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Elective ilio-inguinal neurectomy for prevention of chronic pain after inguinal hernia meshplasty

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Abstract
Background: This study has been carried out on 60 patients of inguinal hernia (either direct or indirect) from February 2016 to August 2017 who were admitted in the surgical ward of Index Medical College Hospital & Research Centre, Indore (M.P.). All patients were admitted through outpatient department.
Method: The patients were divided into two groups: Group I and Group II. Each group consisted of 30 patients. Only male patients were included in the study. Surgery was organized within the hospital structure in the same way as other elective patients admitted in general surgical ward. Patient was fully explained about the procedure and its complications and was included in the study only after his written consent. Written explicit consent was taken in patients own language for group I patients.
Result: The mean age of patients in nerve excision group (I) was 51.6 ± 18.1 years whereas in nerve preservation group (II) it was 50.3 ± 11.6 years. All the patients in both the groups were male. Patients suffering from pain were relatively much higher at 1 month irrespective of preservation or division of nerve.
At 3 months after surgery both the groups had equal number of patients (2) with pain and continued resolution of pain symptom was thus noted.
Conclusion: There is considerable evidence in world literature that supports the contention that in inguinal Hernia Meshplasty Neurectomy is associated with decreased incidence of pain after open hernia surgery. Keeping in mind the results emerging from the present study it may be suggested that routine identification and elective excision of the ilioinguinal nerve may be reasonable option without any significant added morbidity to prevent the chronic; pain in inguinal hernia repair with mesh. But a larger prospective randomized study is still required to confirm the benefit benefits of routine ilioinguinal neurectomy while doing open inguinal hernia repair with mesh.

Keywords: Ilioinguinal nerve, chronic, sensation, hernia & postoperative

Introduction
Inguinal hernia has plagued humans since they have adopted the erect, posture millions of years ago. The fascinating history of surgical repair of groin hernia is a lengthy record of assorted techniques. Although improvements are still being sought and found for several decades, surgeons have had the means to relieve most hernia sufferers. The history of the anatomy and surgery of groin hernia shows how much there was to learn.
The vagaries of recorded history make it impossible to determine exactly when and where hernia surgery began. Operations for hernia are reputed to have been performed in Alexandria, Egypt, by Erasistratus of Keos (ca 330-250 BC) referred to as the founder of physiology [1].
At the end of the 17th century and throughout the 18th century, better information about hernia anatomy emerged.[2] Frederik Ruysch (1638-1731) proved that rupture of the peritoneum did not occur in hernia formation. Antonio Scarpa (1747-1832) of Italy accurately described sliding hernia and perineal hernia. He also described the deep layer superficial fascia of the lower abdominal wall, later named after him as well as the Inguinal Ligament.[3]
In the early part of 20th century, treatment of hernia was further improved by several innovators. Henry Marcy's role was very significant [4]. Marcy performed a procedure to close the internal ring, used absorbable sutures in his hernia repairs and was the first to emphasize the importance of high ligation of the hernia sac [5].

Material & Method

This study has been carried out on 60 patients of inguinal hernia (either direct or indirect) from February 2016 to August 2017 who were admitted in the surgical ward of Index Medical College Hospital & Research Centre, Indore (M.P.). All patients were admitted through outpatient department. Prior to admission, proper screening along with detailed clinical evaluation of each patient was carried out in the form of the following:

- Hemoglobin
- Bleeding time
- Clotting time
- Urine routine examination
- Blood urea
- Blood sugar
- Serum electrolytes
- Chest X-ray
- ECG.

The patients with following criteria were excluded from the present study

1. Age<14 years
2. Obstructed inguinal hernia
3. Strangulated inguinal hernia
4. Recurrent inguinal hernia
5. Hernia cases admitted through emergency department.

The patients were divided into two groups: Group I and Group II. Each group consisted of 30 patients. Only male patients were included in the study.

Surgery was organized within the hospital structure in the same way as other elective patients admitted in general surgical ward. Patient was fully explained about the procedure and its complications and was included in the study only after his written consent. Written explicit consent was taken in patients own language for group I patients.

On the day of surgery patient was given pre-anaesthetic medication as advised by anaesthesiologist. All repairs were performed by the same surgeon using the convention [6] open tension-free mesh technique as described by Lichtenstein *et al*. Mesh repair was done by using the same type of mesh (PMI mesh of Johnson & Johnson) in both the groups.

Group I (Control group): Ilioinguinal nerve was identified during surgery and preserved.

Group II (Study group): This group included 30 patients in whom ilioinguinal nerve was excised after its identification.

In Group II (ilioinguinal nerve division group), the ilioinguinal nerve was identified by its course. On carefully opening the external oblique fascia the nerve was seen following the spermatic cord lying over the ventral surface of cremasteric sheath and exiting through the external ring. After adequate exposure of the nerve along its course as mentioned above, it was cut sharply with a blade or scissor about 1 cm lateral to internal inguinal ring and the distal segment of the nerve was resected till superficial inguinal ring. The proximal end of the nerve was then allowed to retract back into the internal oblique muscle layer. Neither electrocautery nor suture material was used in dividing the nerve. Excised segment of the nerve, which was 3 cm to 4 cm in most cases, was sent for routine histopathological examination. Hernia repair was carried out by Lichtenstein tension free mesh repair method. A sheet of polypropylene mesh was used to support the whole posterior wall of the inguinal canal and extend around the deep ring. Prolene 2-0 suture was used to fix the mesh at pubic tubercle, conjoint tendon, inguinal ligament and both foils of mesh. After mesh fixation spermatic cord was reposited back. External oblique fascia was closed with Prolene 2-0 suture. Subcutaneous tissue and skin was closed in layers.

Among patients in both groups presence or absence of chronic postoperative pain and paresthesia was monitored and tabulated. A p value of less than 0.5 was used to determine statistical significance.

Results

Table 1: Comparison of age in relation to group

			(N=60)
Group	**Mean ± SD**	**'t' Value**	**P Value**
Control group	50.3 ± 11.6	-0.32, df=43	0.763, NS
Case group	51.6 ± 18.1		

Unpaired 't' test applied. P value <0.05 was taken as statistically significant

The above table shows the comparison of mean age between the two groups.

The mean age in the control group was 50.3 ± 11.6 years and in the case, group was 50.9 ± 18.1 years. The difference was found to be statistically not significant (P>0.05), showing that the age is comparable in both the groups.

Table 2: Comparison of body weight in relation to group

			(N=60)
Group	**Mean ± SD**	**'t' Value**	**P Value**
Control group	59.80 ± 6.61	-6.83, df=71	0.000*
Case group	69.13 ± 5.47		

Unpaired 't' test applied. P value <0.05 was taken as statistically significant

The above table shows the comparison of mean body weight between the two groups.

The body weight in the control group was 59.80 ± 6.61 kg and in the case group it was 69.13 ± 5.47 kg. The difference was found to be statistically significant (P<0.05), showing a higher body weight in the case group in comparison to the control group.

Table 3: Comparison of duration of surgery in relation to group

			(N=60)
Group	**Mean ± SD**	**'t' Value**	**P Value**
Control group	1.59 ± 0.84	-2.18, df=49	0.038*
Case group	1.97 ± 0.61		

Unpaired 't' test applied. P value <0.05 was taken as statistically significant

The above table shows the comparison of mean duration of surgery between the two groups.

The duration of surgery in the control group was 1.59 ± 0.84 and in the case group it was 1.97 ± 0.61. The difference was found to be statistically significant (P<0.05), showing a higher duration of surgery in the case group in comparison to the control group.

Table 4: Comparison of pre-hemoglobin in relation to group

			(N=60)
Group	**Mean ± SD**	**'t' Value**	**P Value**
Control group	119.83 ± 1.89	2.92, df=36	0.046*
Case group	13.13 ± 1.62		

Unpaired 't' test applied.P value <0.05 was taken as statistically significant

The above table shows the comparison of mean pre-hemoglobin level between the two groups.
The pre-hemoglobin level in the control group was 119.83 ± 1.89 gm% and in the case group it was 13.13 ± 1.62 gm%. The difference was found to be statistically significant (P<0.05), showing a higher pre-hemoglobin in control group in comparison to the case group.

Table 5: Comparison of duration of analgesia in relation to group

			(N=60)
Group	**Mean ± SD**	**'t' Value**	**P Value**
Control group	4.42 ± 0.99	-3.82, df=13	0.013*
Case group	5.48 ± 1.64		

Unpaired 't' test applied. P value <0.05 was taken as statistically significant

The above table shows the comparison of mean duration of analgesia between the two groups.
The duration of analgesia in the control group was 4.42 ± 0.99 and in the case group it was 5.48 ± 1.64. The difference was found to be statistically significant (P<0.05), showing a higher duration of analgesia in case group in comparison to the control group.

Table 6: Comparison of severity of pain in relation to group at different time intervals

				(N=60)
Time interval	**Control Group [Mean±SD]**	**Case Group [Mean±SD]**	**'t' Value**	**P Value**
1 month	1.27 ± 0.96	1.29 ± 1.47	-0.47, df=62	0.092, NS
3 months	0.09 ± 0.27	0.29 ± 0.61	-1.82, df=62	0.076, NS
6 months	0.28 ± 0.89	0.73 ± 1.11	-1.53, df=62	0.073, NS

Unpaired 't' test applied.
P value <0.05 was taken as statistically significant

The above table shows the comparison of severity of pain between the two groups at different time intervals.
The severity of pain was comparable between the control and case groups at all the time intervals (P>0.05).

Table 7: Comparison of severity of pain in relation to group at different time intervals

				(N=60)
Group	**Severity of pain**	**1 month**	**3 months**	**6 months**
Case Group	No pain	15	26	26
		50.0%	86.7%	86.7%
	Mild	3	2	2
		10.0%	6.7%	6.7%
	Moderate	12	2	2
		40.0%	6.7%	6.7%
	Severe	0	0	0
		0.0%	0.0%	0.0%
Control Group	No pain	9	28	27
		30.0%	93.3%	90.0%
	Mild	9	2	1
		30.0%	6.7%	3.3%
	Moderate	12	0	2
		40.0%	0.0%	6.7%
	Severe	0	0	0
		0.0%	0.0%	0.0%

The above table shows the comparison of severity of pain between the two groups at different time intervals.
Severity of pain was calculated using VAS score. A VAS score of 0 was taken as no pain, ≤ 1 was taken as mild, between 1 to ≤ 5 was taken as moderate pain and >5 was taken as severe pain.
At 1 month 15 (50.0%) in the case group were having no pain in comparison to control graph.

Discussion

Every success story has elements of failure. Nowhere is this more true than in the story of how the modern hernia surgery evolved with time. Even if a few standard operations are developed, surgeons would be wise to look to the knowledge base of their predecessors while developing their own broad-based approach to inguinal hernia repair.
As in most aspects of surgery, however, when so many operative options are arguably viable, it is clear that much remains to be learned about the process of hernia formation and the optimal means of operative repair. While the evidence accumulates, however, there are lessons that can be learned from the endeavors of the past.
The history of modern hernia surgery begin with formulation of the Bassini method in 1887 which brought about a greater understanding of inguinal hernias and the first attempt at a cure. For more than 50 years the Bassini repair was used by surgeons. However, the high recurrence rate in the hands of surgeons at large following the Bassini repair led to transition to the Shouldice procedure during the early 1950 [6, 7].
The next major movement in herniology was the use of prosthetic materials, a concept envisioned by Billroth in 1878 and partially realized by the advent of silver filigree, tantalum mesh, and a variety of plastic meshes [8].

Conclusion

The results of this trial demonstrate that routine identification and elective excision of ilioinguinal nerve during open mesh repair of inguinal hernia decreases the incidence of chronic pain after surgery, but the same was not statistically significant Furthermore, the procedure can be performed safely and is well tolerated by patients without any significant local cutaneous neurosensory disturbances.
There is considerable evidence in world literature that supports the contention that Inguinal Neurectomy is associated with decreased incidence of pain after open hernia surgery. Keeping in mind the results emerging from the present study it may be suggested that routine identification and elective excision of the

Ilioinguinal nerve may be reasonable option without any significant added morbidity to prevent the chronic, pain in inguinal hernia repair with mesh. But a larger prospective randomized study is still required to confirm the benefits of routine Ilioinguinal Neurectomy while doing open inguinal hernia repair with mesh.

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