

# **Platelet Rich Plasma Injection Versus Ligating Inter-sphincteric fistulous tract for Management of High Trans-sphincteric Peri-anal Fistula**

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## ***Abstract***

***Background:*** *Fistula-in-ano (FIA) is one of the most common benign anal conditions in daily surgical practice. Modern management of anal fistula include anal fistula plug, fistula laser closure, adipose-derived stem cells and platelet-rich plasma (PRP) injection.*

***The study was aimed to compare the efficacy of platelet rich plasma injection versus ligating inter-sphincteric fistulous tract in treatment of high trans-sphincteric peri-anal fistula.***

***Patients and methods:*** *Our study was carried out in General Surgery Department, Zagazig University Hospitals and included 18 patients who were divided in two groups; 9 patients were treated with platelet rich plasma injection after curretage of the fistulous tract and 9 patients were treated with ligation of the inter-sphincteric fistulous tract with close monitoring and followed up of all the patients of both groups as regards to: operation time, hospital stay, healing time, postoperative incontinence and recurrence.*

***Results:*** *By the end of this study, the results showed no significant difference between the two techniques in relation to healing time, post operative sappuration, incontinence and recurrence. However platelet rich plasma was slightly better regarding healing time and incontinence while LIFT was slightly better regarding healing and recurrence.*

***Conclusion:*** *It could be concluded that, both platelet rich plasma and ligation of the inter-sphincteric fistulous techniques are promising procedure with better healing rates and less liability for postoperative recurrence. However, PRP was slightly better regarding healing time and incontinence and LIFT was slightly better regarding the rate of recurrence.*

***Keywords:*** *Peri-anal Fistula, PRP and Ligating fistulous tract.*

## 1. INTRODUCTION:

Fistula-in-ano (FIA) is defined as an epithelized abnormal tract connecting two surfaces, usually the anal mucosa and peri-anal skin. Most of the anal fistulas run a benign course, but complicated FIA still carries significant morbidity, namely fecal incontinence and recurrence (1). Peri-anal fistula can be classified according to Park into Inter-sphincteric confined to intersphincteric plane, does not cross external sphincter or levator muscles, Trans-sphincteric ; Track passes radially through external sphincter , Suprasphincteric ; track passes upward within intersphincteric plane over puborectalis muscles and descends through levator muscles, ischiorectal fossa and Extrasphincteric ; Fistula's course is completely outside external sphincter (2).

Idiopathic fistulas are generally believed to represent the chronic phase of intermuscular anal gland sepsis (ie, the cryptoglandular hypothesis). However, peri-anal fistulas may also be caused by other conditions and events, including Crohn's disease, tuberculosis, trauma during childbirth, pelvic infection, pelvic malignancy, and radiation therapy. Alternatively, infection may pass through both layers of the anal sphincter (trans-sphincteric fistulization) to enter the ischiorectal fossa; this development pattern occurs in about 20% of cases (3).

Many diagnostic procedures include magnetic resonance imaging for the assessment of perianal Crohn's and cryptoglandular fistula, anorectal ultrasound highly dependent on the experience of the examiner, examination under anaesthesia considered to be the gold standard when performed by an experienced colorectal surgeon , endoscopy and fistulography has a very limited role in the assessment of peri-anal fistula (4) .Fistulotomy is the most likely method to result in cure for low fistula, reaching 90% of success with low risk for incontinence, One of the oldest and most widely performed procedures is the advancement flap. Modern management of anal fistula include Anal fistula plug, Fistula laser closure , Video-assisted anal fistula treatment , Adipose-derived stem cells and platelet-rich plasma injection (5) .

The concept and description of Platelet-rich plasma (PRP) is defined as a portion of one's own plasma with above-baseline platelet and growth factor levels as obtained with centrifugation. PRP was used as a transfusion product to treat patients with thrombocytopenia. PRP started to be used in maxillofacial surgery as platelet –rich fibrin. Fibrin had the potential for adherence and homeostatic properties, and PRP with its anti-inflammatory characteristics stimulated cell proliferation (6). Platelets have alpha granules that contain a number of proteins (PDGF, FCT- $\beta$ , IL-1, VEGF, ECGF, osteocalcin, osteonectin, fibrinogen, fibronectin, and thrombospondin) with multiple actions on the various aspects of tissue repair. Despite the advancement in preoperative road mapping of fistula tracts by magnetic resonance imaging (MRI) and endoanal ultrasound (EAUS) plus modern management of anal fistulas , there is a significant recurrence rate of 4% up to 45% (7).

A new sphincter-saving procedure involving ligation of the inter-sphincteric fistulous tract (LIFT). This technique involves disconnection of the internal opening from the fistula tract and removal of the residual infected anal gland, without dividing any part of the anal sphincter complex. Many surgeons have adopted this technique. The LIFT technique has gained popularity particularly due to its high success rate and preservation of continence (8).

In this study, we compared the two methods PRP and LIFT in the treatment of the high trans-sphincteric peri-anal fistula.

## **2. PATIENTS AND METHODS:**

A prospective comparative study was held in zagazig university hospitals GIT surgery unit between june 2018 and february 2020. Written informed consents were obtained from all patients included in this study after approval of Ethical Committee in Faculty of Medicine, Zagazig University.

The study included eighteen cases randomly divided into two groups by closed envelop method nine cases of each group. Group (A) who operated by curettage of the fistulous tract followed by platelet rich plasma injection. Group (B) who operated by ligation of the inter-sphincteric fistulous tract.

The Inclusion criteria was patients with high trans-sphinctericperi-anal fistula in age between 15 to 60 years of both sexes. While, diabetic patients of uncontrolled blood sugar and other patient of uncontrolled co-morbidities. specific causes of peri-anal fistula as crohn's disease , tuberculosis , malignancy .other types of peri-anal fistula and recurrent peri-anal fistula were excluded.

### **Preparation of platelet rich plasma (Group A):**

20 ml blood was sampled from the patient into two 10 ml syringes containing anticoagulant, Na citrate. The syringes were prepared to be used in the centrifuge by cutting the plunger and fingers grip. The double spin technique were used, the first spin was at speed 1000 (RPM) for 10 min., and the second one was at speed 3000 RPM for 10 min. The initial centrifugation is to separate red blood cells followed by a second centrifugation to concentrate platelets in the smallest final plasma volume. The specimen was activated by adding calcium gluconate 10%; every 9 ml were activated by 1ml calcium gluconate.

### **Surgical technique:**

The surgical procedure was performed under spinal anesthesia in lithotomy position. Internal opening was identified and irrigated the fistulous tact using hydrogen peroxide through the external opening. Curettage of the fistulous tract was done using a piece of gauze between two strings and different sizes of curettes, then irrigation of the fistulous tract by saline and hydrogen peroxide. The fistulous tract

was filled with activated autologous platelet rich plasma which is delivered by syringe and left to form gel, and the tissue around the tract was infiltrated by activated PRP. Finally, the internal opening is closed by simple sutures using polyglactin.

#### **Ligating Inter-sphincteric fistulous tract procedure (Group B):**

The internal opening identified, entering the intersphincteric plane then identification of the fistulous tract hooking it followed by ligation of the tract close to the internal opening by polyglactin 3/0 and finally excision of the fistulous tract.

#### **Assessments and follow up:**

Parameters of comparison between both techniques include healing time and complications in the form of infection, incontinence and recurrence. Follow up in outpatient clinic for post-operative results and possible complications for six months.

#### **Statistical analysis:**

#### **RESULTS:**

There is statistically non-significant difference between the studied groups regarding age or gender. In Group A five females and four males while in group B four females and five males (Table 1).

Regarding operation time the mean time for group A was  $59.78 \pm 3.07$  with a range 56 – 66 while in group B was  $48 \pm 2.45$  with a range of 45 – 52. The hospital stay was in the GIT surgery unit and patient discharged within 24 hours. There is significant difference between the studied groups regarding duration of operation (longer in curettage followed by PRP injection technique). There is also significant difference between them regarding hospital stay (longer in LIFT technique) (Table 2).

Regarding healing time in group A, at four weeks four cases showed complete healing and two cases healed 4-5 weeks. Three cases not healed. In group B three cases healed at 3 weeks and four cases healed 4-5 weeks however, two cases not healed. There is non-significant difference between the studied groups regarding occurrence of healing. On the other hand, there is statistically significant between them regarding duration of healing (shorter in curettage followed by PRP injection technique) (Figure 1).

Total complications in group A included 3 cases complicated by infection and or recurrence. In the other group 3 cases complicated by recurrence and or infection. There is non-significant difference between the studied groups regarding occurrence of postoperative complications or infection (Table 3).

**Table (1): Demographic data of both groups :**

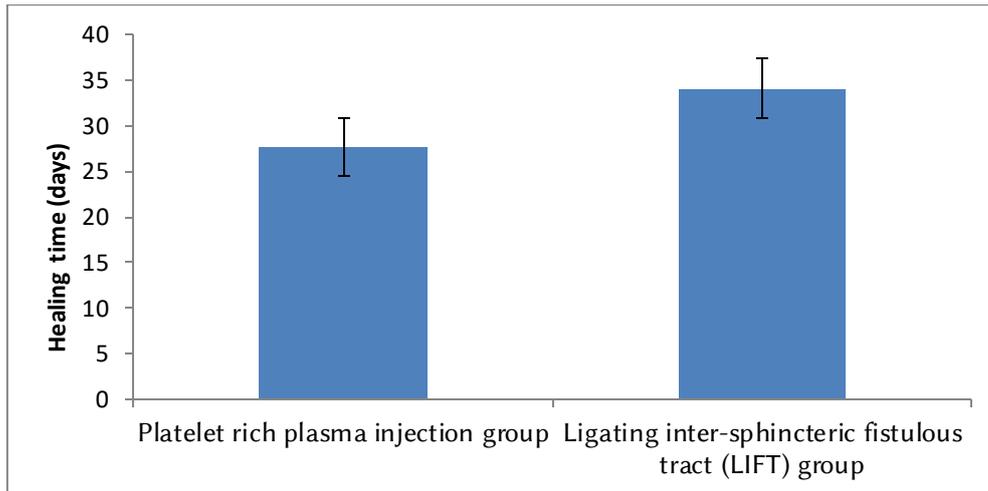
| Demographic characteristic      | Group A<br>Group B                   |  | Test       |       |
|---------------------------------|--------------------------------------|--|------------|-------|
|                                 | Platelet rich plasma injection group | Ligating inter-sphincteric fistulous tract group | $\chi^2/t$ | p     |
|                                 | N=9 (%)                              | N=9 (%)  |            |       |
| <b>Gender:</b>                  |                                      |  |            |       |
| <b>Female</b>                   | 5 (55.6)                             | 4 (44.4)   | Fisher     | >0.99 |
| <b>Male</b>                     | 4 (44.4)                             | 5 (55.6)   |            |       |
| <b>Age:</b>                     |                                      |  |            |       |
| <b>Mean <math>\pm</math> SD</b> | 40.89 $\pm$ 6.94                     | 39.78 $\pm$ 9.81                                 | 0.277      | 0.78  |
| <b>Range</b>                    | 32 – 52                              | 27 – 56  |            |       |

$\chi^2$  Chi square test t independent sample t test

**Table (2) duration of operation and hospital stay:**

|                                    | Group A<br>Group B |                  | Test |         |
|------------------------------------|--------------------|------------------|------|---------|
|                                    | PRP                | LIFT             | t    | p       |
|                                    | N=9 (%)            | N=9 (%)          |      |         |
| <b>Duration of operation (min)</b> |                    |                  |      |         |
| <b>Mean <math>\pm</math> SD</b>    | 59.78 $\pm$ 3.07   | 48 $\pm$ 2.45    | 8.99 | <0.001* |
| <b>Range</b>                       | 56 – 66            | 45 - 52          |      |         |
| <b>Hospital stay (hours):</b>      |                    |                  |      |         |
| <b>Mean <math>\pm</math> SD</b>    | 12.22 $\pm$ 0.83   | 14.89 $\pm$ 1.76 | -    | 0.021*  |
| <b>Range</b>                       | 9 – 18             | 12 - 24          | 2.56 |         |
|                                    |                    |                  | 3    |         |

t independent sample t test \*\*p $\leq$ 0.001 is statistically highly significant \*p<0.05 is statistically significant



**Figure (1): Simple bar chart showing comparison between the studied groups regarding healing time**

**Table (3) postoperative complications :**

| Postoperative                    | Group A                              |   | Group B  |        | Test |  |
|----------------------------------|--------------------------------------|---|----------|--------|------|--|
|                                  | Platelet rich plasma injection group | Ligating inter-sphincteric fistulous tract (LIFT) group | $\chi^2$ | p      |      |  |
|                                  | N=9 (%)                              | N=9 (%)   |          |        |      |  |
| <b>Total complications</b>       | 3 (33.3)                             | 3 (33.3)  | Fisher   | >0.999 |      |  |
| <b>No complications</b>          | 6 (66.7)                             | 6 (66.6)  |          |        |      |  |
| <b>Infection:</b>                |                                      |   | Fisher   | >0.999 |      |  |
| <b>Absent</b>                    | 7 (77.8)                             | 8 (88.9)  |          |        |      |  |
| <b>Present</b>                   | 2 (22.2)                             | 1 (11.1)  |          |        |      |  |
| <b>Incontinence to flatus:</b>   |                                      |   | Fisher   | >0.999 |      |  |
| <b>Absent</b>                    | 9 (100)                              | 8 (88.9)  |          |        |      |  |
| <b>Present</b>                   | 0 (0)                                | 1 (11.1)  |          |        |      |  |
| <b>Major fecal Incontinence:</b> |                                      |   | Fisher   | >0.999 |      |  |
| <b>Absent</b>                    | 9 (100)                              | 9 (100)   |          |        |      |  |
| <b>Present</b>                   | 0 (0)                                | 0 (0)   |          |        |      |  |

$\chi^2$  Chi square test

**DISCUSSION:**

Anal sepsis is one of the most common benign ano-rectal diseases managed by surgeons. The aim of surgical treatment for anal fistula is to heal the fistula, possibly avoiding damage to the sphincter muscles. The technique involves disconnection of the internal opening from the fistula tract and removal of the residual infected anal gland, without dividing any part of the anal sphincter complex (9, 10).

In our study we compare between LIFT technique and platelet rich plasma injection in management of high trans-sphincteric peri-anal fistula.

As regarding demographic there is no significant difference between the studied groups regarding age or gender. Our study showed mean operative time  $48 \pm 2.45$  min in LIFT while  $59 \pm 3.07$  min in PRP. This is in agreement with LIFT technique in **Rojanasakul et al., (11)** who stated that, the operative time was  $40 \pm 2.67$  min. Also, **Shanwani et al., (12)** who reported that, the operative time was  $67.5 \pm 3.54$  min and in the study of **Ooi et al., (13)** was  $39 \pm 2.53$  min.

Our study showed mean length of hospital stay was  $14.89 \pm 1.76$  hours in LIFT group while in PRP group was  $12.22 \pm 0.83$  hours. This results are agree with study of **Rojanasakul et al., (11)** who evaluated the hospital stay length was  $24 \pm 1.2$  hours, in **Shanwani et al., (12)** was  $48 \pm 2.25$  hours and in study of **Ooi et al., (13)** was  $12 \pm 1.5$  hours.

Our study showed mean healing time  $34.1 \pm 2.41$  days in LIFT while  $27.6 \pm 2.58$  days in PRP. This agree with **Rojanasakul et al., (11)** who reported that the healing time in LIFT technique was  $30 \pm 2.67$  days. Similarly, this results agree with **Orban and Goda (14)** who conducted that, the healing time in PRP technique was  $24.86 \pm 1.441$  days.

Regarding post operative complications, our study showed recurrence rate was 22.2 % in LIFT while in PRP was 33.3%. This results agree with agree with **Shanwani et al., (12)** and **Ooi et al., (13)** who suggested rate of recurrence was 17 % and 28%, respectively in the LIFT technique. While, in the study of **Orban and Goda (14)** was 25% after PRP technique.

**CONCLUSION:**

It could be concluded that, both platelet rich plasma and ligation of the inter-sphincteric fistulous techniques are promising procedure with better healing rates and less liability for postoperative recurrence. However, PRP was slightly better regarding healing time and incontinence and LIFT was slightly better regarding the rate of recurrence .

**CONFLICT OF INTEREST:** No conflict of interest.

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