

PROSPECTIVE ANALYTICAL STUDY OF DIODE LASER & CONVENTIONAL SURGERY TREATMENT, A COMPARATIVE STUDY INFISTULA IN ANO TERTIARY CARE CENTER

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ABSTRACT

Background & Objectives: Fistula in ano is amongst one of the earliest lesions to be recognized. It is accepted that majority of them occur due to suppuration of anal glands which open into the anal crypts. Fistula-in-Ano is the most common and an intriguing problem of the Ano-rectal region in general population. Laser assisted fistulous tract closure (LAFT) for fistula in ano is beneficial as one of the modalities of treatment with respect to ease of applicability, cost effectiveness, less pain, sparing of sphincters, early recovery and low complications compared to conventional procedures. To compare the effectiveness of treatment with laser surgery to the traditional type of surgery. Healing rates, healing duration, surgery time, Postoperative complications, Duration of hospital stay.

Methods: A Prospective Analytical study of patients admitted and treated for fistula in ano. With sample size 60. Patients operated for fistula in ano during the period of study at Osmania General Hospital for 24 Months.

Results and Conclusion: Results of the study were inferred and it was found that laser surgeries have an advantage of short operative time, minimal blood loss, short hospital stay, minimal postoperative pain, shorter duration for healing and sphincter sparing surgery but a high chance of recurrence when compared to other conventional surgeries. There is decrease in the recurrence rate laser surgery by careful patient selection and closure of internal opening by suturing and seton placement for drainage of active discharge in other studies.

Keywords: Fistula, Healing rates, healing duration, surgery time.

INTRODUCTION

The Latin word for a reed, pipe, or flute is fistula. Fistula in ano is an irregular communication between the anal canal and the skin that is coated with granulation tissue and results in a long-lasting inflammatory reaction. These fistulae typically appear after an anal abscess that results from an anal gland infection. The most frequent reason for seropurulent discharge in the perianal

region is due to it [1].

Anal glands, which are found in the subepithelial layer of the anal canal at the level of the dentate line, are the source of anal fistulae. Each gland's duct has a direct entrance into the anal crypt (Morgagni's crypt). Chronic infection of the anal gland can result in a perianal abscess or fistula when it expands into the intersphincteric plane because the internal anal sphincter serves as a reliable barrier against bacterial contamination. If the glands' exit points are obstructed due to faeces, foreign objects, or trauma, stasis, infection, and abscesses may develop, which may finally point to the skin's surface. The fistula is the tract that results from this process. If the fistula seals up and pus builds up, an abscess may reoccur. The process is then repeated after it resurfaces [2,3].

Anal fistulae by themselves are not harmful, but the pus that drains through them may be uncomfortable or bothersome. Additionally, the fistula may allow for the passage of formed stools. Recurrent abscesses cause morbidity like discomfort and may be the basis of infection transmission. Decompression of acute abscesses and infection prevention are considered to be the two most important goals of surgery for fistula in ano. Due to the difficulty and complications it might cause for patients, fistula surgery is now only performed as an elective procedure [4].

Fistula symptoms might include pain, bleeding, discharge (either bloody or purulent), pruritis ani (itching in the perianal region), pruritis ani, diarrhoea, bleeding PR, skin excoriation, and systemic manifestation if the abscess becomes septic. Before receiving definitive care, some individuals may appear with an active infection that needs to be cleared up with antibiotics. Inflammatory bowel disease, diverticulitis, TB, HIV infection, prior radiation exposure, or steroid medication are a few illnesses that may be linked to fistulas. Abdominal pain, weight loss, and changes in bowel habits are possible symptoms in these patients. Therefore, linked disorders should be looked into and ruled out before starting a fistula in ano therapy that is permanent. Fistula cannot be cured by antibiotics alone. For a full recovery, it frequently requires a conclusive operation. Therefore, decisive surgical procedures are now performed [5].

The anatomical location of the disease, recurrence incidence, potential danger of septic complications, and post-operative faecal incontinence make treating anal fistula a challenging undertaking. Surgery's primary goals are to close the fistula and reduce disease morbidity. There are numerous surgical procedures used to repair fistulas, including fistulectomy, fistulotomy, the Seton technique, endorectal advancement flap, LIFT, laser surgery, VAAFT, fibrin glue, and fibrin plug [6]. Sepsis eradication and continence maintenance are two major obstacles to successful surgery. Therefore, the best choice should be taken while selecting the surgical procedure to treat the ano fistula.

All laser tissue interaction results in some degree of tissue vaporisation and a thermal necrosis zone around it. It is ideal to keep this thermal damage zone to a minimum as it may obstruct wound healing, graft take, and decrease tensile strength. Greater precision, a relatively bloodless surgical and postsurgical procedure, sterilisation, vaporisation, and cutting, as well as little to no suturing and postoperative pain are all benefits of this equipment. The laser wavelength, laser powder, the available laser waveform (continuous wave, chopped, and pulsed beams), and the temperature characteristics of the tissue are the parameters that affect the first tissue effect. Laser beams have the potential to burn or damage healthy tissue, resulting in severe and occasionally

irreversible injuries. The doctor should go over all of the aforementioned dangers, safety measures, and potential drawbacks with the patient [7]. One of the elements affecting the result of laser surgery is the nature and severity of the disease, the ability of the surgeon performing the procedure, the patient's general health, and realistic expectations.

MATERIALS AND METHODS

A Prospective Analytical study of patients admitted and treated for fistula in ano. With sample size 60. Patients operated for fistula in ano during the period of study at Osmania General Hospital for 24 Months.

INCLUSION CRITERIA:

- Patients with fistula in ano.
- Age >18 years 3. both the sex

EXCLUSION CRITERIA:

- Age <17 years
- Patients who do not give consent and unwilling to be a part of study 3 Active perianal disease.

SOURCE OF STUDY:

1. Data will be collected from all patients attending OGH General
2. Surgery OPD and admitted in the department of surgery and undergoing surgical intervention. The patients will be evaluated and followed up according to protocol.
3. Detailed history of the patient will be entered in proforma.
4. Patient is investigated and evaluated for any other comorbidities
5. Patient will be informed about surgical procedure and informed written consent will be taken
6. Once patient is operated, the patient is observed for any complications
7. Patient is then followed up according to the protocol

Statistical analysis used

All characteristics were summarized descriptively. For continuous variables, the summary statistics of mean ± standard deviation (SD) were used. For categorical data, the number and percentage were used in the data summaries and diagrammatic presentation. Chi-square (χ^2) test was used for association between two categorical variables. The formula for the chi-square statistic used in the chi square test is:

The subscript “c” are the degrees of freedom. “O” is observed value and E is expected value. C=

$$\chi^2 = \sum \frac{(\text{Observed value} - \text{Expected value})^2}{\text{Expected value}}$$

(number of rows-1)* (number of columns-1)

The difference of the means of analysis variables between two independent groups was tested by unpaired t test. The t statistic to test whether the means are different can be calculated as follows:

t-value

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

\bar{x}_1 : Mean value of the first group

\bar{x}_2 : Mean value of the second group

n_1 : Size of the first group

n_2 : Size of the second group

s_1 : Standard deviation of the first group

s_2 : Standard deviation of the second group

If the p-value was < 0.05 , then the results were considered to be statistically significant otherwise it was considered as not statistically significant. Data were analyzed using SPSS software v.23.0. and Microsoft office.

RESULTS

TOTAL PATIENTS COUNT

INTERPRETATION: We have performed surgery on 60 patients, out of which 30 patients have undergone Laser surgery and the remaining 30 patients have been performed the conventional surgery.

FIGURE 1: TOTAL PATIENTS COUNT IN OUR STUDY

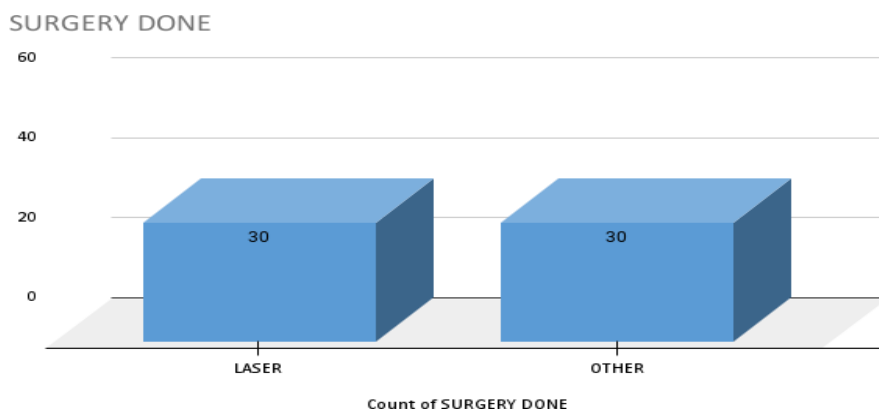


FIGURE 2: TOTAL PATIENTS COUNT IN OUR STUDY

SURGERY DONE

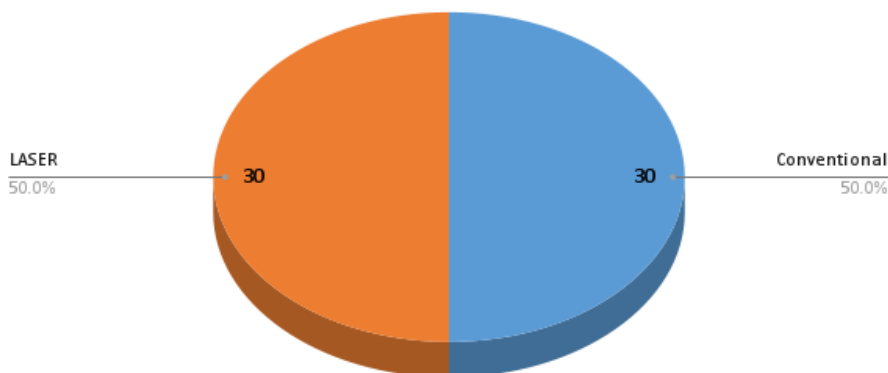


TABLE 1: AGE GROUP DISTRIBUTION IN OUR STUDY

AGE GROUP	COUNT
<=20	3
21-30	11
31-40	18
41-50	16
51-60	10
>60	2

INTERPRETATION: We have covered different age group patients for our study. The major predominance is observed to be of 31-40 age group i.e., 18 patients (30%).

FIGURE 3: AGE GROUP DISTRIBUTION

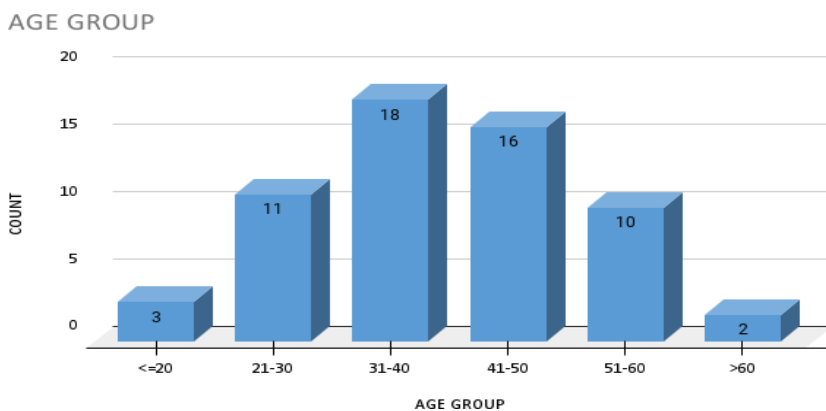
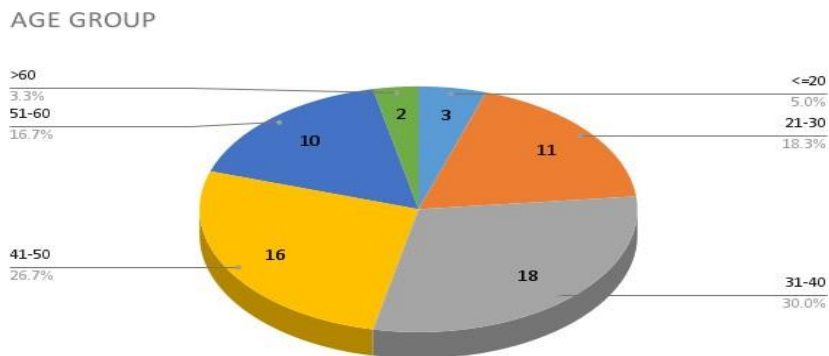


FIGURE 4: AGE GROUP DISTRIBUTION



GENDER DISTRIBUTION:

INTERPRETATION: There are 53 male and 7 female patients in our study with slight male predominance.

FIGURE 5: GENDER DISTRIBUTION IN OUR STUDY

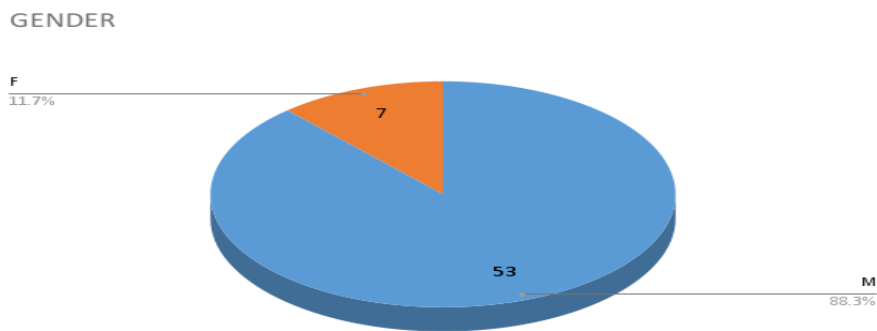
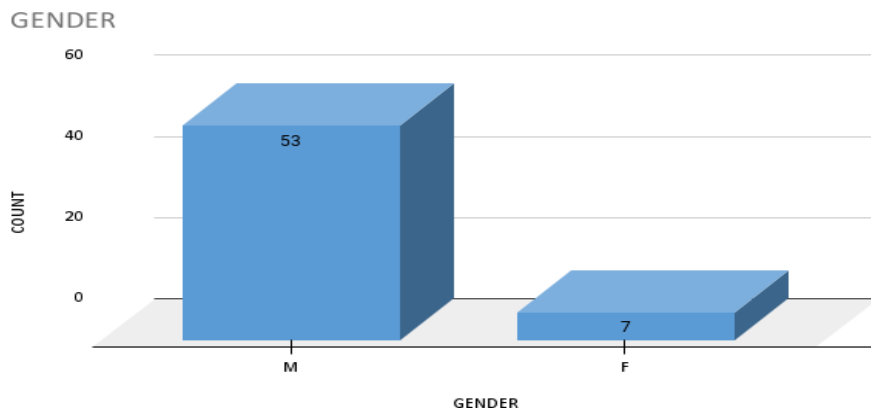


FIGURE 6: GENDER DISTRIBUTION IN OUR STUDY



HIGH/LOW DISTRIBUTION:

INTERPRETATION: In this study 90% of patients had low level fistula and another 10% of patients had internal opening situated above the ano rectal ring.

FIGURE 7: HIGH/LOW FISTULA DISTRIBUTION IN OUR STUDY

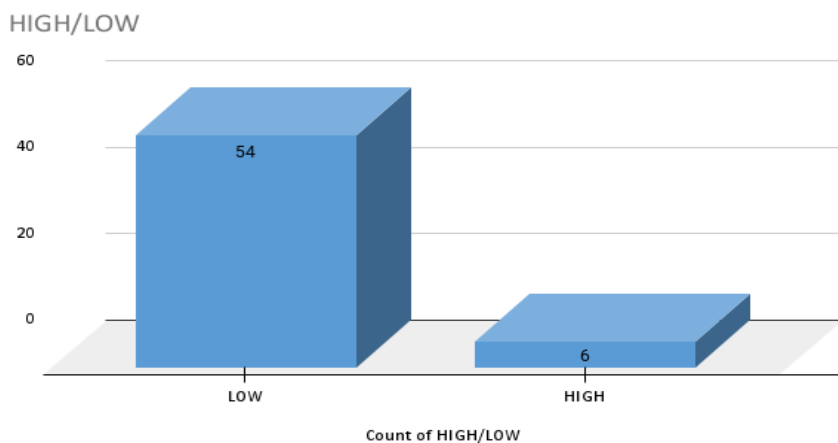
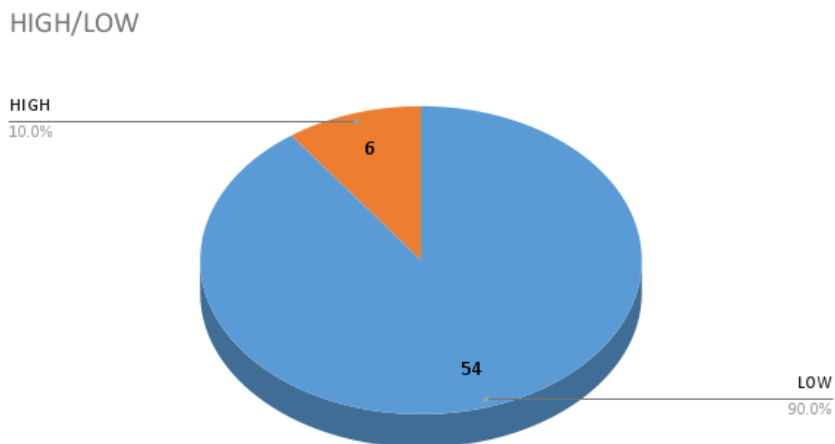


FIGURE 8: HIGH/LOW DISTRIBUTION IN OUR STUDY



SIMPLE/COMPLEX DISTRIBUTION:

INTERPRETATION: In the study of 60 cases, 83.3% of them had only one external opening, while 16.7% had more than 2 external opening and Hence fistula in ano with a single external opening is commonest in occurrence.

FIGURE 9: SIMPLE/COMPLEX DISTRIBUTION IN OUR STUDY

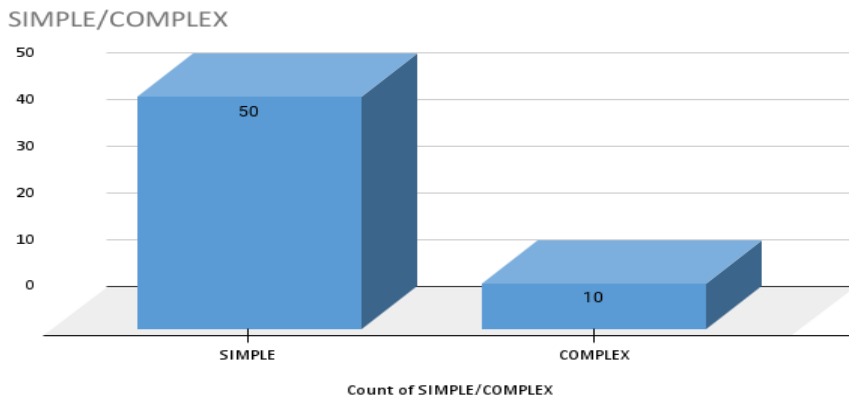
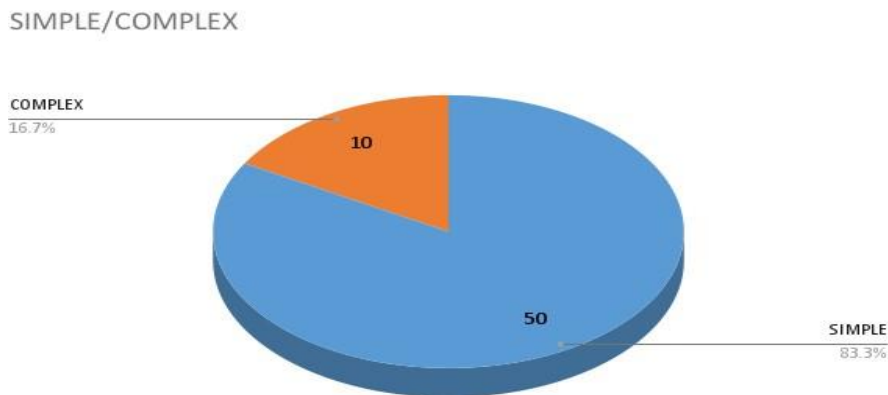


FIGURE 10: SIMPLE/COMPLEX DISTRIBUTION IN OUR STUDY



PARK'S CLASSIFICATION DISTRIBUTION:

INTERPRETATION: In our study, 58.3% of the patients having intersphinteric, 40% having transsphinteric and 1.7% suprasphinteric.

FIGURE 11: PARK CLASSIFICATION DISTRIBUTION IN OUR STUDY

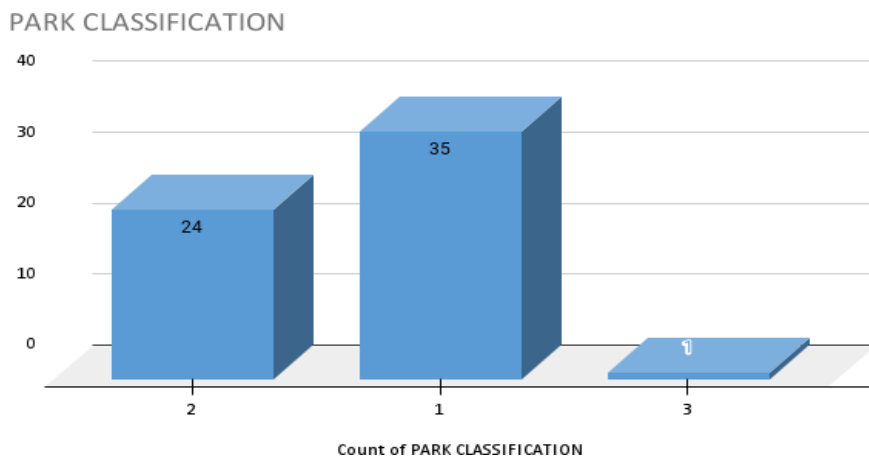
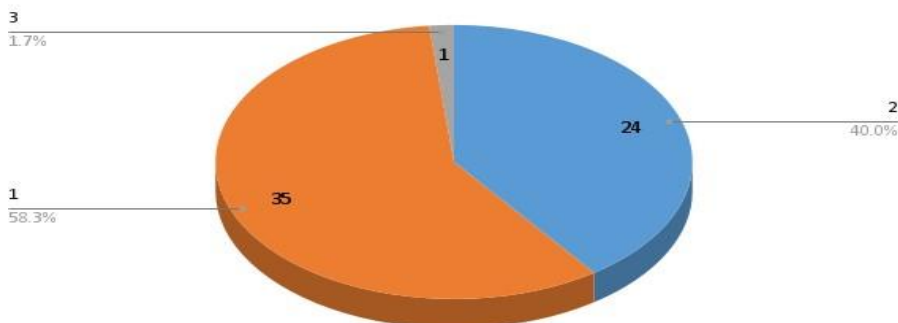


FIGURE 12: PARK CLASSIFICATION DISTRIBUTION IN OUR STUDY

PARK CLASSIFICATION



TYPE OF FISTULA IN ANO:

INTERPRETATION: In our study, we have considered majority is of intersphinteric type of 52.5%, with transsphinteric of 20.3 %, with multiple external openings of 8.5 % and 3.4% of horse shoe fistulas and suprasphinteric of 1.7%.

FIGURE 13: TYPE OF FISTULA IN ANO DISTRIBUTION IN OUR STUDY

TYPE OF FISTULA IN ANO

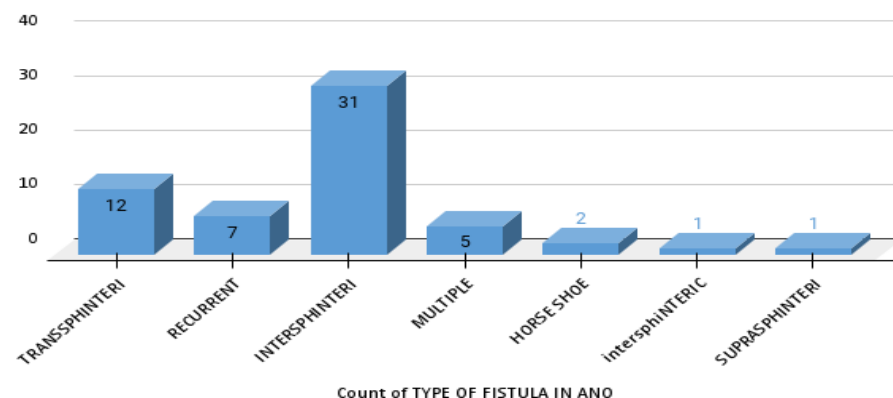
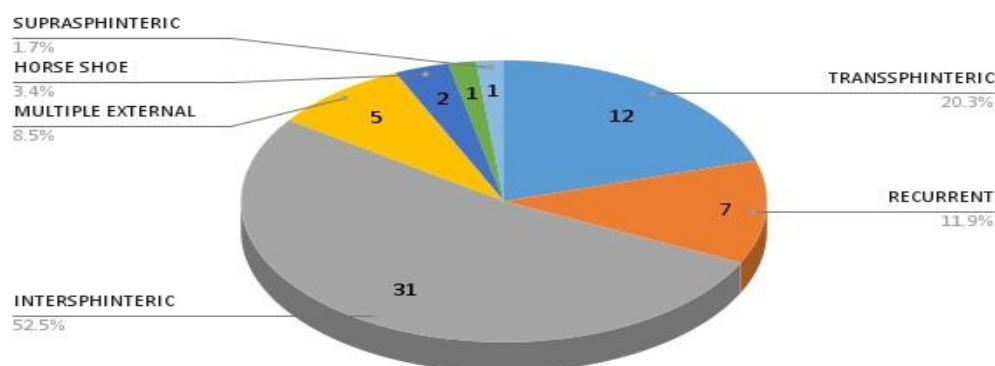


FIGURE 14: TYPE OF FISTULA IN ANO DISTRIBUTION IN OUR STUDY

TYPE OF FISTULA IN ANO



CRYPTOGLANDULAR/CROHN'S:

INTERPRETATION: : In our study, 98.3% of the cases are cryptoglandular in origin and 1.7% of the case are Crohn's disease.

FIGURE 15: CRYPTOGLANDULAR/CROHN'S DISTRIBUTION IN OUR STUDY

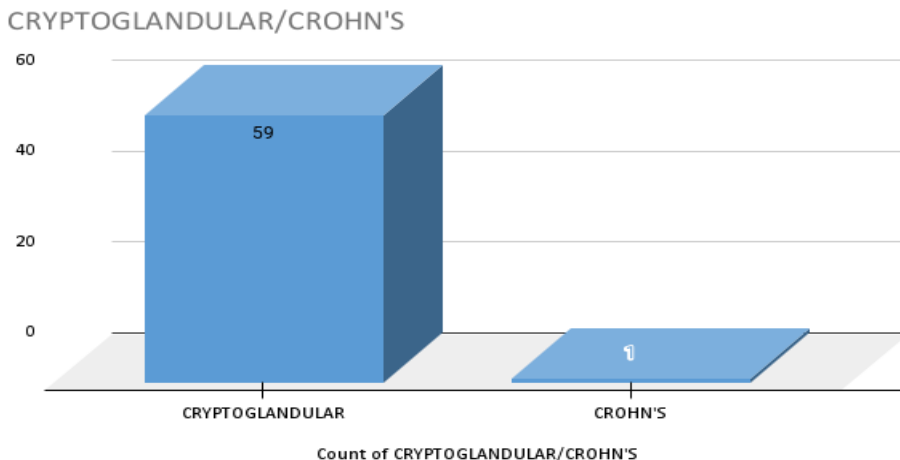
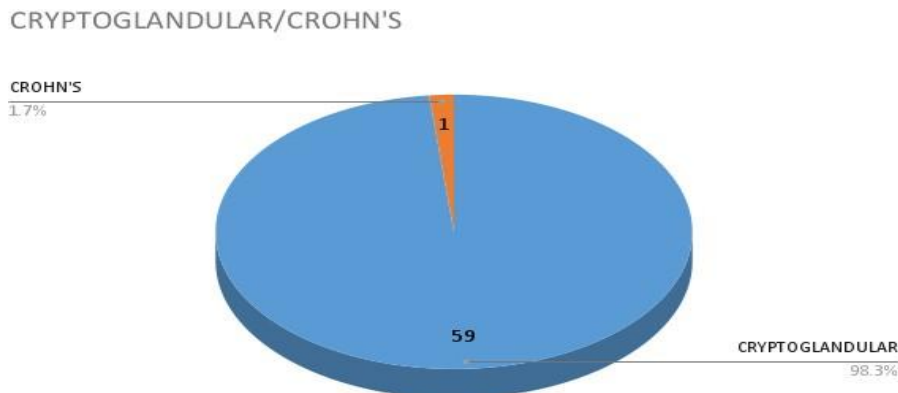


FIGURE 16: CRYPTOGLANDULAR/CROHN'S DISTRIBUTION IN OUR STUDY



INVESTIGATION:

INTERPRETATION: In our study, 65% of the cases where simple proctoscopy is sufficient for diagnosis where most of the simple fistulas are observed,26.75% of the patients need MR fistulogram for complex fistulas and recurrent fistulas, trans rectal ultrasound and usg 3.3% respectively.

FIGURE 17: INVESTIGATION IN OUR STUDY

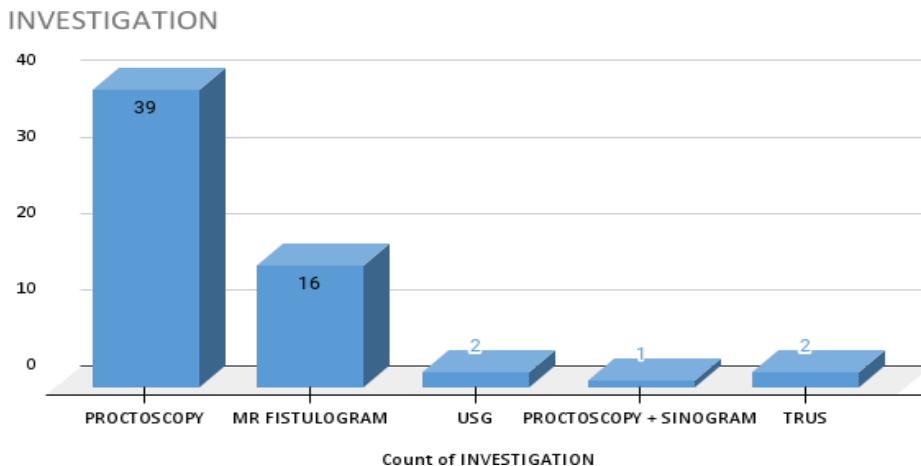


FIGURE 18: INVESTIGATION IN OUR STUDY

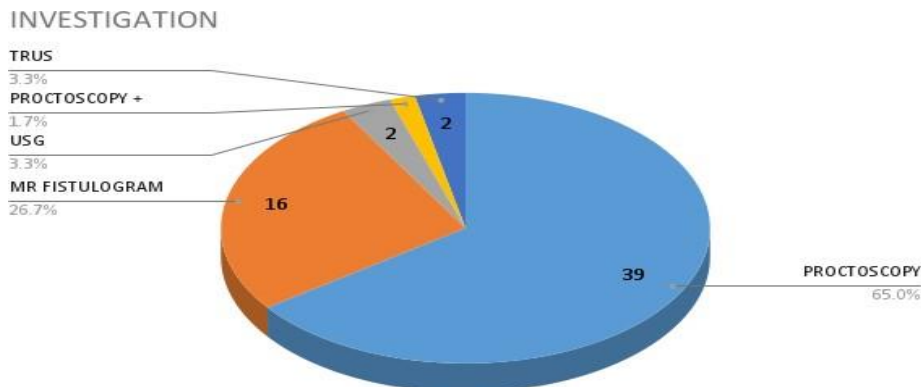
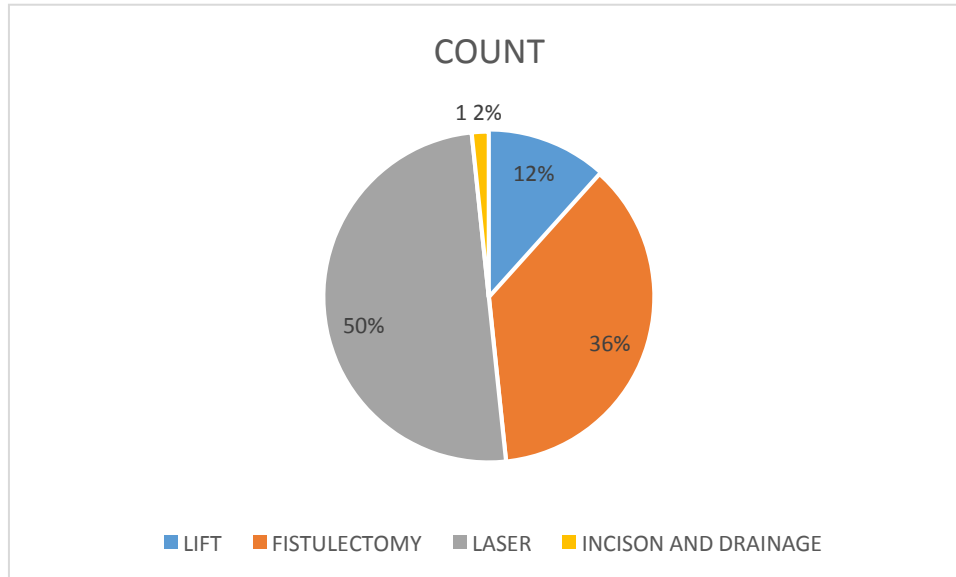


Table 2: Type Of Surgery Done

SURGERIES DONE	COUNT
LIFT	7
FISTULECTOMY	22
LASER	30
INCISION AND DRAINAGE	1



PRIOR FISTULA REPAIR:

FIGURE 19: PRIOR FISTULA REPAIR IN CONVENTIONAL SURGERIES

PRIOR FISTULA REPAIR for Conventional SURGERY

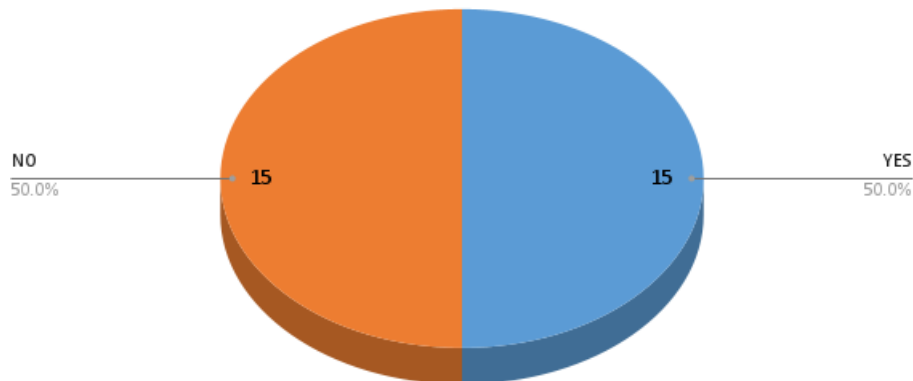
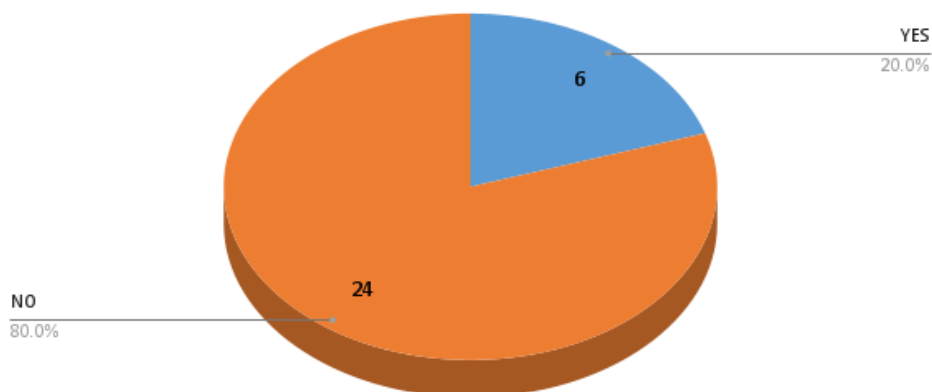


FIGURE 20: PRIOR FISTULA REPAIR FOR LASER SURGERY

PRIOR FISTULA REPAIR for LASER SURGERY



HEALING RATES AFTER PROCEDURE:

FIGURE 21: HEALING AFTER PROCEDURE FOR CONVENTIONAL SURGERIES.

HEALING AFTER PROCEDURE for Conventional SURGERY



FIGURE 22: HEALING AFTER PROCEDURE FOR LASER SURGERY.

The chi-square statistic is 5.9341. The p-value is .014851. Significant at $p < .05$. The chi-square statistic with Yates correction is 4.6886. The p-value is .030363. Significant at $p < .05$.

HEALING DURATION:

HEALING AFTER PROCEDURE for LASER SURGERY

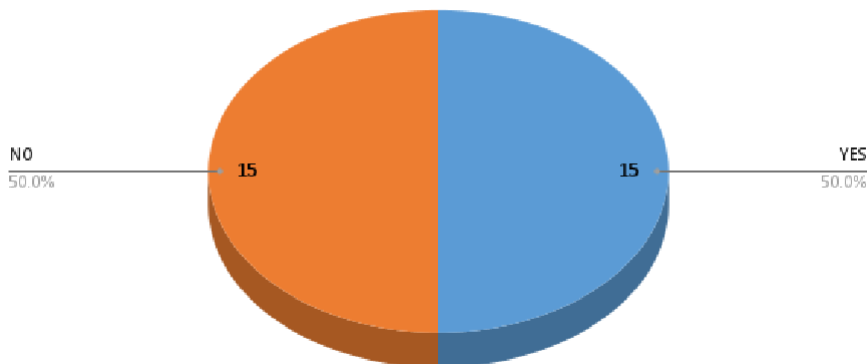
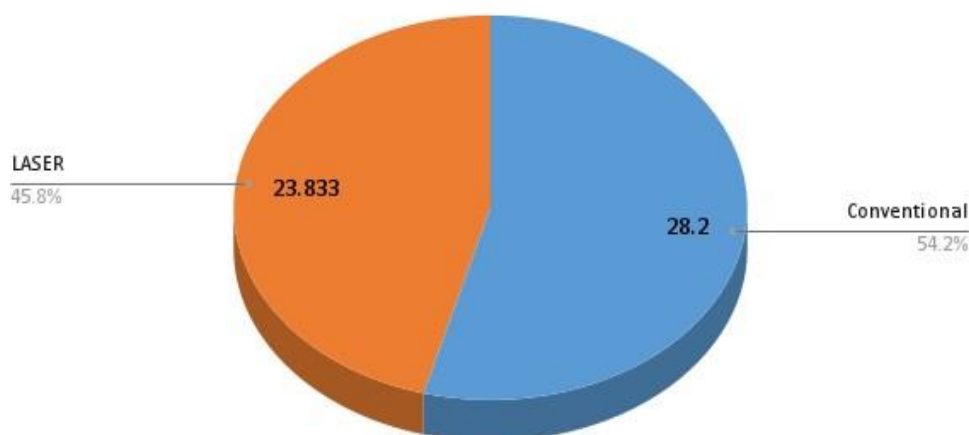


FIGURE 23: THE HEALING DURATION COMPARISON BETWEEN LASER AND OTHERCONVENTIONAL SURGERIES.

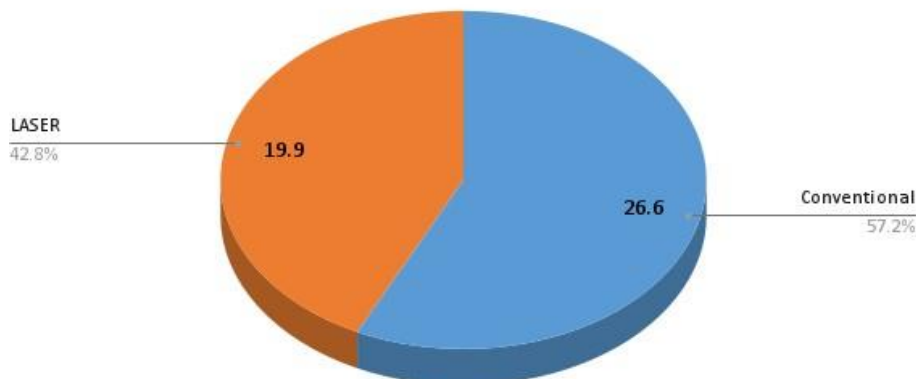
HEALING DURATION



MINIMUM TIME COMPARISON:

FIGURE 24: THE AVERAGE MINIMUM TIME COMPARISON BETWEEN LASER AND OTHER CONVENTIONAL SURGERIES.

Average of TIME[MIN]



LENGTH OF STAY IN HOSPITAL:

FIGURE 25: LENGTH OF STAY FOR CONVENTIONAL SURGERIE

LENGTH OF STAY for Conventional Surgery

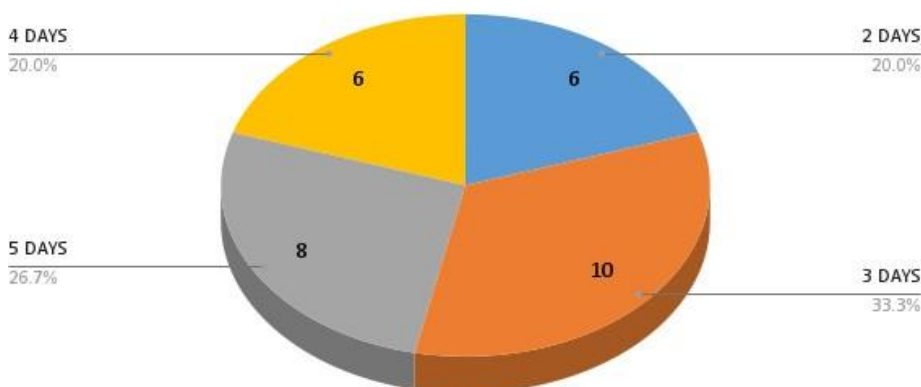
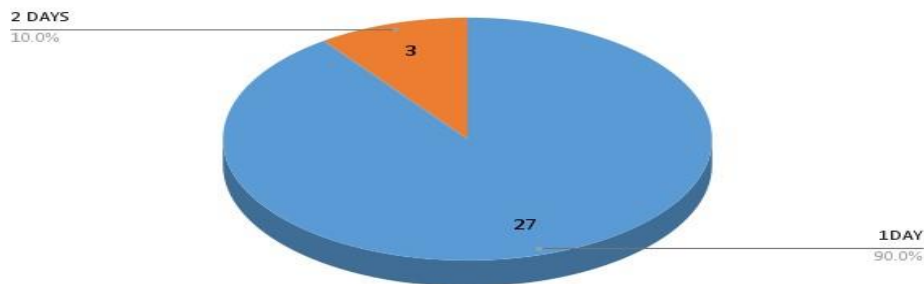


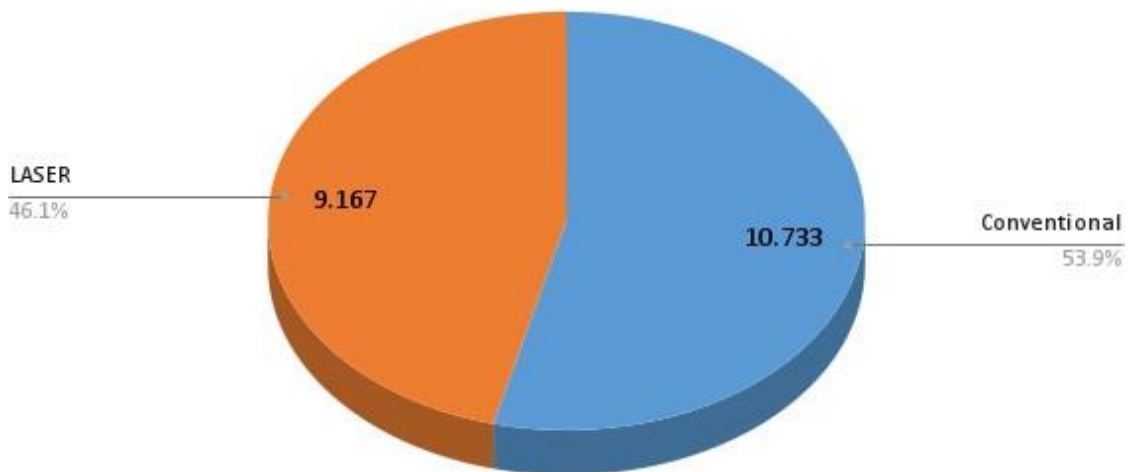
FIGURE 26: LENGTH OF STAY FOR LASER SURGERY

LENGTH OF STAY for LASER Surgery



FOLLOWUP [MONTHS]:**FIGURE 27: THE AVERAGE FOLLOWUP [MONTHS] BETWEEN LASER AND OTHERCONVENTIONAL SURGERIES.**

Average FOLLOWUP [MONTHS]

**INCONTINENCE:****FIGURE 28: INCONTINENCE FOR CONVENTIONAL SURGERIES**

INCONTINENCE for Conventional Surgery

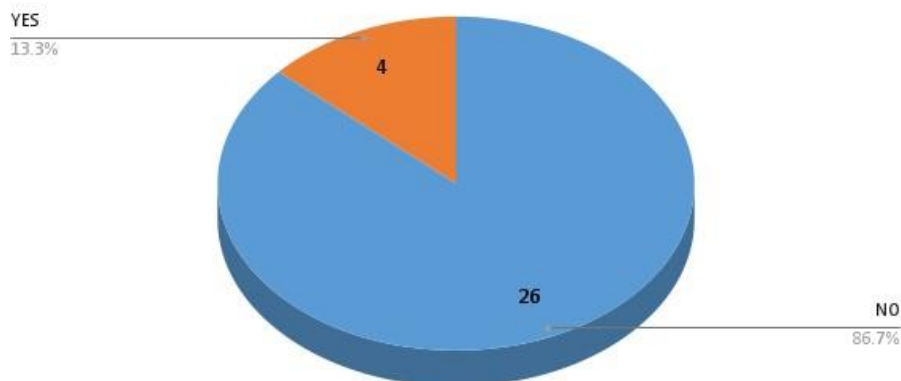
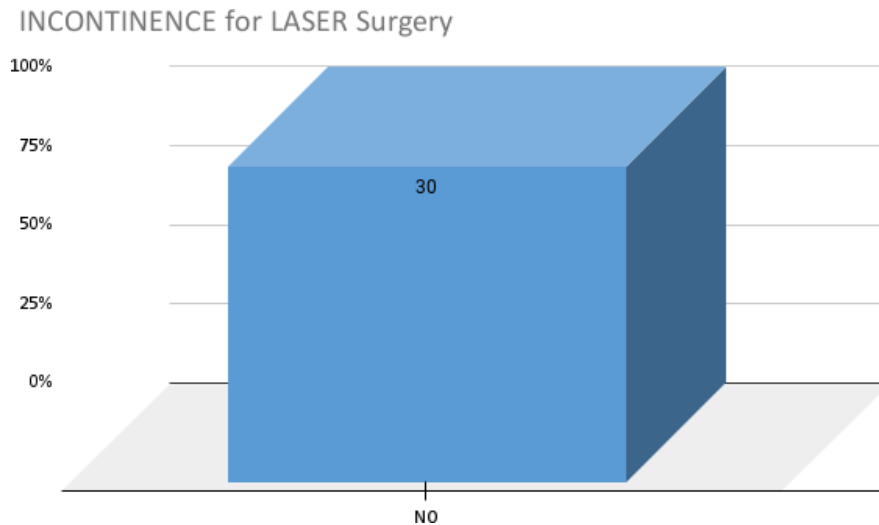


FIGURE 29: INCONTINENCE FOR LASER SURGERY**DISCUSSION****Age incidence:**

In the present series of 60 cases, 30% of patients were in the age group of 31 – 40 years. Another 26.7% of patients were in the age group of 41 – 50 years. Mean age at presentation was 40.71 years.

Sex incidence:

In the study of 60 cases, 88.3% of patients were male and 7% were females so the sex ratio is 4:1. Male preponderance may be related to an increased number of anal glands, which also tend to be more cystic and ramified when compared with female [8].

Modes of presentation

In the study of 2-year duration, we could find that the commonest mode of presentation is discharging pus in 70% of cases. Pain was the associated symptoms in 20% of cases. Past history of peri anal abscess was the presenting complaint in 80% of patients. Swelling 20%, recurrent abscess was also the associated complaint in significant cases. Peri anal irritation was seen in 10% of cases [9].

Complex or simple fistula:

In the study of 60 cases, 83.3% of them had only one external opening, while 16.7% had more than 2 external opening and Hence fistula in ano with a single external opening is commonest in occurrence.

Situation of external opening:

In this present series of 50 cases, who were randomly selected 84% of patients had external

openings situated posterior to the anal openings. Another 16% of patients had an external openings situated anteriorly [10].

Park's classification and distribution:

In this study of 60 patients type 1 intersphincteric is most common (58.3%) followed by transsphincteric and 1.7 % cases of suprasphincteric type.

Aetiology:

In our study, 98.3% of the cases are cryptoglandular in origin and 1.7% of the case are Crohn's disease.

Types of Fistula:

Fistula can be classified as simple and complex fistula. In our study about 83.3% are simple fistula. Complex fistulas constitute about 16.7% Anal fistulas can be categorised either simple(or) complex. A Simple anal fistula include low trans sphincteric and intersphincteric fistulas that cross the external sphincter. Fistulas are complex if primary tract includes high trans sphincteric fistulas with (or) without a high blind tract. Suprasphincteric, and extrasphincteric fistulas, horseshoe fistulas, multiple tracts, anterior lying [11].

In our study intersphincteric fistula is most common It constitutes 53.3%. Here the fistulous track confined to intersphincteric plane. Trans sphincteric fistula – 20%. Here the fistula connects the intersphincteric plane with ischiorectalfossa by perforating external sphincter. Horse shoe fistulas Incidence – 3.3% in our study. Here the fistulous tract goes from one ischiorectal fossa to contralateral one through posterior rectum. Fistula with multiple openings constitute 8.3% Suprasphincteric Fistula 1.7% [12].

Investigations:

Most of the diagnosis were made by proctoscopic examination of 65% of the cases with xray sinogram. where if the diagnosis is uncertain 26.7 % of the patients needed MR fistulogram, trans anal ultrasound [TRUS] 3.3% and usg 3.3%.

Type Of Surgery:

In this study 50% 30 are laser surgery , 22 are fistulectomy, 7 are LIFT and 1 case of incisionand drainage.

LIFT PROCEDURE

Done in 7 cases. (11.7%). Mainly done for transsphincteric fistula. Post operative period, patients had less pain & would healing better Mean period of stay 2 days. One patient had recurrence after 1 month which was managed by Fistulectomy.

Post operative period

Mean period of stay 2 days. All patients treated with antibiotics, analgesics, symptomatic measure Pain is the Major complaint in our study

Recurrence

Found in 1 case

Recurrence followed – Fistulectomy – 1

INCISION AND DRAINAGE PROCEDURE

Done in 1 case. (1.7%) done for complex horse shoe fistula Post operative period, patients had pain & would healing poor Mean period of stay 3 days patient had recurrence after 6 month which was managed by Fistulectomy Post operative period Mean period of stay 3 days All patients treated with antibiotics, analgesics, symptomatic measure Pain is the Major complaint in our study.

Recurrence

Found in 1 case

Recurrence followed – Fistulectomy – 1

FISTULECTOMY

Done in 22 cases. (36.7%). Mainly done for recurrent 4 cases, intersphincteric 12 cases , Post operative period, patients had pain & would healing is good Mean period of stay 4 days 5 patients had recurrence after 9 month [13].

Post operative period

Mean period of stay 3 days. All patients treated with antibiotics, analgesics, symptomatic measure Pain is the Major complaint in our study and incontinence to 3 patients [14].

Recurrence Found in 5 cases. FILAC (LAFT)

Done in 30 cases. (50%). Mainly done for intersphincteric 18 cases ,8 transsphincteric cases and ,1 suprasphincteric ,2mcomplex fistula cases Post operative period, patients had less pain & would healing is equivocal Mean period of stay 1.1 days, 15 patients had recurrence after 7 months.

Post operative period

Mean period of stay 1 days. All patients treated with antibiotics, analgesics, symptomatic Measure. Persistence discharge is the main complaint postoperatively.

Recurrence

Found in 15 cases.

Healing Rates:

Only 50% of the operated patients were healed compared to 76% healing rate in conventional studies. Which is statically significant of value <0.04.

Mean healing Duration:

Mean healing duration of laser surgery was 23.8 days which is less when compared to 28.2days for other conventional surgeries.

Length of stay:

The length of stay for the conventional surgeries on an average of 3.5 days compared to 1.1day in laser surgeries

MINIMUM TIME COMPARISON:

In our study, average time for laser surgery was 19.9 minutes compared to 26.6 for conventional surgeries, where laser surgery is less time consuming [15].

FOLLOW UP MONTHS:

In our study the mean follow up months for laser surgery was 9.16 months when compared to conventional surgeries of mean 10.7 months.

INCONTINENCE:

In contrast to conventional operations, which have an incidence of incontinence rate of 13.3%, none of the 60 patients in our research who underwent laser surgery have flatus or bowel incontinence.

The first image most people have when they think about surgery is a knife. Many people may be deterred from undergoing critically required medical operations by the idea of being sliced. With the development of laser surgery and the developments in medical technology, more people can feel at peace while considering major surgery or minor cosmetic procedures. In addition to helping to seal off contaminated regions, this can be used to block blood vessels to lessen blood loss during surgery. All of this is accomplished with little harm to the neighbourhood [16,17].

The ability to block nerve endings via laser surgery is another benefit. This is particularly useful for easing pain in areas that have recently had surgery. Despite the fact that this kind of surgery has some drawbacks of its own, it is still a viable alternative to pain drugs and their adverse effects.

Numerous research have compared the use of lasers and traditional ways to treat fistula in ano, although these studies varied either in the kind of laser used—such as CO₂—or in the approach itself. Since our work is not comparable to that of the diode laser, we will only compare the outcomes of conventional surgery.

CONCLUSION

Whether they use laser surgery or conventional operations, all innovative prosthetics have a specific set of known postoperative problems. With a follow-up of 10 months, the current investigation was conducted over a two-year period. In the current study, 60 patients in total were included, with 30 patients undergoing both laser and traditional surgery for fistula in a single group. Though prospective and long-term follow-up studies should be conducted, the FILAC, or sphincter preservation minimally invasive surgery, in the treatment of anal fistulas, appears promising. The study's conclusions were deduced, and it was discovered that while laser surgeries have a high chance of recurrence when compared to other conventional surgeries, they have an advantage in terms of quick recovery times, little blood loss, short hospital stays, little postoperative pain, and sphincter-sparing surgery. With careful patient selection, internal opening closure with sutures, and seton insertion for active discharge drainage, the recurrence rate of laser surgery is reduced in other trials.

In my opinion, more study has to be done on the LAFT method to determine its indication (when to use it for what kinds of fistula), the variations in the laser fibres utilised, and the benefit of

closing the internal opening over just LAFT. I think that when it comes to fistula surgery, there is no such thing as a "one size fits all" approach, and more research needs to be done to determine the best technique for each kind of fistula.

FUNDING

Nil

CONFLICT OF INTEREST

None

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