



A Comparative Study of Management of Fistula-in-ano with Partial Fistulectomy Combined with Medicated Seton Technique and Conventional Fistulectomy

KEYWORDS

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ABSTRACT *Background*

Fistula in ano is one of the commonest problems faced in today's world. It is still the disease

of the present and has acquired much significance today in the background of a rising incidence of fistula in ano. Several techniques have been described for the management of fistula-in-ano, but all carry their own risks of recurrence and incontinence. Technology has evolved over the past 2 decades that may enable surgeons to deal with this troublesome issue with greater success. This study summarizes the history of fistula-in-ano management, the current techniques available, and describes new technologies.

Aims And Objectives

1. To review & study patients who presented with *Fistula-in-ano*.
2. To study the efficacy of partial fistulectomy combined with medicated seton technique.
3. To compare the efficacy of this technique with the conventional techniques of fistulectomy.
4. To study and compare the morbidity associated with this technique with conventional methods.
5. To study and compare the early and late post operative complications of this technique with the conventional techniques.

Materials and methods

*A comparative study of 50 patients of *Fistula in ano* starting from September 2012 to*

September 2014 was carried out in Dhiraj Hospital, SBKS medical college, Sumandeep Vidyapeeth, Pipariya, Vadodara. These patients were divided into 2 groups of 25 each-one group undergoing conventional fistulectomy and another group undergoing technique of medicated seton insertion. All admitted patients had undergone the required work up for the diagnosis and treatment for fistula-in-ano. All patients were monitored with clinical and blood examinations and some special investigations like fistulogram, CT scan, MR fistulogram, sigmoidoscopy. Then patients were classified into simple and complex anal fistula and then they were divided into 2 groups-one treated with conventional technique of fistulectomy, second group treated surgically with partial fistulectomy combined with medicated seton technique. The post op complications like recurrence, incontinence, pain and cosmetic problems and outcome were also evaluated for both the groups. A statistical analysis was carried out comparing the efficacy of both the techniques. The follow up study was carried out according to the extent of fistulous tract, approximately extending from 2 months to 1 year.

Results

The patients were of various ages, ranging from 18-62 years, with most of them in their 3rd or 4th decade, with a mean age of 38.62 years. Incidence among sexes (male: female) was in the ratio of 49:1 showing male predominance. Pus discharge was the commonest symptom complained by all the patients undergoing this study followed by itching and anal pain. On examination most of the patients presented with low anal type of fistula and single external opening. In comparison with both the technique medicated seton technique was much better for high and longer fistula and also of high healing rate compared to conventional fistulectomy. Patients were operated and after discharge were advised follow-up. On follow-up the pus discharge was present in all cases but there was no pain and patients were able to carry out their routine without much discomfort except there was slight itching in some of the cases.

Conclusion

This study signifies that the management of fistula on ano by partial fistulectomy combined with medicated seton technique is a much better procedure as compared to conventional fistulectomy technique with faster healing and least complications.

Introduction

"MORE IS MISSED BY NOT LOOKING, THEN BY NOT KNOWING" -Thomas M' Crae (1870-1935).The fistula is an opening between two organs of the body, or between an organ and the skin, that would not normally exist, caused by injury, infections, etc. Fistula in ano is defined as communication between anal canal or rectum to external surface. In majority of cases it follows after a perianal or

ischio-rectal abscess, which produces a thick yellow liquid or pus because of infection. Fistula-in-Ano, considered second to haemorrhoids in importance among all ano-rectal abnormalities, is prevalent all over the world and its incidence in a London hospital study was reported to be 10 % of all in-patients and 4% of all new out-patients [1]. Similar study in India reported anal fistula to constitute 1.6 % of all surgical admission [2]. Surgical treatment of fistula

in ano requires hospitalisation, regular post-operative care and is associated with a significant risk of recurrence (0.7-26.5%) and a high risk of impaired continence (5-40%) [3]. Changing trends in the treatments is due to the fact that none of the methods proved satisfactory and recurrence of the disease was rather a rule. This was mainly being due to site and the frequency of combination of the disease-bearing area. In spite of the best efforts even today, the main problems faced in the treatment of this disease, are:

- (1) Extensive mutilation of the ano-rectal and ischio-rectal area which is a prerequisite for radical cure,
- (2) Prolonged hospitalization,
- (3) High rate of recurrence.

The term seton is derived from the Latin word 'seta' meaning bristle. This innovative combination of using a medicated seton along with surgical intervention for the fistulas has proven to be more effective, with lesser morbidity and lower chances of recurrence, hence this study was decided upon.

Fistula is the latin word for reed, pipe or flute. In medicine it implies a chronic granulating tract connecting two epithelium lined surfaces. These surfaces may be cutaneous or mucosal. Perianal fistulas run from the anal canal to the perianal skin or perineum. Perianal fistulas are associated with considerable discomfort and morbidity to the patient. Fistulas are a burning problem in the society. In spite of advances in medical science still there is no treatment available which can give complete cure without any recurrences.

Most anal fistulas originate in the anal glands. These anal glands are located in the subepithelial layer of the anal canal at the level of the dentate line. The duct of each gland has a direct opening into the anal (Morgagni's) crypt. Since the internal anal sphincter is a competent barrier against bacterial contamination, chronic infection of an anal gland can only lead to a perianal abscess or fistula when it extends into the inter-sphincteric plane. It has been shown that 30-50 % if the anal glands branch out into the inter-sphincteric plane.

Occlusion of the drainage duct, secondary to faecal material, foreign bodies, or trauma, may result in stasis and infection. This infection can lead to an inter-sphincteric abscess. When the size of the abscess increases, it will invariably follow two avenues of extension. It can either follow the fibro-muscular fibres running downward between the internal and external sphincter or through the external anal sphincter into the ischio-rectal space. Consequently, a

peri-anal abscess, located at the anal verge has an inter-sphincteric origin while an abscess located further from the anus, usually has a trans-sphincteric origin. A peri-anal abscess, like all abscesses in other parts of the body, must be adequately drained. To minimize the risk of a

fulminant infection of peri-anal and peri-rectal tissues operative drainage must be performed as soon as possible.

The risk of such an infection is especially high in diabetics and immune-compromised patients. There is little, if any, use for antibiotics in the primary management of peri-anal suppuration. Adjunctive antibiotic therapy is only indicated in patients with rheumatic or acquired valvular heart disease and in those who are immune-suppressed. It is wise to make a generous elliptical incision, rather than a small incision with or without contra incision. In about half of all

cases, the abscess will recur either as a recurrent abscess or as a peri-anal fistula, even after adequate drainage.

So this study aims at defining the role of two surgeries: medicated seton insertion and conventional fistulectomy, for high peri-anal fistulas in terms of recurrence and post-operative morbidity.

Materials and methods

Source of Data

- Location: Dhiraj Hospital, SBKS MEDICAL INSTITUTE & RESEARCH CENTER,
- Sumandeep University.
- Study period: September 2012 to September 2014.

Inclusion Criteria

- Patients of all age groups.
- Patients of both sexes.

Exclusion Criteria

- Patients not willing.
- Patients managed with other techniques.
- Patients with gross co morbid conditions and systemic illnesses like CCF, myocardial ischemia, chronic renal failure where anaesthesia and surgery would be of high risk.
- Diabetes, Inflammatory bowel diseases (Acute and chronic ulcerative colitis &
- Crohn's disease).
- Tuberculosis of hip joint or spine (as the prognosis is not good)
- Osteomyelitis of femur or pelvic bones
- Intestinal and pelvic malignancies
- Venereal diseases, HIV and HBsAg positive
- Strictures of urethra causing urethral sinuses
- Pregnancy

Method of study:

A prospective study of 50 patients of Fistula in ano starting from September 2012 to September 2014 was carried out in Dhiraj Hospital, SBKS medical college,

Sumandeep Vidyapeeth, Pipariya, Vadodara. These patients were divided into 2 groups of 25 each-one group undergoing conventional fistulectomy and another group undergoing technique of medicated seton insertion. All admitted patients had undergone the required work up for the diagnosis and treatment for fistula-in-ano. All patients were monitored with clinical and blood examinations and some special investigations like fistulogram, CT scan, MR fistulogram, sigmoidoscopy. Then patients were classified into simple and complex anal fistula and then they were divided into 2 groups-one treated with conventional technique of fistulectomy ,second group treated surgically with partial fistulectomy combined with medicated seton technique. The post op complications like recurrence, incontinence, pain and cosmetic problems and outcome were also evaluated for both the groups. A statistical analysis was carried out comparing the efficacy of both the techniques. The follow up study was carried out according to the extent of fistulous tract, approximately extending from 2 months to 1 year.

• *Five essential points* of a clinical examination of an anal fistula :

- (1) location of the *internal* opening.
- (2) location of the *external* opening.
- (3) location of the *primary* track .

- (4) location of any secondary track.
 (5) Determination of the presence or absence of underlying disease.

Procedure of partial fistulectomy with medicated seton

Application:

Pre-operatively, the procedure of medicated seton application is explained to the patient and consent is taken. After giving spinal anaesthesia, the patient is laid supine and lithotomy position is given. The outer opening of the fistulous tract is identified and methylene blue dye is injected into it so that the tract is stained with the dye and also checked for the dye to come out of the opening thereby confirming the patency of the fistulous tract. After that the probe is passed through the external opening and negotiated upto the internal opening slowly and steadily avoiding injury or creation of false passage around the tract. As the probe exits through the internal opening of the tract, it is palpated per-rectally confirming the exit of the probe through it.

FIGURE 1-AFTER PROBE INSERTION:

A circumferential incision which involves the indurated region is taken at the external opening and is dissected around the tract in the deeper plane which is already stained with dye (Partial Fistulectomy). That part of the tract is sent for histo-pathological study. There is a hole at the end of probe which is at the external opening where the medicated seton is fixed by tying the knot. After that the probe is pulled out from anal region so that the seton occupies the whole fistulous tract replacing the probe. Now one end of the seton at the fistulous opening is tied with the other end of the seton which has come out of the normal anal opening after traversing the whole tract. Similar procedure is repeated for the silk thread which is also inserted in the tract by tying the thread with seton and then the seton is rotated such that the silk thread also occupies the tract. The silk is then tied separately but similarly as the seton. Both the seton and silk are tied loosely. Then the knots are tucked in to the tract so that patient doesn't feel the irritation of the applied knot. Proper sterile dressing is done and patient is shifted out.

FIGURE 10-POST MEDICATED SETON INSERTION Post operative management

Post operatively the patients were kept NBM for about 4 hours and then were started with liquids followed by light diet the following day. Stool softeners and hot Seitz bath were given daily. Daily morning dressings were done for 4-5 days in conventional patients and 2-3 days in seton insertion patients following which the patients were discharged and were called for daily dressings.

The observations made before the treatment and on every day of fresh application of medicated seton shall be recorded in the proforma of the case sheet prepared for the study.

Follow-ups

All cases were followed up depending upon the level and extent of fistulous tract, which was from 1 to 6 months.

Also any complications like recurrences or any others were noticed if any.

Patient was asked regarding any pain, discharge or swelling in the local area and was also asked and assessed regarding continence and difficulty in defecation. Also the

patient was asked about its psychological satisfaction and return to his routine activities.

Local examination was also done to note the condition of the healed wound and the persistence of infection, tenderness and presence of any other fistulous tract.

Results:

Our study comprised of 50 cases of fistula in ano which were treated by conventional fistulectomy and partial fistulectomy combined with medicated seton technique in equal numbers. In both the groups out of 50 patients, maximum patients are from the age group 31 – 40 years of age group. In both the groups out of 50 patients, maximum patients are male. 49 patients are male and only 1 female patient. In both the group of study 47 patients i.e. 94 % patients having history of illness less than one year. Only 3 patients i.e. 6 % patients having history of illness more than one year. In our study all patients presented with pus discharge from the external opening. There was no serous or blood discharge. In our study group 41 (82 %) patients are having low anal fistula, 7 (14 %) having high anal fistula, 1 (2 %) patient having subcutaneous and 1 (2 %) patient having sub mucous fistula. In our study of total 50 patients 46 (92 %) patients having single external opening, 2 (4 %) patients having two external opening and 2 (4 %) patients having more than two openings. In our study groups external opening is more or less equally present in all four quadrants, i.e. right upper, right lower, left upper and left lower. In our study, in 40% of cases, internal opening was located on lateral wall, 38% located on posterior border and 22% located on anterior border. So the internal opening is most commonly found on the lateral border. In comparison with both the technique medicated seton technique is much better for high and longer fistula compared to conventional fistulectomy. In our study UCT is 4.6, 4.5 and 4.7 according to age, type and length of the fistula respectively. Therefore mean UCT for fistula is 4.6 days/cm. In comparison between both the techniques healing occurs much faster with medicated seton technique than conventional fistulectomy. In our case study group post operative pain is much less in the medicated seton technique as compared with conventional fistulectomy.

In our case study groups patients operated by both the medicated seton technique and conventional fistulectomy having chronic non specific histopathological findings. 2 cases which did not show complete healing even after 18 weeks of treatment turned out to be Koch's infection and were put on anti-tuberculous treatment. In our study group post op cases with medicated seton technique had less pus discharge days as compared to conventional fistulectomy. In our study population of 50 cases of fistulectomy by both medicated seton & conventional fistulectomy only 2 cases of medicated seton and 3 cases of conventional fistulectomy post op patients had incontinence for flatus and that too for a very short period of time (2 days), and 45 (90 %) patients had no incontinence.

Discussion:

Fistula in ano is a common peri-anal condition that is associated with appreciable morbidity and inconvenience to the patient and it is a burning problem since mankind. Despite of so many advances in medical science no such treatment option is available which can give complete cure without any recurrence rate or incontinence after surgery. The principles of anal fistula surgery are to eliminate the fistula, prevent recurrence and preserve sphincter function.

Success is usually determined by identification of the primary opening and dividing the least amount of sphincteric muscle possible.

The diagnosis of low perianal fistula is easy and the prognosis after surgery is good in terms of recurrences rates or post-operative incontinence rates after any form of surgery whether it is seton or fistulotomy or fistulectomy. But the diagnosis of high fistula is difficult to make pre-operatively as the diagnostic procedure like MRI are not in the affordability range of every patient and are not available all the time as well. Also in some cases, the diagnosis of high fistula is made per-operatively. In our comparative study we have tried to evaluate the role of these two surgeries in high perianal fistulas.

The age distribution and male predominance (74%) seen in this series are similar to most other series. This study suggests that the majority of anal fistula can be treated successfully with setons. Most of the patients tolerated the procedure well and were satisfied with the treatment. We used silk no.1 material with medicated seton in the tract. The seton was a cutting seton which was tied tightly outside the fistula and the sensitive anoderm outside the seton was cut. The seton was changed every 7-10 days so that the seton could cut the tract in a controlled fashion. The cutting seton probably reduced the period of treatment. All of the patients had the insertion of seton in the operating room. In conclusion, our method provides an alternative to the conventional operative treatment of all anal fistulae. This traditional treatment for fistula in ano has the advantage of being considerably cheaper than in patient operative methods and may allow the patient to continue employment. The conventional treatment of fistula in ano lies in radical excision of tract with removal of portion of the surrounding tissue and leaving the wound open (open fistulectomy). This bold step makes the poor patient a victim of widespread surgical wound which poses various problems in healing in comparison to other wounds.

The dressing in the post operative period has to be meticulous, to avoid recurrence. It is probably for this reason that the frequency of recurrence in spite of the radical excision rates is pretty high in this disease.

Besides having high rates of recurrence, conventional fistulectomy is usually followed by an unusually long period of convalescence during which patient has to stay in the hospital and has to undergo a painful procedure of surgical dressing once or twice every day. While the dressing itself offers an ordeal for him and scares him, the patient also has to bear the psychological trauma of carrying larger wounds. The patient also has to suffer economic loss as he has to be away from his job and the society as a result of prolonged hospitalization. Considering current situation where everybody has to be on a run to earn for a living, this is one of the greatest disadvantages.

In our study out of 50 patients, maximum patients are from the age group 31 – 40 years of age group, while in other studies it was found to be around 21-30 years. So the incidence in this younger age group is mostly due to previous ano-rectal abscesses which occur most commonly in this age group of 21-40 years.

In our study the average age was found to be 38.62 years while in Bombay Hospital study it was more or less similar-38.17 years.

In our study the commonest age group was 31-40 years while Bombay Hospital study had age group of 21-30 years.

So the middle age group is more commonly affected than the both extremes of age group i.e.

<20 and >40 years.

In our study, sex incidence of males was 98% compared to other Khurane et al (91%) and Bombay Hospital (92%) studies in which the incidence was similar and higher in males.

So it can be said that the incidence of peri-anal abscess and subsequent formation of anal fistula is higher in males as compared to females.

In our study, in almost all cases the duration of illness was < 1 year compared to Deshpande et al in which the incidence of disease was similar in both <1 year and >1 year. So our study had much better results as compared to their study.

In our study maximum patients had low type of anal fistula (41/50) while in Deshpande et al study the incidence was 26/43 patients in low anal and 15/43 patients in high anal type. So our study had much better results as compared to their study.

In our study maximum patients were having almost equal incidence of lateral and posterior internal opening (40% and 38%) while Buie et al study showed maximum posterior openings

(56%). This may be due to more no. of anal glands found posteriorly than other regions.

In our study the maximum patients showed single external opening (92%) compared to Buei

et al study which showed 82% of the patients having single external opening (84%). So our

study had better results as compared to their study. In our study the incidence of location of lateral external opening was 52% and 30% of anterior opening while Buie et al study showed maximum lateral external openings (73%). In our study 46% and 52% of the cases presented with length of tract <5 cm and 5.1 to 10 cm while compared to Buie et al study it was 34%, 40%, and 20% with length of <5cm, 5.1-10 cm and 10.1-15 cm. In our study the average time was 4.5 days as compared to Khurane et al study which was 7 days. So our study had much better results as compared to their study. In our study according to cases, as the depth of tract increased time also increased which was similar to Khurane et al study but the time taken was less (4.5 days) than other study (6.14 days). So our study had much better results as compared to their study. In our study as the length of tract increased time also increased which was similar to other study but the time taken was less (4.7 days) than Khurane et al study (6.26 days). So our study had much better results as compared to their study. In our study 48% and 32% patients were treated in around 6 weeks and 12 weeks respectively compared to other study in which Khurane et al showed 28% and 20% patients which were treated in around 6 weeks and 12 weeks respectively and Deshpande et al showed 20% and 28% patients which were treated in around 6 weeks

and 12 weeks respectively. This may be due to the proper techniques done under proper aseptic precautions and also proper cooperation given by the patient. So our study had much better results as compared to their study. In our study 48% and 32% patients were treated in around 21-42 days and 43-84 days respectively compared to other study in which Khurane et al showed 28% and 20% patients which were treated in around 21-42 days and 43-84 days respectively and Deshpande et al showed 20% and 28% patients which were treated in around 21-42 days and 43-84 days respectively. So our study had much better results as compared to their study. In our study 28%, 18%, 20% and 26% patients had post op pain for 1-2, 3-4, 5-6 and 7-8 days respectively compared to Khurane et al study which showed 26%, 20%, 16% and 20% patients who had post op pain for 1-2, 3-4, 5-6 and 7-8 days respectively and other Deshpande et al study which showed 28%, 22%, 18% and 10% patients who had post op pain for 1-2, 3-4, 5-6 and 7-8 days respectively.

In all studies including our study we did not find any significant difference in incidence of post-op pain. There was similar incidence of post-op pain in almost all patients of all three studies. In our study we found that all cases showed chronic non-specific inflammation in the histopathological report except 2 who showed Koch's infection as compared to Khurane et al study in which there were 3 patients who showed Koch's infection in the histopathological report. In our study the post-op discharge stopped around 21-40 days in most (46%) of the patients while it was 16% and 18 % in Khurane et al and Deshpande et al respectively. This was due to faster healing rate and proper hygiene maintained by the patient. So our study had much better results as compared to their study. In our study all patients had post-op pus discharge except 2 of them who showed seropurulent discharge whose histopathological findings showed Koch's infection and who presented again to our OPD with persistent fistulous tract while Khurane et al study showed patients who had post-op pus discharge (40/43) and other patients (3/43) had blood mixed with pus discharge. In our study we found maximum patients with no incontinence (45/50) while other study showed incontinence of gas (20/43), liquid stools (14/43) and even solid stools (17/43). So our study had much better results as compared to their study.

Conclusion

This is a comparative study of management of fistula in ano by conventional fistulectomy and partial fistulectomy combined with medicated seton technique and to compare the efficacy of both the techniques and the morbidity associated with both the methods. Surgical modalities of fistula in ano by both the techniques were conducted at Dhiraj General Hospital, Sumandeep Vidyapeeth, Pipariya from September 2013 to September 2014.

It was found that fistula in ano most commonly affects adults in 4th decade which is more common in males compared to females. Most of the patients had duration of illness <1 year.

Most of the fistulas were the sequelae of peri-anal abscesses. The fistula was classified into 4 groups- subcutaneous, submucous, low anal and high anal. All the patients presented with pus discharge from the perianal region and having both internal and single as well as multiple external openings.

A total of 50 patients presented with various types of fistu-

la in ano out of which 25 were treated by medicated seton technique and other 25 were treated by partial fistulectomy combined with medicated seton technique.

There was much less post-operative pain found in medicated seton technique as compared to conventional fistulectomy technique. We also found that medicated seton technique is much superior than conventional fistulectomy in terms of pain, faster healing and less recurrence.

There were 2 persistence of fistulous tract in conventional fistulectomy and no recurrence was found in patients treated with medicated seton technique.

Our study suggests that the majority of anal fistula can be treated successfully with partial fistulectomy combined with medicated seton. Most of our patients tolerated the procedure well and were satisfied with the treatment.

This procedure is more advantageous in cases of low anal and high anal fistulas which have inter-sphincteric tract which could not have been treated by conventional fistulectomy even in multiple stages. In conclusion, our method provides an alternative to the conventional operative treatment for all anal fistulae. The procedure of partial fistulectomy with medicated seton placement for fistula in ano also has the advantage of being considerably cheaper and may allow the patient to continue employment even during the healing process within 48-72 hours just after the procedure with no complications.

REFERENCE

- Marks CG, Ritchie JK. Anal fistulas at St. Mark's hospital. *Br J Surg* 1977;64:84-91.
- Raghavaiah, NV. Anal fistula in India. *Int Surg* 1976;61:243-5.
- Garcia-Aguilar J, Belmonte C, Wong WD, Goldberg SM, Madoff RD. Anal Fistula Surgery: factors associated with recurrence and incontinence. *Dis Colon Rectum* 1996;39:723-9.
- Shukla, N.K. Narang, R. Nair, N.G.K., Radhakrishna, S., Satyavati, G.V.: Multicentric randomized controlled clinical studies of Medicated seton in management of fistula-in-ano. *Indi J. Med. Res. (B)*, 1994 :177-85.
- Pankaj S., Manoranjan S. Efficacy of Medicated seton therapy in the management of fistula-in-ano. *World Journal of Colorectal Surgery*. 2010;2(2) (Art. 6:01-10)
- Lilius H.G. Investigation of human fetal anal ducts and intermuscular glands and a clinical study of 150 patients. *Acta Chirurgica Scandinavica*. 1968;7:382-7.
- Madoff R.D., Wong W.D., Garcia-Aguilar J., Belmonte C. Anal fistula surgery: factors associated with recurrence and incontinence. *Diseases of the Colon and Rectum*. 1996;39:723-9.
- Satyavati G.V., Nair N.G.K., Shukla N.K., Narang R., Radhakrishna S., Multicentric randomized controlled clinical trial of Ksharasutra, (medicated seton) in the management of fistula-in-ano. *IJMR*. 1991;94:176-84.
- Sainio P., Husa A. Fistula-in-ano. Clinical features and long-term results of surgery in adults. *Acta Chirurgica Scandinavica*. 1985;151:169-76.
- Vasilevsky C.A., Gordon P.H. Results of treatment of fistula-in-ano. *Diseases of the Colon and Rectum*. 1985;28:225-31.
- Deshpande P.J., Sharma K.R. Successful nonoperative treatment of high rectal fistula. *American Journal of Proctology*. 1976;24:39-47.
- Dennis F Zagrodnik II, MD, FACS, Consulting Staff, Wisconsin Vein Center, *Fistula in ano*, article e medicine, Nov. 2007.
- Lockharyt Mummery, J.P : Discussion on fistula on ano, *Proc R Soc. Med*. 22: 1331, 1929.
- Lockharyt Mummery: Treatment of fistula in ano, *Lancet Vol.CCL II Vol. I: 671-672*, May 17, 1947.
- Lockharyt Mummery: Anal abscess and fistula, *Practitioner*, 179: 567-597, 1957.
- Parks, A.G.: The pathogenesis and treatment of fistula in ano. *Brit. Med. J.*, 1: 463-9, 1961.
- Parks AG, Gordon PH, Hardcastle JD. A classification of fistula in ano. *Br J Surg*. Jan 1976;63(1):1-12.
- Nesselrod Peerman J : *Clinical Proctology*, 3rd Edn. Oxford and IBH publishing co. Edn. PP 122-146, 1970.
- Sharma, Y.T.: "Sushruta's Sushruta Samhita (Sanskrit)". 3rd Edition, Nirnay Sagar Press, Bombay, India, 1938, pp. 4547.
- Faujdar HS, Mehta GG, Agrawal Rk, Malpani NK. Management of fistula in ano. *J Postgrad Med* 1981;27:172-7.
- Mishra B.S.: "Bhavamishra's Bhavaprakash Nighantu (Hindi)" 1st Edition, Vol. I., Chowkhamba Sanskrit Series Office, Varanasi, India, 1969, pp.114-116 and 307-9.
- Tripathi, J.P.: "Chakrapanidatta's Chakradatta (Hindi)" 3rd edition, Shlok 148, Chowkhamba Sanskrit Series Office, Varanasi, India, 1961, pp.91.
- Deshpande, P.J., Pathak, S.N., Sharma, B.N. and Singh, L.M.: Treatment of fistula in ano by Ksharasutra . *J. Res. Ind. Med.*, 2: 131-9, 1968.
- Deshpande, P.J. Pathak and Sharma K.R.: Non-Operative ambulatory treatment of fistula in ano by a new technique. Review and follow up of 200 cases. *Amer. J. Proctol.*, 24: 49-60, 1973.
- Deshpande, P.J. and Sharma K.R.: Successful non-operative treatment of high rectal fistula. *Amer. J. Proctol.*, 27: 39-47, 1976.
- Deshpande, P.J., Sharma K.R., Sharma S.K. and Singh L.M.: Ambulatory treatment of fistula in ano, Results in 400 cases. *Ind. J. Surg.*, 37:85-9, 1975.
- Parks AG and Stitz RW: The treatment of high fistula in ano ; *Dis. Col and Rec.*, 19: 487-499;1976.
- Goligher, J.C.: "Surgery of Anus, Rectum and Colon." 1st Edition, Cassel and Co. Ltd., London, 1961, pp.11 and 174-208.
- Khurana C., Saronwala K.C. and Gupta S.P.: Primary skin grafting after fistulectomy in the treatment of fistula in ano. *Amer. J. Proctol.*, 23:139-152, 1972.
- Glaser. S : *Hippocrates and Proctology*, *Proc. Roy. Soc. Med*. Vol. 62, April 1969.
- Zimmerman. M. Leo and Ilzaveith, Great ideas in the history of Surgery, pp 161, 1961.
- Huges, E.S.R.: The surgery of the anus, anal canal and rectum. E & S Livingston Ltd. Edinberg, pp.68-103, 1957.
- Huges, E.S.R.: Primary skin grafting in proctological surgery. *Brat. J. Surg.*, 41: 639-642, 1953.
- Von. H. Frustenberg : *Fistula disease with a historical survey*. PP 545-547. Ag. 1965.
- Morgan Naunton. C. and Henry R. Thompson. Surgical anatomy of the anal canal with special reference to the surgical importance of the internal sphincter and conjoint longitudinal muscle. *Annals of Royal College Of Surgeons of England* 19; 88;1956.
- Goligher J.C., Leacock. A.G. and Brossy. J.J: *Surgical Anatomy of the Anal Canal*, *British Journal Of Surgery* : 51,1955.
- Milligan And Morgan : *Surgical anatomy of the anal canal with special reference to ano-rectal fistula*, *Lanct. Vol. CCXXVII*. PP. 1150-6, 1213-7, Nov. 1934.
- Bennett R.C.: A review of the results of the orthodox treatment for anal fistulae. *Proc. Roy. Soc. Med.*, 55: 756-7, 1962.
- Kumar. R Gupta. A. K. And Mathur.D :Anal Fistula : A Non-Operative method of treatment. A report of 100 cases. *Indian Journal of Surgery*, 49; 239-243, July 1987.
- Bacon H. E., Stuart T. Ross and Porfiro Mayo Recro : *Proctology*, J. B. Lippincott Co. PP. 88-108, 1956.
- Buie. L. A.: *Practical Proctology*, 2nd Edn. 1960. 42. Gabriel W.B.: "The Principles And Practice Of Rectal Surgery." 5th Edition. H.K. Lewis and Co. Ltd. London, pp. 6, 268, 289-313, 1963.
- Flint Frank B. and Edward Passaro : Carcinoma associated with tuberculous anorectal fistula, *American Journal Of Surgery*, Vol. 120 pp. 397, Sep. 1971.
- John Hill R, Shyroek E.H., Rebell F.G.: Role of the anal glands in the pathogenesis of ano-rectal disease, *JAMA*, 121, 742, 1943.
- Young Kenny R : The gas wedge in the etiology of fistula in ano. *Lancett*, CCXXVII PP. 384-5, Aug. 18, 1934.
- Hamilton Bailey : *A short practice of surgery*, 15th Edn. 1971, 24th Edn. 2007.
47. Weisman RI, Orsay CP, Pearl RK, Abcarian H.: The role of fistulography in fistula in ano. Report of five cases. *Dis Colon Rectum*, 34(2): 181-4, Feb. 1991.
48. Hamalainen KP, Sainio AP. Incidence of fistulas after drainage of acute ano-rectal abscesses. *Dis Colon Rectum*, 41(11):1357-61; discussion 1361-2, Nov.1998.
49. Sainio P. Fistula in ano in a defined population. Incidence and epidemiological aspects. *Ann Chir Gynaecol.*, 73(4):219-24, 1984.
50. Jackman R. J.: Anorectal fistulas current concepts and collected papers from the Mayo clinic and the Mayo foundation Vol. 59PP. 75, 1967-68.
51. Topstad DR, Panaccione R, Heine JA, Johnson DR, MacLean AR, Buie WD. Combined seton placement, infliximab infusion and maintenance immunosuppressives improve healing rate in fistulizing anorectal Crohn's disease: a single center experience. *Dis Colon Rectum*. 46(5):577-83, May 2003.
52. McCourtney JS, Finlay IG. Setons in the surgical management of fistula in ano. *Br. J. Surg*. 82(4):448-52, Apr. 1995.
53. Mc Givney John: Treatment of internal rectal abscess and fistula. *J. Med.*; 58; 29, Texas.