



Surgery

ROLE OF ILIOINGUINAL NEURECTOMY IN ENTRAPMENT SYNDROME IN INGUINAL HERNIA REPAIR IN TERTIARY CARE HOSPITAL

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ABSTRACT

Background and Objectives: Chronic post herniorrhaphy groin pain is defined as pain lasting > 3 months after surgery, which is one of the most important complication occurring after inguinal hernia repair, occurs with greater frequency than previously thought.^{1,2} Chronic groin pain is one of the most significant complication following inguinal hernia repair, and majority of chronic pain has been attributed to ilio inguinal nerve entrapment. Routine excision of the ilio inguinal nerve is an attempt to decrease the incidence of chronic groin pain caused by nerve entrapment, inflammation, fibrotic reactions around the nerve.^{3,4} The purpose of the current study was to evaluate the effect of routine ilioinguinal nerve excision compared to nerve preservation on chronic groin pain and other sensory symptoms when performing lichtenstein's inguinal hernia repair.⁵

METHODS: A total of 100 patients admitted for inguinal hernia at Govt.sivagangai medical college hospital, sivgantai, who met with inclusion criteria who underwent open mesh repair of inguinal hernia over the study period from may 2014 to November 2016. The ilioinguinal nerve was identified and preserved in 50 patients (group A) and ilioinguinal neurectomy done in 50 patients (group-B) were evaluated for pain and other sensory symptoms at PoD-1, at one month, at second month, and at third months after surgery by using visual analogue scale.

RESULTS: 100 patients are included in the study and it was divided into two groups namely one group with the preservation of ilioinguinal nerve consisting of 50 patients named as group A and another group with ilioinguinal neurectomy done consisting of 50 patients named as group B. The results showed the incidence of postoperative chronic groin pain months after surgery are 72% vs 84% (p=0.384) at POD-1 ; 56% vs 14% (p<0.05) at 1 month ; 44% vs 12% (p<0.05) at 2 months ; and 28% vs 8% (p<0.05) at 3 months in group A and B respectively by using Chi square test. The results showed that the incidence of postoperative chronic groin pain decreases in neurectomy group compared to nerve preservation group. The results showed no significant differences in hypoesthesia in either group, it is found to be 12% vs 44% at post operative day-1, 10% vs 36% at 1st month, 8% vs 32% at 2nd month, 8% vs 20% at 3rd month. And the P values are 0.001, 0.004, 0.005, 0.096 at post operative day-1, 1st month, 2nd month and 3rd month respectively.

The incidence of post operative numbness was compared between Group A and Group B and the results of the follow up study are as follows : 36% vs 6% at day-1 (P=0.001), 32% vs 10% at 1st month (P=0.011), 20% vs 6% at 2nd month (P=0.001), 32% vs 10% at 1st month (P=0.011), 20% vs 6% at 2nd month (P=0.045), 24% vs 6% at 3rd month (P=0.016). The interpretation of the results are that there is statistical significant difference between Group A and Group B regarding the incidence of post operative numbness.

CONCLUSION: The ilioinguinal neurectomy during Lichtenstein mesh hernia repair decreases the incidence of chronic groin pain after surgery. Furthermore the procedure is not significantly associated with additional morbidities in terms of local cutaneous neurosensory disturbances. So when performing Lichtenstein inguinal hernia repair, routine ilioinguinal neurectomy is a reasonable option.

KEYWORDS : Inguinal hernia; Groin; Lichtenstein; Polypropylene mesh; Herniorrhaphy; Ilioinguinal; Neurectomy; Mesh repair.

INTRODUCTION

Though lichtenstein's hernia repair has reduced the incidence of recurrence of hernia to less than 2% inguinodynia is one of the significant post operative complications.

The incidence of inguinodynia is vastly underreported. The incidence of inguinodynia due to lichtenstein's repair and the laparoscopic hernia repair are reported less than 1% The patients with inguinodynia less than 1% are referred for further treatment. The life time risk of developing hernia in males is 15% and in females<5%.

Since the pain having the subjective component the true incidence of inguinodynia is difficult to be determined by the studies. Nerve entrapment is one of the common causes of inguinodynia. Ilioinguinal nerve is the commonest nerve to be entrapped in entrapment neuropathy causing inguinodynia.

Elective ilioinguinal neurectomy eliminates the risk of entrapment neuropathy commonly caused by sutures, staples, tacklers, direct nerve injury, mesh related fibrosis and scar reactions. Various studies have shown that elective ilioinguinal neurectomy does not causes neurosensory disturbances in the groin, groin numbness or quality of life as there is innervations form contra lateral side

In this study, we study the role of ilioinguinal nerve for entrapment syndrome in LICHTENSTEIN hernia repair considering high incidence of entrapment syndrome and its consequent morbidity and also considering regain of sensation after few months which is lost due to neurectomy and comparing with Ilioinguinal nerve preservation during hernia repair.

And to study the incidence, age groups, postoperative complications other than inguinodynia.

METHODOLOGY

SUBJECT SELECTION

The patients admitted with uncomplicated hernia at Govt.sivagangai medical college hospital, sivagantai, are considered eligible for study. 100 male patients diagnosed with uncomplicated inguinal hernia are randomly selected and divided into study group A with 50 male patients undergoing prophylactic ilioinguinal neurectomy and group B with 50 male patients undergoing preservation of ilioinguinal nerve.

All the patients selected undergo open mesh hernia repair by Lichtenstein hernia repair and are followed post operatively

INCLUSION CRITERIA

Uncomplicated inguinal hernia (direct & indirect) Age-18-80 yrs

EXCLUSION CRITERIA

- Patients below 18 years and above 80 years.
- Patients with diabetes mellitus.
- Patients with bilateral inguinal hernia
- Patients with recurrent hernias
- Large inguinoscrotal hernia
- Peripheral neuropathy
- Impaired cognitive function
- Previous surgery in the inguinal region
- Limited mobility
- Female gender

SCREENING PROCEDURES

Clinical history, Detailed Clinical Examination, Routine Laboratory investigations, USG abdomen in selected cases.

FOLLOW UP PROCEDURES / VISITS

Period of follow up being 3 months form the day of surgery.

- P.O.D 1,
- AT 1st Month
- AT 2nd Month
- At 3rd Month
- Post operative pain will be assessed using Visual analogue scale

STATISTICAL ANALYSIS

In this study the results of the two groups were compared and analyzed by using Chi square test.

RESULT AND OBSERVATIONS

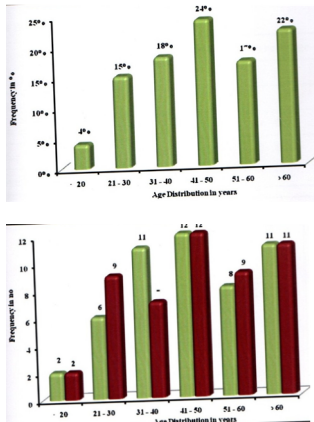
In this study title “role of ilioinguinal neurectomy in entrapment syndrome in inguinal hernia repair” conducted in Govt.sivangangi medical college hospital, sivganga from may 2014 to November 2016. A Total of 100 Patients of uncomplicated inguinal hernia who underwent Lichtenstein mesh Hernioplasty included for this Prospective comparative study, & 100 Patients completed the study protocol fully.

PATIENTS DEMOGRAPHY

Table -1 Age at Presentation

Age group (in years)	No of Patients	Percentage (%)	Group A	Group B
	4	4.0%	2	2
21 – 30	15	15.0%	6	9
31 – 40	18	18.0%	11	7
41 – 50	24	24.0%	12	12
51 – 60	17	17.0%	8	9
> 60	22	22.0%	11	11

Graph-1 Age at Presentation



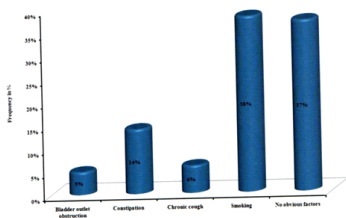
In this study the age of the patients ranged between 18 years to 80 years. The youngest patient included in this study series was 19 years, and eldest was 74 years old. Almost 24% of the patients were in 41-50 age group. This includes 12% in group A and 12% in group B.

PREDISPOSING FACTORS

Table-2: Predisposing Factors

Factors	No of patients	Percentage
Bladder outlet obstruction	5	5%
Constipation	14	14%
Chronic cough	6	6%
Smoking	38	38%
No obvious factors	37	37%

Graph -2: Predisposing Factors



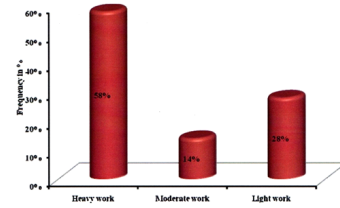
In this study 5% of the patients showed the features of bladder outlet obstruction, 14% had constipation, 6% had chronic cough, 24% of patients work was lifting heavy weight eg, farmers, and 38% were smokers.

RELATION WITH OCCUPATION

Table – 3: Relation with occupation

Factors	No of patients	Percentage
Heavy work	58	58%
Moderate work	14	14%
Light work	28	28%

Graph – 3: Relation with occupation



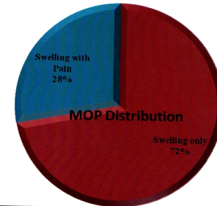
The present study shows that 58% patients were involved in heavy and strenuous work like Agricultural labour, Manual labour, and construction workers. 14% of patients were involved with moderate work like Cooks, Teachers and Drivers. And 28% of patients involved with light work.

MODE OF PRESENTATION

Table – 4: mode of presentation

MOP	No of patients	Percentage (%)	Group A	Group B
Swelling only	72	72.0%	35	37
Swelling with pain	28	28.0%	15	13

Graph – 4: mode of presentation



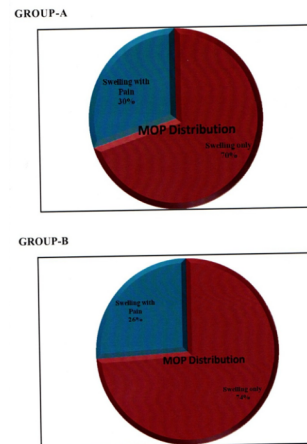
Without exception all the patients presented with swelling, Of these 72% of patients presented with swelling only, While 28% patients presented with both swelling and pain.

DURATION OF ILLNESS

Table-5 – Duration of illness Duration

Duration	No of patients	Percentage (%)	Group A	Group B
< 6 Months	5	5.0%	2	3
6-12 Months	41	41.0%	16	25
> 1 Year	54	54.0%	32	22

Graph-5 – Duration of illness Duration



Majority of the patients in this study ie, 46% of patients presented with in 1 year of the onset of hernia and were operated, and 54% presented later than a year for operation.

LOCATION OF THE HERNIA

Table- 6: Location of hernia

Side	No of patients	Percentage (%)	Group A	Group B
Right	36	36.0%	20	16
Left	64	64.0%	30	34

The Present study showed that hernia was more common on left side ie, 64% Right side hernia comprised about 36%

TYPE OF INGUINALHERENIA

Table- 7: Type of Hernia

Type	No of patients	Percentage (%)	Group A	Group B
Direct	41	41.0%	22	19
Indirect	59	59.0%	28	31

In this present study 59 cases were belongs to indirect hernia and 41 cases belongs to direct hernia contributing 59% Vs 41% respectively.

COMPARISON OF STUDY GROUPS

Table-8: Comparison of study groups

Comparison of	Ilio inguinal nerve preservation Group A	Ilio inguinal neurectomy Group B
1.DEMOGRAPHY		
Male	50	50
Mean Age	45.86 + 14.6	46.14 + 15.8
2.MODE OF PRESENTATION		
Swelling only	35	37
Swelling with Pain	15	13
3.SIDE		
Right	20	16
Left	30	34
4.TYPE		
Direct	22	19
Indirect	28	31

In the present study Preservation of ilioinguinal nerve (GROUP A) during Lichtenstein Inguinal hernia repair was performed in 50 patients mean age of 45.86 + 14.6 years.

Of the 50 patients, 35 patients presented with swelling in the groin only, where 15 patients presented with swelling associated with pain. Of the 50 male patients, 2(4%) showed features of bladder outlet obstruction, 8 (16%) had constipation, and 3(6%) had chronic cough. Regarding type, 20(40%) patients had right sided inguinal hernia and 30(60%) had left sided inguinal hernia.

Of the 50 patients, 22(44%) cases were direct inguinal hernia and 28(56%) cases were indirect hernia.

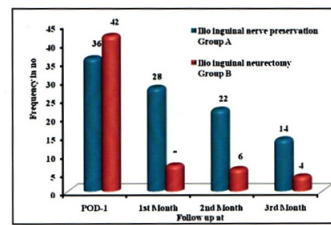
Routine excision of ilioinguinal nerve during Lichtenstein hernia (group B) repair was performed in 50 patients, all are male patients with mean age of 46.14 + 15.8 years.

Of the 50 patients, 37(74%) patients presented with swelling in the groin only, where as 13(26%) are presented with swelling associated with pain. 3(6%) patients showed features of bladder outlet obstruction, 6 (12%) had constipation, 3(6%) had chronic cough. Of the 50 patients, 16(34%) had right sided inguinal hernia, 34(68%) had left sided inguinal hernia, 19(38%) patients were direct inguinal hernia, and 31(62%) were indirect hernia.

Table-9: Incidence of post operative neuralgia

Follow-up at	Ilio inguinal nerve preservation Group A	Ilio inguinal nerve preservation Group B	P – Value
POD-1	36	42	0.384
1st Month	28	7	0.000
2nd Month	22	6	0.001
3rd Month	14	4	0.013

Graph -6: Incidence of post operative neuralgia



In the present study the incidence of post operative neuralgia in group A (ilioinguinal nerve preservation) was compared with group B (ilioinguinal nerve excised) during Lichtenstein hernioplasty.

The results of the follow up visits are 72% vs 84% (po.384) at POD-1 ; 56 % vs 14% (p<0.05) at 1 month; 44% 12% (p<0.05) at 2 months; and 28% vs 8% (p<0.05) at 3 months in group A and group B respectively.

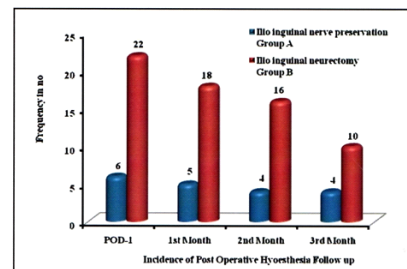
Table-9 (a) : Post operative pain severity score (VAS)

Follow up & Severity	Group A (N=50)				Group B (N=50)			
	0	1	2	3	0	1	2	3
POD-1	14	29	5	2	8	8	3	0
1st Month	22	20	4	4	43	43	1	0
2nd Month	28	16	3	3	44	44	1	0
3rd Month	36	8	3	3	46	46	0	0

Table-10: Incidence of post operative Hypoesthesia

Incidence of Post Operative Hypoesthesia Follow up at	Ilio inguinal nerve preservation Group A	Ilio inguinal nerve preservation Group B	P – Value
POD-1	6	22	0.001
1st Month	5	18	0.004
2nd Month	4	16	0.005
3rd Month	4	10	0.096

Graph-7: Incidence of post operative Hypoesthesia



In the present study the incidence of post operative groin hypoesthesia was compared between group A and group B. The results of the follow up visits are 12% vs 44% (p<0.05) at POD-1; 10%36% (p<0.05) at 1 month 8% vs 32% (p<0.05) at 2nd Months; and 8vs 20% (p<0.05) in group A and B respectively. Here the p value was found to be insignificant (p>0.05).

Table-11: Incidence of post operative Paresthesia

Incidence of Post Operative Hypoesthesia Follow up at	Ilio inguinal nerve preservation Group A	Ilio inguinal nerve preservation Group B	P – Value
POD-1	18	3	0.001
1st Month	16	5	0.011
2nd Month	10	3	0.045
3rd Month	12	3	0.016

In the present study the incidence of post operative numbness was compared between group A and B. The results of the follow up visits are 36% vs 6% (p<0.05) at POD-1 ; 32% vs 10% (p<0.05) at 1 month 20% 6% (p<0.05) at 2nd months ; and 24% 6% (p<0.05) at 3 months. The difference was significant (p-value <0.05).

Table-12: Comparison of incidence of hypoesthesia

Studies	Mui et al		FatemeH et al		Present study	
	NP n=50 (%)	NE n=50 (%)	NP n=50 (%)	NE n=50 (%)	NP n=50 (%)	NE n=50 (%)
Pod-1	-	-	45(90)	39(78)	6 (12)	22 (44)
1st Month	31 (66)	26 (55)	12 (24)	9 (18)	5 (10)	18 (36)
3rd Month	-	-	-	-	4 (8)	10 (20)

The above table shows the incidence of hypoesthesia in the present study compared with two other studies

In the present study the incidence of post operative hypoesthesia at groin between ilioinguinal nerve preservation and nerve excision during surgery, The results obtained are 10%vs36% at 1 month; are compared with studies conducted by FatemeH (FatemeH M.D et al, 2008). and Mui (Mui M.B et al, 2006).

Table-13: Comparison of incidence of numbness

Studies	Mui et al		FatemeH et al		Present study	
	NP n=50 (%)	NE n=50 (%)	NP n=50 (%)	NE n=50 (%)	NP n=50 (%)	NE n=50 (%)
Pod-1	-	-	-	-	18 (36)	3 (6)
1st Month	16 (34)	9 (19.1)	46 (12)	54 (14)	16 (32)	5 (10)
3rd Month	-	-	-	-	12 (24)	3 (6)

Graph-13: Comparison of incidence of numbness

In the present study the incidence of post operative numbness compared ilioinguinal nerve preservation versus nerve excision, results showing 32% vs 10% at 1 month, and are compared with results of studies conducted by Picchio (Picchio et al, 2004) and Mui (Mui M.B et al, 2006)

Table- 14: Comparison of incidence of groin pain with other studies

Studies	Dittrick M.D et al		Mui et al		FatemeH et al		Present study	
	NP n=50 (%)	NE n=50 (%)	NP n=50 (%)	NE n=50 (%)	NP n=50 (%)	NE n=50 (%)	NP n=50 (%)	NE n=50 (%)
Pod-1	-	-	-	-	-	-	36 (72)	42 (84)
1st Month	5 (21)	3 (5)	37 (78)	37 (78)	-	-	28 (56)	7 (14)
3rd Month	-	-	-	-	10 (21)	3 (6)	14 (28)	4 (8)

The above table shows the number of patients and percentage of incidence of post operative chronic groin pain in three previous studies and the present study. The incidence of post operative groin pain in the present study compared ilioinguinal nerve preservation versus routine excision of ilioinguinal nerve showing the results 28% VS 8% at 3 month comparable with study conducted by fatemeH et al.

(Mui M.B. et al, 2006) 69 and Dittrick (Dittrick M.D et al, 2004). Here the incidence of pain at POD-1 is not considered for post operative chronic groin pain.

DISCUSSION

Patients suffering from inguinodynia irrespective of the severity including the mild type affects the day to day activities of the Patients to a great extent.

Various recent studies though prove that the division of ilioinguinal nerve during the surgery decreases the risk of inguinodynia still there are controversies regarding the benefits of ilioinguinal nerve division during the surgery.^{6,7}

In the present study 100 patients were evaluated for pain, hypoesthesia, and numbness.

In the group of preservation of ilioinguinal nerve (Group A) the nerve is secured till the completion of surgery.

In group B the ilioinguinal neurectomy is done and the proximal end is buried inside the internal oblique muscle lateral to the deep ring.

The patients were followed up for assessment of pain, hypoesthesia, and numbness at POD-1, 1, 2 & 3 months after operation.

After the results of various studies showing the incidence of incidence of inguinodynia as high as 62.9%., surgeons started finding out the protocols to prevent injury to the sensory nerves in the inguinal canal rather than preventing it the commonest nerve involved in the injury due to entrapment is the ilioinguinal nerve & there are various studies supporting the evidence of ilioinguinal entrapment syndrome.^{8,9,10}

Since ilioinguinal nerve is the commonest nerve involved in inguinodynia ilioinguinal neurectomy significantly reduces the number of patients with inguinal hernia as supported by various studies.

Dittrick et al 2004

The result has showed that chronic groin pain in lesser in nerve division group compared with nerve preservation group (3% vs 26% P<0.001) and even at 1 year period the difference is significant (3% vs 25% p=0.003).^{11,12,13}

The incidence of parasthesia between nerve preservation and neurectomy group is statistically insignificant.

Mui M.D. et al 2006

This double blinded and randomized study consisting of 100 patients concluded that the incidence of chronic groin pain at 6 months was significantly lower in the group A (50 patients) than group B (50 patients). (8% vs 28.6%) p=0.008.^{14,15,16}

No significant inter group differences in the neurosensory disturbances were found as compensated by cross innervations from the collateral cutaneous nerves.

FatemeH malekpour et al 2008

Double blinded randomized controlled clinical trail was performed on 121 patients undergoing open anterior mesh repair of inguinal hernia.^{17,18,19,20}

Of the 121 patients, 61 were nerve excision group and 60 were nerve preserving group. The chronic post surgical inguinodynia was seen in 6% in nerve excision group and 21% in nerve preserved group (p=0.033). Results were concluded that the neurectomy decreases the post surgical pain after elective inguinal hernia repair.^{21,22,23,24}

In the present study – Results.

A prospective comparative study conducted at department of sugery at Govt.sivangangai medical college hospital, sivgangai with 50 patients in group A (ilioinguinal nerve preservation) and 50 patients in group B (ilioinguinal nerve divided). & all the 100 patients have completed the study.

The results showed the incidence of postoperative chronic groin pain months after surgery are 72% vs 84% (p0.384) at PDO-1 ; 56 % vs 14% (p<0.05) at 1 month ; 44% vs 12% (p<0.05) at 2 months ; and 28 % vs 8%) (p<0.05) at 3 months in group A and B respectively by using Chi square test

The incidence of hypoesthesia was 12% vs 44% (p<0.05) at PDO – 1 ; 10% vs 36%% (p<0.05) at 1 month 8% vs 32%% (p<0.05) at and months ; and 8 vs 20% (p<0.05) in group A & B respectively.

The results of the follow up visits are 36%vs6%(p<0.05)) ate POD -1, 32% vs 10% (p<0.05) at 1 month 20%6%% (p<0.05) at 2nd months ; and 24%6% (p<0.05) at 3 months. The difference was significant (p-value<0.05).

Thus showed the incidence of chronic groin pain is lower in ilioinguinal nerve excision (group B) compared to nerve preservation (group A) . & Statistically significant (p<0.05). No significant difference noted in hypoesthesia in either group. There is significant difference in parasthesia with lower incidence of parasthesia at the 3 months in neurectomy group compared with nerve preservation group. p<0.05.

SUMMARY

The Summary of the study namely “ROLE OF ILIOINGUINAL NEURECTOMY IN ENTRAPMENT SYNDROME IN INGUINAL

HERNIA REPAIR” conducted in the department of surgery at Govt.sivangangai medical college hospital, sivgangai from may 2014 to November 2016 are as follows;

Datas are collected in the prescribed proforma, analysed and evaluated for the incidence of post operative neuralgia, hypoesthesia and paresthesia at post operative day – 1, 1st month, 2nd month, 3rd month.

100 patients are included in the study and it was divided into two groups namely one group with the preservation of ilioinguinal nerve consisting of 50 patients named as group A and another group with ilioinguinal neurectomy done consisting of 50 patients named as group B.

The mean age of the patients in the group A is 45.86±14.6
The mean age of the patient in the group B is 46.14±15.8

In group A, 35 patients presented with the swelling only and 15 patients with swelling and the pain.

In group B, 37 patients presented with swelling only and 13 patients with the swelling and the pain.

In this study, 5 patients had bladder outlet obstruction, 14 patients had constipation, 6 patients has chronic cough and 38 patients are smokers.

58 patients doing heavy work, 14 patients doing moderate work and 28 patients doing light work are included in the study.

In group A, 20 patients had right sided inguinal hernia and 30 patients had left sided inguinal heria. more over in this group 22 patients had direct inguinal hernia and 28 patients had indirect inguinal hernia.

In group B, 16 patients had right sided inguinal hernia and 34 patients had left sided inguinal hernia.in the same group 19 patients had direct inguinal hernia and 31 patients had indirect inguinal hernia.

In comparing the incidence of post operative neuralgia between group A and the group B it is found to be 72% Vs 84% at POD – 1, 56% VS 14% at 1 month, 44% VS 12% at 2nd month and 28% vs 8% at 3rd month respectively and the P valued are 0.384,0.0,0.001, and 0.13 at POD-1,1 months, 2nd month and 3rd month respectively

The interpretation of the study regarding the aspect of post operative neuralgia is that the patients belonging to the ilioinguinal neurectomy has decreased incidence of postoperative neuralgia compared to the nerve preservation group.

In comparing the incidence of post operative hypoesthesia between Group A and Group B it is found to be 12% vs 44% at post operative day-1, 10% vs 36% at 1st month, 8% vs 32% at 2nd month 8% vs 20% at 3rd month. And the P values are 0.001, 0.004, 0.005, 0.096 at post operative day -1, 1st month, 2nd month and 3rd month respectively.

The inference is that though the patients who had undergone ilioinguinal neurectomy at the time of surgery for inguinal hernia repair initially had hypoesthesia, the sensory impairment is gradually regained within few months and there is no statistical significance regarding the incidence of hypoesthesia within Group A and Group B at the 3rd month of follow up.

In the present study the incidence of post operative numbness was compared between Group A and Group B and the results of the follow up study are as follows: 36% vs 6% at day-1 (P=0.001), 32% vs 10% at 1st month (P=0.011), 20% vs 6% at 2nd month (P=0.045), 24% vs 6% at 3rd month (P=0.016). The interpretaion of the results are that there is statistical significant difference between Group A and Group B regarding the incidence of post operative numbness and patients with ilioinguinal nerve preservation (Group A) has more incidence of post operative paresthesia.

CONCLUSION

Prophylactic Ilioinguinal neurectomy significantly reduces the incidence of post operative neuralgia i.e; inguinodynia considering the ilioinguinal nerve entrapment syndrome as the predoinant cause of inguinodynia in inguinal hernia repair (Lichenstein's tension free hernia repair).

The hypoesthesia after ilioinguinal neurectomy in Lichenstein's hernia

repair is regained within few months due to overlapping of adjoining dermatomes of the nerves or due to contralateral innervation of the nerve.

The incidence of paresthesia is more in the patients with ilioinguinal nerve preservation compared to ilioinguinal neurectomy in inguinal hernia repair.

So to conclude, the prophylactic ilioinguinal neurectomy is a reasonable option in inguinal hernia repair to decrease the incidence of inguinodynia.

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