

## THE DIFFERENCE IN OUTCOMES OF EXCISION VERSUS INVAGINATION OF HERNIAL SAC IN MANAGEMENT OF INDIRECT INGUINAL HERNIA

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### ABSTRACT

#### BACKGROUND

The newer belief is that ligation of richly innervated peritoneal sac is responsible for increased postoperative pain and other complications without any advantage in terms of recurrence rate. It is mainly due to the fact that ligation of richly innervated and well vascularised peritoneum produces a miniature peritonitis contributing to the post-operative discomfort and other complications. Aim of our study was to compare the difference in outcome of two different techniques of indirect inguinal hernia sac management.

#### MATERIAL AND METHODS

Our study included open Lichtenstein tension free inguinal hernioplasty patients, 25 patients in each group (Group I underwent invagination of hernial sac, Group II underwent excision and high ligation of hernia sac). The lower limit of age was 18 years. All patients who underwent open Lichtenstein tension free inguinal hernioplasty with indirect inguinal hernia and without any comorbidities were included in the study. Data was tabulated and analysed by using SPSS for windows 7 software.

#### RESULTS

Most common presenting complaints were swelling with or without associated dragging pain. Both groups were comparable in age, BMI, occupation, side of hernia, length of incision, operative time and operative findings. The mean operative time was 53.2+/-6.272 minutes and 56.2+/-13.407 minutes in Group A and B respectively. There was no difference in mean VAS score at 6, 12, 24 hours and 7<sup>th</sup> day, but it was significantly higher in Group B on 21<sup>st</sup> day. Insignificant difference in complications rate was seen between the two groups.

#### CONCLUSION

The method of invagination of sac is better than the excision of sac with ligation or transfixation in reducing the incidence of chronic postoperative pain and decreased operative time after open Lichtenstein repair of indirect incomplete hernia.

#### KEYWORDS

Excision of Sac, Invagination of Sac, Hernial Sac, Postoperative Pain, Indirect Inguinal Hernia.

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#### INTRODUCTION

No disease of the human body belonging to the province of the surgeons requires in its treatment a greater combination of accurate anatomical knowledge with surgical skill than hernia in all its varieties.<sup>[1]</sup> Inguinal hernia is one of the commonest problems of mankind. The disease has been known since the period of Hippocrates (4<sup>th</sup> century BC) and various treatment methods were adopted.<sup>[2]</sup>

Of the study of many operations available in a general surgeon's armamentarium that of hernia repair has been written about repeatedly.

The rapid changes have been witnessed in open approach surgeries, prosthetic materials and laparoscopic surgeries have made hernia surgery a most interesting field of endeavour that demands renewed discipline and dedication. Watson said in the entire history of surgery, no subject has been so controversial as the repair of groin hernias.<sup>[3]</sup>

Earlier studies concentrated on excision of sac after high ligation, as a routine step in various hernia repair surgeries. Bassini recommended high ligation and excision of indirect hernia sac.<sup>[4]</sup> In Shouldice technique the indirect hernia sac is opened, inspected and then either excised or simply returned into peritoneal space.<sup>[5]</sup> Rutkow, however, recommended that hernia sac should not be opened for visual inspection. In Rutkow's mesh plug repair, the sac is not ligated but inverted.<sup>[6]</sup> The sac is either inverted or excised in Lichtenstein repair.<sup>[7]</sup> The reported recurrence rate is very low in mesh repair; in Rutkow's mesh plug repair it is .2% and .4% for Lichtenstein repair.<sup>[6]</sup> Following open mesh repair, early postoperative pain has been found to be greater after excision than invagination of hernia sac.<sup>[8]</sup> This issue, how best to manage indirect inguinal hernia sac, has become more complicated with introduction of laparoscopic groin hernia repair where sac is simply invaginated and not ligated.<sup>[9-11]</sup>

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Even in the laparoscopic era, due to long and complex learning curve of laparoscopic hernia repair, open Lichtenstein tension free meshplasty is accepted as gold standard in inguinal hernia repair in modern era.<sup>[12-13]</sup> Need to ligate the sac has been questioned by a group of surgeons as this group trusts that suturing of peritoneum causes ischemia which leads to impaired healing, increasing postoperative pain and also increased chances of haematoma formation postoperatively.<sup>[14]</sup> Sac invagination will be associated with a decreased incidence of future adhesive complications and less pain, because the richly innervated peritoneum is not incised.<sup>[15]</sup>

## MATERIAL AND METHODS

The aim of our study was to compare the effect of two different techniques of indirect inguinal hernia sac management, i.e. sac excision and ligation and sac invagination in terms of postoperative pain, recurrence rate up to one year after surgery and incidence of postoperative complications. All patients included in this study after their approval and signing a written consent form. Our study included 50 patients of open Lichtenstein tension free inguinal hernioplasty for indirect inguinal hernia during the September 2011 to January 2014 from a tertiary care center, which was approved by the Ethics Committee of our university (Pt. B. D. Sharma PGIMS Rohtak Haryana, India).

### Inclusion Criteria

1. All patients with indirect inguinal hernia planned for open Lichtenstein tension free inguinal hernioplasty.

### Exclusion Criteria

1. Patients under 18 years.
2. The patients with complete indirect inguinal hernia.
3. Recurrent inguinal hernia, direct hernia and complicated hernia.
4. Female patients.
5. Those undergoing laparoscopic repair or other than Lichtenstein repair.
6. Not willing to give consent.

### Operative Technique

Operations were performed by same surgeon. Groin of the patient was shaved before operation. After preparing operative site with 5% povidone iodine, oblique inguinal incision was made. Inguinal canal was opened in the usual manner. The indirect hernia sac dissected up to neck.

In the excision group (Group B) – the sac was transfixed at neck and distal part excised in the traditional manner. While in the invagination group (Group A), after dissection the entire sac was repositioned into the peritoneal cavity. The repair of the deep ring was done and prolene mesh was applied in all the patients in usual way. Antibiotics prophylaxis using IV amoxicillin plus clavulanic acid was provided to all patients.

Primary outcomes were measured as postoperative pain using visual analogue scale of 1 to 10 for first 24 hrs. VAS was recorded after 6, 12 and 24 hrs. Secondary outcomes were measured as incidence of the postoperative complications, i.e. urinary retention, scrotal oedema, seroma formation, wound infection, groin sepsis, sinus formation, persistent pain, testicular atrophy and recurrence. Patients were reviewed after at 7<sup>th</sup> and 12<sup>th</sup> postoperative day. The recurrence was

evaluated in all those patients who completed one year after surgery in follow-up.

All data was collected on a proforma and master chart prepared. Data was tabulated and analysed using SPSS for windows 7 software. The Chi Square Test, Fisher's test and student 'T' test were used as appropriate to establish status of significance. Statistical significant relationship was taken at  $p < 0.05$ .

## RESULTS

A total of 50 patients who underwent open Lichtenstein tension free inguinal hernioplasty for incomplete indirect inguinal hernia were included in this study. The mean age of the patients in group A and group B were 43.96+/-17.019 and 35.8+/-17.102 years respectively. Maximum patients in both groups were heavy workers (farmers and labourers). The mean BMI of patients was 25.25+/-1.976 and 24.19+/-2.39 in group A and B respectively. None of the patients were in underweight or obese group as per WHO classification. Patients presented with swelling (100%) and swelling associated with pain or dragging sensation (32%), while none of the patients had pain as only presenting complaints.

12 (24%) patients presented within three months of onset of symptoms, 35 (70%) reported within one year of onset of symptoms, while only 20% patients had history of onset for more than 2 years; 56% cases were having right sided hernia and 44% cases were of left sided hernia, while none of the cases presented with bilateral indirect inguinal hernia.

Length of the incision were 7.23+/- .769 cm and 7.07+/- .809 cm in group A and B respectively. The minimum operative time was 30 minutes and maximum was 100 minutes. The mean operative time was 53.2+/-6.272 minutes and 56.2+/-13.407 minutes in group A and B respectively.

On comparing the VAS score in both the groups, there were no difference at 6, 12, 24 hours and 7<sup>th</sup> day. Mean VAS score was significantly higher in group B on 21<sup>st</sup> day by using paired 'T' test (Table 1). There was insignificant difference in complications rate between the two groups and p value was  $> .05$  on Chi Square test (Table 2).

Only 24 patients out of 50 reported for follow-up at one year. None of the reported patients had recurrence or chronic inguinodynia at one year follow-up in either group.

Postoperative Period	Group (A)	Group (B)	P - value
	Mean VAS Score	Mean VAS Score	
6 hours	5.32+/-1.145	5.64+/-0.907	0.279
12 hours	4.36+/-1.114	4.2+/-1.080	0.608
24 hours	2.68+/-0.69	2.8+/-0.764	0.563
7 <sup>th</sup> day	1.84+/-0.624	1.92+/-0.881	0.726
21 <sup>st</sup> day	0.64+/-0.70	1.12+/-0.927	0.044

**Table 1: Mean VAS Score in Both Groups**

Complications	Group (A)	Group (B)	P value
No complication	21	20	-
Urinary retention	2	4	.384
Scrotal oedema	2	1	.552
Seroma formation	1	2	.552
Scrotal oedema + urinary retention	1	1	NR
Seroma + urinary retention	0	1	NR
Wound infection/groin sepsis	0	0	-
Sinus formation	0	0	-
Testicular atrophy	0	0	-
Recurrence	0	0	-

**Table 2: Comparison of Postoperative Complications in Both the Groups**

## DISCUSSION

Lichtenstein's tension free meshplasty is considered as gold standard procedure for hernia repair in modern era. But even this procedure is not completely free of complications. Recurrence and persistent postoperative pain are two main problems faced by the patients as well as the surgeons following hernia repair. Traditional surgeons of earlier time, who thought the presence of preformed sac as only cause of hernia formation used to excise the sac after ligating or transfixing it. But some of the pioneer workers who repositioned the sac without ligation questioned the credibility of this step. Both groups were comparable in age, BMI, occupation, side of hernia, length of incision, operative time and operative findings. The average surgery duration was less in group A as compared to group B. Although the difference was not significant, but this shows that we can decrease the operative time by alleviating a needless step of surgery (excision and ligation/transfixation of sac), the step which is responsible for increased postoperative pain and other complications without any added advantage.

The postoperative long term pain is significantly less in patients undergoing invagination of sac compared to the patients in whom the sac was excised or ligated. The mean pain score was higher in group B as compared to group A on 21<sup>st</sup> postoperative day; however, we did not find any significant difference in terms of pain on first postoperative day between two groups. So, the corollary of these results can be that the excision and transfixation of sac may be one of the causes of prolonged postoperative pain in hernia surgery which is in congruence of previous reports by Bansal et al<sup>[14]</sup>, Vincent et al<sup>[16]</sup> and Delikoukos et al<sup>[17]</sup>

Although, there were increased rates of complications like urinary retention and seroma formation in group A, but the difference was not significant in our study. We were not able to demonstrate any significant difference in terms of other outcomes like wound infection, groin sepsis, sinus formation and testicular atrophy and most importantly the recurrence as none of our patients in either group reported to have these complications. However, some of the earlier studies reported that there is no difference in postoperative complications rate when sac is excised or ligated.<sup>[14,18-19]</sup> There are controversies over the difference in the recurrence rate as some of the studies reported that there is no difference in recurrence rate in both the groups.<sup>[14,16,19]</sup>, but the study conducted by G. Stylianidis et al reported that excision of the

sac in indirect inguinal hernia repair is associated with lower risk of recurrence than invagination.<sup>[20]</sup>

The present study had certain limitations, i.e. less number of cases, poor follow-up, short duration of follow-up, lack of parameters like quality of life after surgery. It was beyond the scope of study to observe no limitations, as number of patients included in groups were small and restriction of the study which prevented the extrapolation of results to the general. Though we acknowledge the pitfalls in the subjective assessment of analgesics activity, we feel our rigorous methodology provided a true comparison.

## CONCLUSION

The method of invagination of sac is better than the excision of sac with ligation or transfixation in reducing the incidence of chronic postoperative pain and operative time in open Lichtenstein repair of indirect incomplete hernia. There is no significant difference in terms of complications and recurrence rate, so invagination of sac should be the preferred method.

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