posted for surgery were put on nil per oral 10 hrs before surgery. Soap and water enema given twice one on the previous night and other on the morning of surgery. Pre-operative antibiotics are given 1hour before surgery.

Anesthesia:

Spinal anesthesia

Position:

Lithotomy position

Operative procedure;

After positioning the patient parts painted and draped. Per rectal examination and proctoscopy was done. Internal and external opening of the fistula were identified and its track was washed completely using normal saline.

Following which 5 Fr feeding tube introduced via external opening and advanced till its tip seen in the internal opening. Cyanoacrylate glue was injected through the tube via nozzle.

After visualizing the glue in internal opening catheter was slowly withdrawn by slowly injecting the glue till the tip appears at external opening. Stabilization of glue occurs in 30s.

Post-operative care:

Patients were given fluids after 6hrs of surgery. Patients were ambulated 6hrs later and were given normal diet. Patients were discharged 24 hrs later following surgery.

Follow up:

Patients were examined weekly for initial 4 weeks, then 2nd weekly for next 1 month, then monthly for next 4 months.

Limitations:

Smaller study group

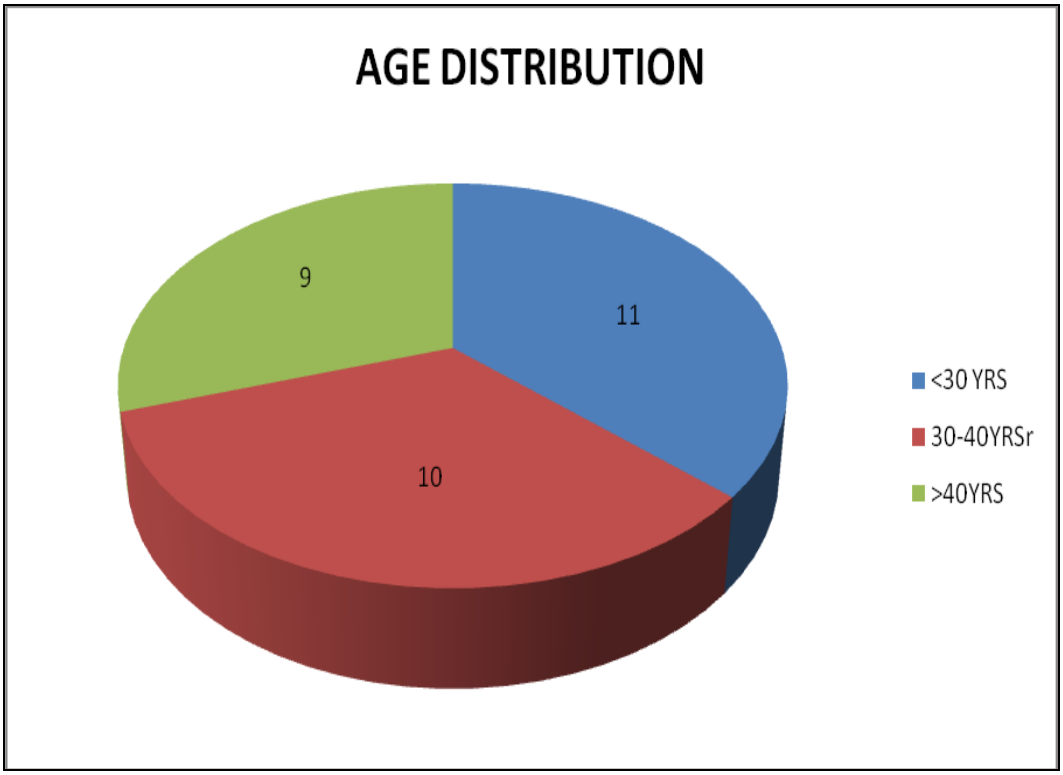
OBSERVATIONS

All patients with low anal fistula were admitted in Coimbatore medical college hospital and treated with cyanoacrylate glue. They were followed up for period of 6 months and the outcome was noted.

Table 1: AGE DISTRIBUTION

AGE DISTRIBUTION	MALE	FEMALE	TOTAL
< 30YRS	9	2	11
30-40 YRS	7	3	10
>40 YRS	4	5	9
TOTAL	20	10	30

Out of 30 patients 20 were male and 10 were female. 11 patients (36.7%) were below thw age group of 30 yrs, 10 patients (33.3%) were between 30-40 yrs of age and remaining 9 patients (30%) were above 40 yrs of age.


AGE DISTRIBUTION
9
11
10
<30 YRS
30-40YRSr
>40YRS

AGE AND SEX DISTRIBUTION

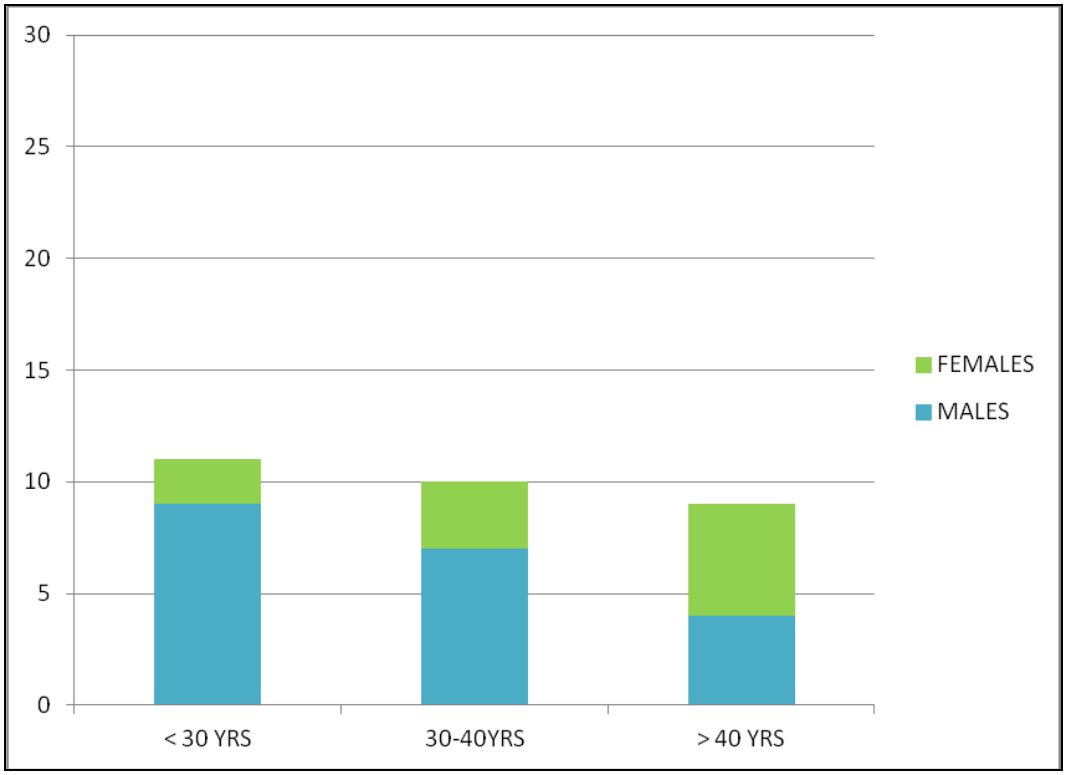


Table 2: OUTCOME OF STUDY

CURED	5 PATIENTS
RECURRENCE	20 PATIENTS
LOST FOLLOW UP	5 PATIENTS
TOTAL	30 PATIENTS

Among 30 patients treated with cyanoacrylate glue only 5 got cured and 20 patients had recurrence during study period and 5 lost follow up.

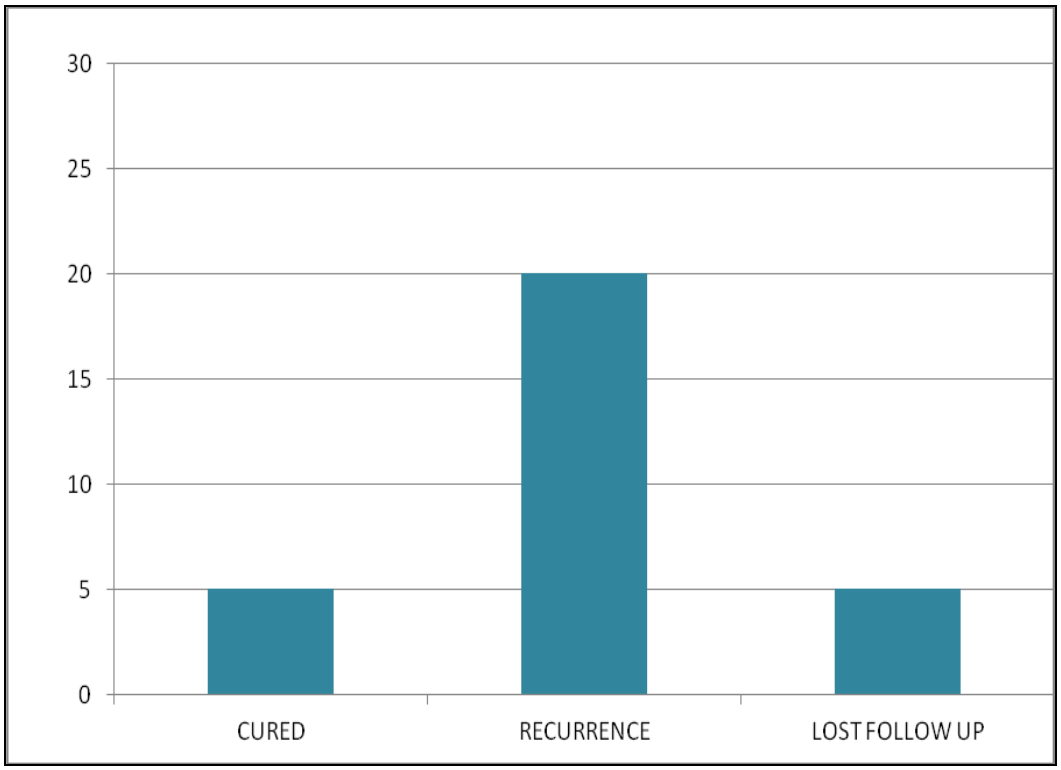
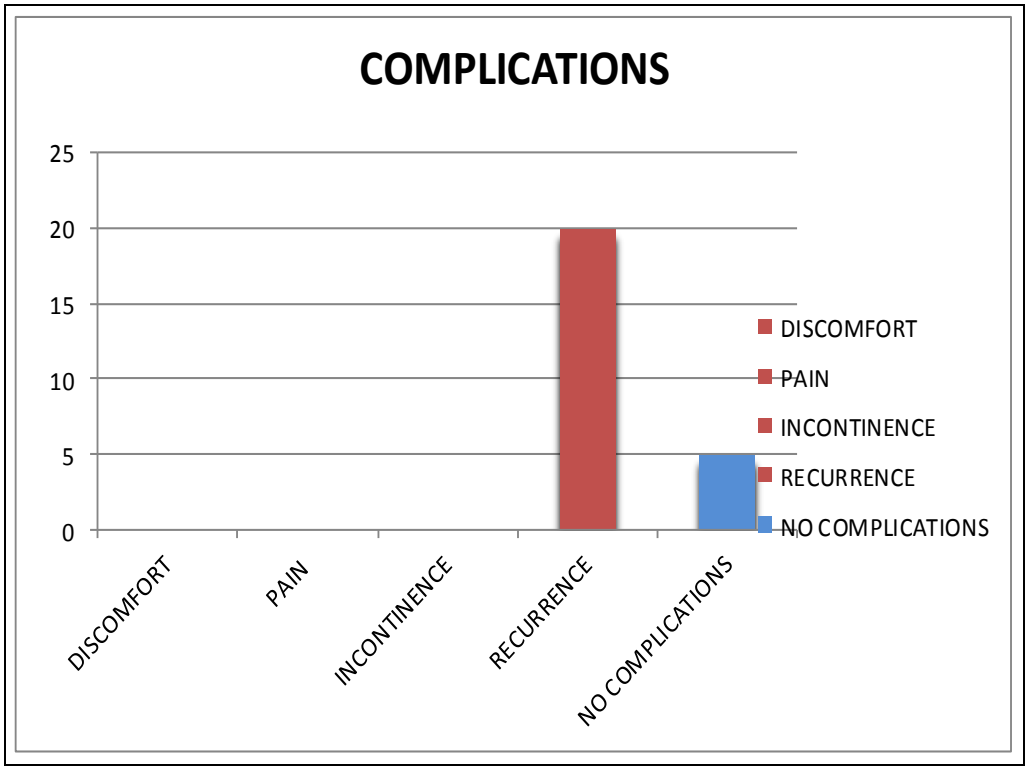

30
25
20
15
10
5
0
CURED
RECURRENCE
LOST FOLLOW UP

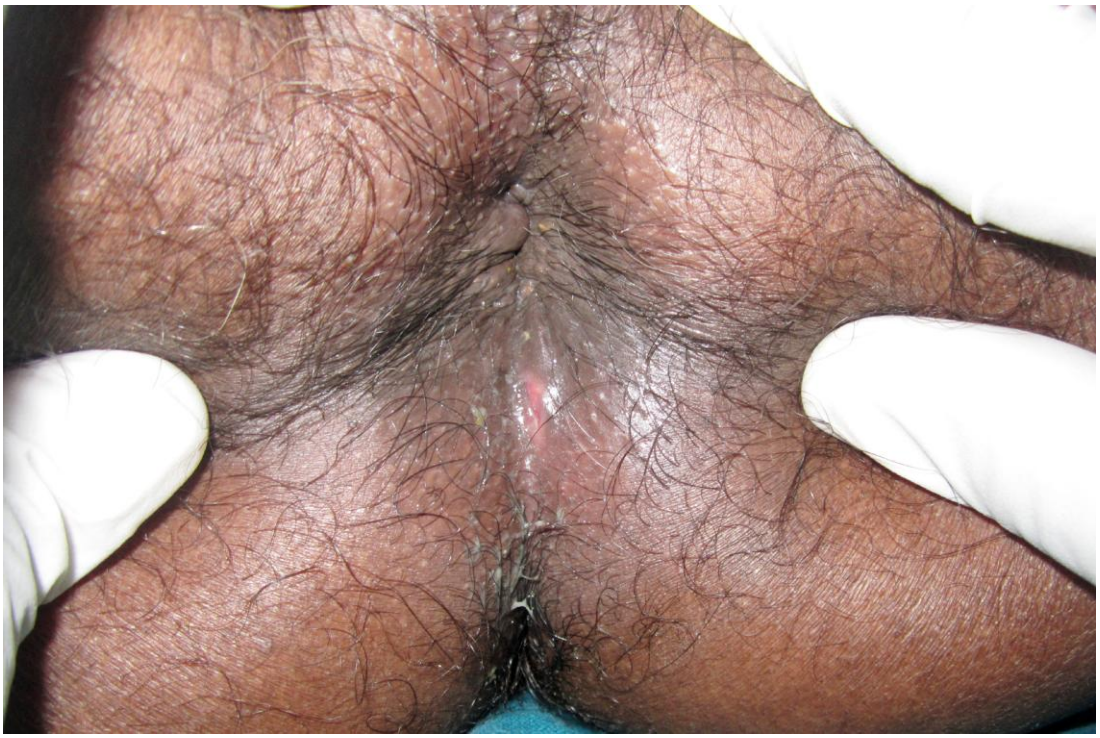
Table 3: COMPLICATIONS DURING STUDY

COMPLICATIONS	PERCENTAGE OF PATIENTS
DISCOMFORT	NIL
INCONTINENCE	NIL
RECURRENCE	66.7%

Among 30 patients 66.7% (20 patients) got recurrence of fistula with the study period. None of the patients had complication like discomfort or pain following after injection of glue.

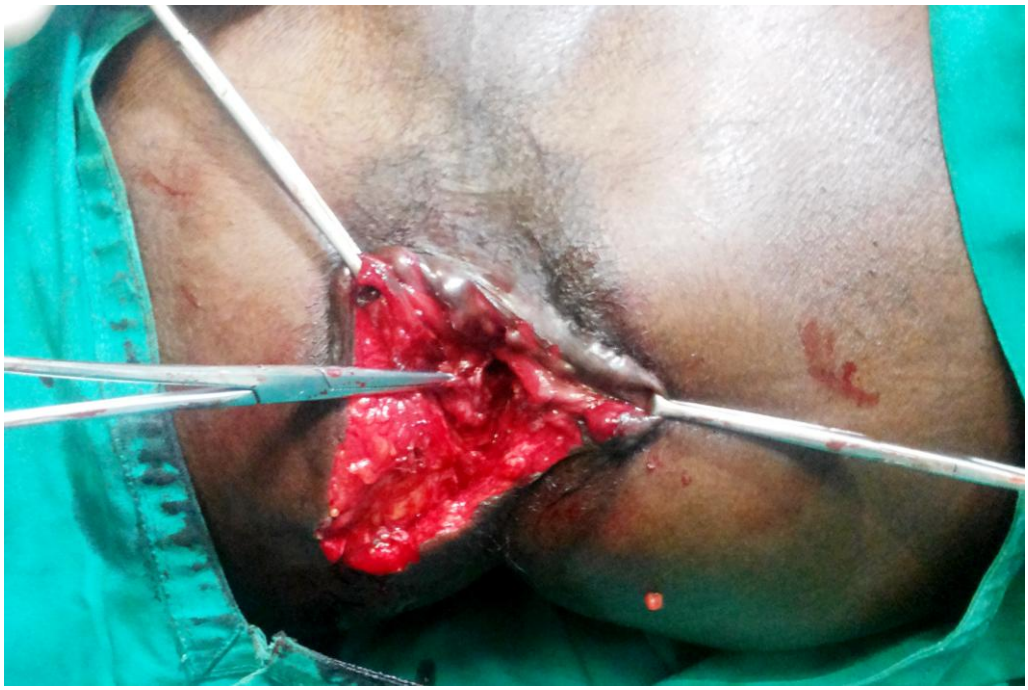

COMPLICATIONS
25
20
15
10
5
0
DISCOMFORT
PAIN
INCONTINENCE
RECURRENCE
NO COMPLICATIONS
DISCOMFORT
PAIN
INCONTINENCE
RECURRENCE
NO COMPLICATIONS

FISTULA IN ANO

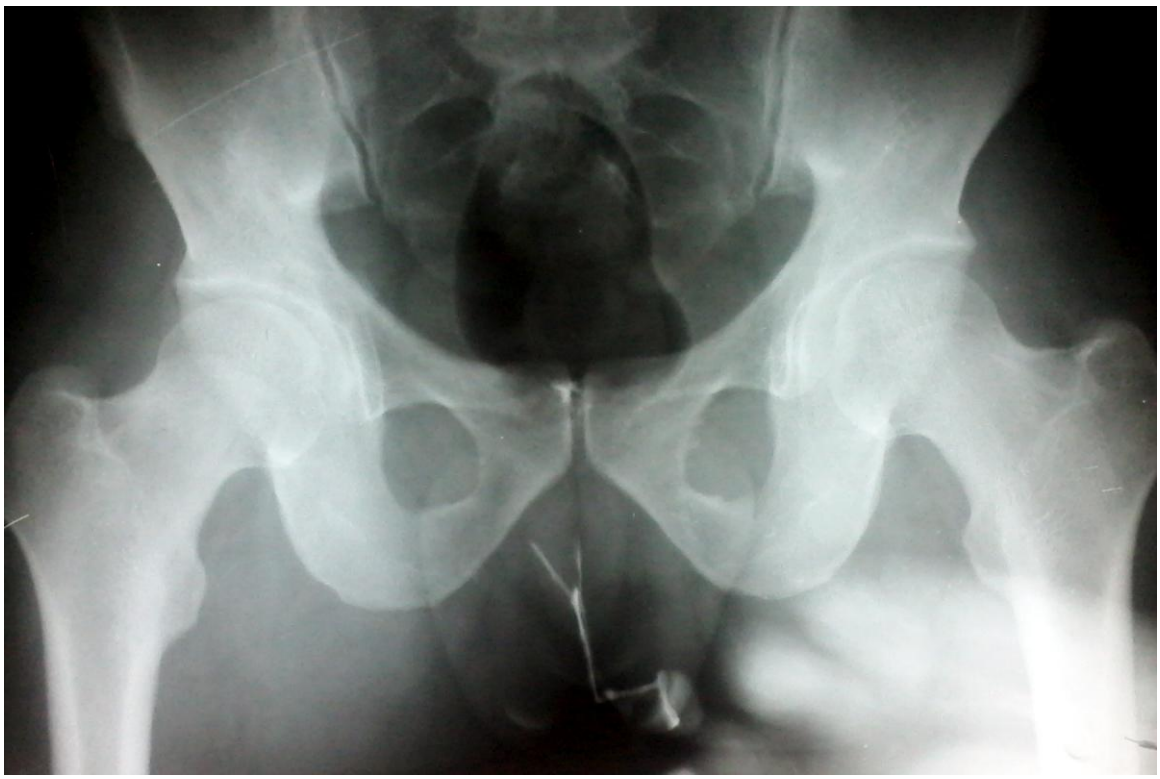


FISTULA IN ANO

FISTULOTOMY-LAY OPENING



FISTULOGRAM



GLUE INSTILLATION

DISCUSSION

Fistulotomy is the gold standard treatment in fistula in ano and is technically simple to perform and has higher success rate of 95%. But it has the complication of incontinence rate upto 50% and open wound and discomfort.

Fibrin glue instillation is another newer modality in treatment of fistula in ano which has the success rate which ranges from 10-85%.

In our study we used glue which has an active component of N-butyl 2- cyanoacrylate which polymerizes on contact with tissues. It acts like an inert foreign body and seals the fistulous tract by acting as a plug. Cyanoacrylate glue has advantage that is cost effective and has longer shelf life when compared to fibrin glue.

3o patients admitted with low anal fistula, where subjected to instillation of cyanoacrylate glue during the study period. They were followed up for a period of 6 months. None of the patients had complaints of preoperative incontinence.

5 patients (16.6%) cured following instillation of cyanoacrylate glue and were asymptomatic till 6 months. Out of 20 patients (66.7%) who had got recurrence underwent fistulotomy.

There were no signs of intolerance to glue, hemorrhage, allergic

reaction, abscess formation or incontinence in any of the patients treated with glue. Patients who were treated with glue were painless and did not require any analgesics.

Due to shorter duration of follow up and less number of study population the efficacy of cyanoacrylate glue in management of fistula in ano should be assessed in long term.

SUMMARY

In our study we used glue which has an active component of N-butyl 2- cyanoacrylate which polymerizes on contact with tissues. It acts like an inert foreign body adhesive and seals the fistulous tract by acting as a plug.

3o patients admitted with low anal fistula, where subjected to instillation of cyanoacrylate glue during the study period.

They were followed for postoperative pain, discomfort, incontinence, glue sequlae and recurrence .

Patients were followed for period of 6 months. Instillation of glue avoids open wound, sphincter injury and postoperative discomfort. It avoids perianal sepsis and has advantage of early ambulation. In our study after instillation of glue we had more recurrence rate.

CONCLUSION

30 patients with low anl fistula were subjected to instillation of cyanoacrylate glue.

5 patients cured (16.6%), 20 patients (66.7%) recurred and 5 (16.6%) patients lost follow up.

Patients were followed up for a period of 6 months after glue instillation to look for complications.

Post-operative pain, discomfort, incontinence were abscent in case of glue instillation.

Early ambulation and less time of stay in hospital were added advantage in case of glue instillation.

Recurrence rate is high (66.7%) in case of cyanoacrylate glue instillation in our study.

Due to shorter period of follow up and smaller study group the overall efficacy of cyanoacrylate glue should be followed for longer time.

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CONSENT FORM

It has been explained to me in my mother tongue and I ncompletely understand my condition,its related complications and the treatment Options available. I have been explained in detail regarding this study "Effectiveness of Cyanoacrylate glue in the management of low anal Fistula".I hereby give my consent to participate in the above mentioned study.

SIGNATURE OF THE RELATIVE WITH NAME

SIGNATURE OF THE PATIENT WITH NAME

PROFORMA

Name

Age

Sex

Address

Income

Occupation

Ip no

Date of surgery

Diagnosis

Procedure done: instillation of cyanoacrylate glue

Postoperative follow up

Immediately after surgery

a) Pain (Y/N)

b) Discomfort (Y/N)

Weekly follow up for 1st month after discharge

a) Pain (Y/N)

b) Discomfort (Y/N)

c) Incontinence (Y/N)

d) Recurrence (Y/N)

2nd month to end of 6 months of follow up

a) Incontinence (Y/N)

b) Recurrence (Y/N)

Further follow up for specific complaints

MASTER CHART

S.NO	NAME	AGE	SEX	IP NO	OUTCOME
1	Thangavelu	53	M	75552	Recurred
2	Janarthanan	34	M	76335	Recurred
3	Pasupathi	25	M	77081	Recurred
4	Ayyavu	57	M	77227	Recurred
5	Subramani	20	M	77435	Recurred
6	Karuppusamy	35	M	78230	Recurred
7	Mani	24	M	464	Healed
8	Sakthivel	29	M	506	Recurred
9	Ananthavel	36	M	1981	Lost follow up
10	Poovalingam	20	M	3025	Recurred
11	Narayanan	26	M	4450	Recurred
12	Navamani	40	M	5765	Lost follow up
13	Suresh kumar	27	M	6459	Healed
14	Nallusamy	40	M	7288	Healed
15	Persojan	42	M	10388	Recurred

16	Julian	30	M	11214	Recurred
17	Ganeshan	31	M	11886	Recurred
18	Arjunan	47	M	13341	Lost follow up
19	Prasanth	25	M	13497	Healed
20	Balaji	29	M	14593	Lost follow up
21	Kunathal	22	F	78201	Recurred
22	Sowmiya	21	F	78423	Recurred
23	Sheela	35	F	5049	Recurred
24	Devi	50	F	3021	Lost follow up
25	Rajeshwari	38	F	5747	Recurred
26	Devaki	55	F	7229	Recurred
27	Maral	48	F	9145	Recurred
28	Ruckmani	53	F	11889	Healed
29	Mylathal	35	F	11918	Recurred
30	Renuga	28	F	16594	Recurred