

**“COMPARATIVE STUDY BETWEEN TACKER MESH FIXATION AND  
SUTURE MESH FIXATION IN LAPAROSCOPIC HERNIA REPAIR“**

DISSERTATION SUBMITTED TO

**THE TAMIL NADU DR.MGR MEDICAL UNIVERSITY, TAMILNADU**

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF

**MASTER OF SURGERY**

**IN**

**GENERAL SURGERY BRANCH - I**



**DEPARTMENT OF GENERAL SURGERY**

**GOVERNMENT MOHAN KUMARAMANGALAM MEDICAL COLLEGE**

**HOSPITAL, SALEM**

**Year : 2018-2021**

**GOVERNMENT MOHAN KUMARAMANGALAM  
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**DECLARATION BY THE CANDIDATE**

I solemnly declare that this dissertation “**COMPARATIVE STUDY BETWEEN TACKER MESH FIXATION AND SUTURE MESH FIXATION IN LAPAROSCOPIC HERNIA REPAIR**“

was prepared by me at Government Mohan Kumaramangalam Medical College and Hospital , Salem-636030 under the guidance and supervision of **Prof.Dr.G.RAJ ASHOK, M.S.**, Professor of General Surgery. Government Mohan Kumaramangalam Medical College and Hospital, Salem. This dissertation is submitted to the Tamilnadu Dr.M.G.R Medical University, Chennai-32 in fulfilment of the University regulations for the award of the degree of M.S. General Surgery ( Branch I ).

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**DR.S.ARULMOZHIVARMAN**



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Protocol title	"COMPARATIVE STUDY BETWEEN TACLER MESH FIXATION AND SUTURE MESH FIXATION IN LAPAROSCOPIC HERNIA REPAIR"
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## **Abstract**

### **Background**

Randomised trials show that laparoscopic repairs are more efficacious than open surgeries. A number of issues related to laparoscopic surgery have been resolved like access to abdominal cavity, size of mesh, extent of overlap, etc. However, the prosthetic material and the technique of fixation are yet to be studied in details.

### **Aim and Objective**

The study aims to compare the cost effectiveness, duration of surgery, duration of hospital stay and post-operative complications in patients undergoing laparoscopic hernia repair by using tacker and suture fixation of mesh.

### **Material and Methods**

From November 2018 to October 2020, a comparative study was done among 50 patients presenting with reducible inguinal hernia and planned for laparoscopic hernia repair.

Data was collected with regards to age, sex, demographic characteristics, socio economic status, detailed history and duration of complaints. A detailed general examination was done. Data was extracted from the patient's history,

clinical examination and follow up. Data was then analysed using IBM SPSS v25. Statistical comparison was done using parametric tests

## **Results**

The mean age of all cases is 43.4 years with a standard deviation of 11.5 years. Comparison of age between the two groups showed that they do not differ significantly in the age distribution and the two groups are comparable. All the 50 participants of the study are males. The mean duration of surgery in the suture fixation group is 73.6 minutes while in the tacker fixation group, the mean duration is 51.4 minutes. The two groups differ significantly ( $p < 0.05$ ). Hence, the duration of surgery differs between suture fixation and tacker fixation group.

The mean duration of hospital stay in the suture fixation group is 2.3 days while in the tacker fixation group, the mean duration is 2.2 days. There was no difference in the post-operative pain and discomfort in the two groups. Only one case had seroma ( $n=1$ , 2%). One case in suture fixation had Seroma. None of the cases in tacker fixation had Seroma. Out of 50 cases, 46 cases came for regular follow-up and none of them had recurrence as well as intestinal obstruction.

## **Conclusions**

Both the surgical techniques are equally effective. But suture fixation is cost-effective than tacker fixation whereas the duration of surgery is less in tacker mesh fixation.



# **INTRODUCTION**

## **Introduction**

Laparoscopic hernia repair is being used since the last few decades<sup>1</sup>. There are a number of benefits of laparoscopic repair;

- a) The recurrence rate is low<sup>2</sup>
- b) Hospital stay is of shorter duration<sup>3</sup>
- c) Wound-related complications are less prevalent<sup>4</sup>

Randomised trials show that laparoscopic repairs are more efficacious than open surgeries<sup>5-8</sup>. A number of issues related to laparoscopic surgery have been resolved like access to abdominal cavity, size of mesh, extent of overlap, etc. However, the prosthetic material and the technique of fixation are yet to be studied in details.

Literature shows that mesh has been fixed with

- a) Single tacks<sup>9</sup>
- b) Double layer of tacks<sup>10</sup>
- c) Transfascial tacks and sutures<sup>11</sup>

When mesh fixation is done using tacks, it is time saving and convenient<sup>12</sup>. But the tensile strength of suture fixed mesh is around 2.5 times greater than tacker fixation<sup>13</sup>.

All the layers of the abdominal wall is penetrated in the transfascial sutures which enables the mesh fixation to the fascial-muscular layer of the abdominal wall. Still certain issues are not resolved like the number of sutures, placement of the sutures, materials used (absorbable or nonabsorbable). Few experimental studies have compared this<sup>14-17</sup>.

The study aims to compare the cost effectiveness, duration of surgery, duration of hospital stay and post-operative complications in patients undergoing laparoscopic hernia repair by using tacker and suture fixation of mesh.

# **AIM OF THE STUDY**

## **Aim of the Study**

To study the cost effectiveness, duration of surgery, duration of hospital stay and post-operative complications in patients undergoing laparoscopic hernia repair by using tacker and suture fixation of mesh

# **OBJECTIVES OF THE STUDY**

## **Objectives of the study**

- To do a comparative study on the cost effectiveness, duration of surgery, duration of hospital stay in patients undergoing laparoscopic hernia repair by using tacker and suture fixation of mesh
- To study the post-operative complications in patients undergoing laparoscopic hernia repair by using tacker and suture fixation of mesh
- To study the clinical profile of patients undergoing laparoscopic hernia repair by using tacker and suture fixation of mesh

# **REVIEW OF LITERATURE**



## **Review of literature**

### **Inguinal Hernia**

Inguinal hernia is a common surgical problem with an increasing prevalence with age. The overall age prevalence is 1.7% while the prevalence for persons aged >45 years is 4%. It constitutes 75% of the incidence of all abdominal hernias. The lifetime risk is higher in males (27%) than females (3%)<sup>18</sup>. Thus, inguinal hernia repair is the most commonly done surgical repair.<sup>19</sup> Older males are more affected<sup>20</sup>.

### ***Anatomy of the inguinal canal***

Inguinal canal is a short passage in the inferior part of the abdominal wall. It runs inferiorly and medially. It lies parallel and superior to the inguinal ligament. This is the pathway through which the contents pass from the abdomen into external genitalia.

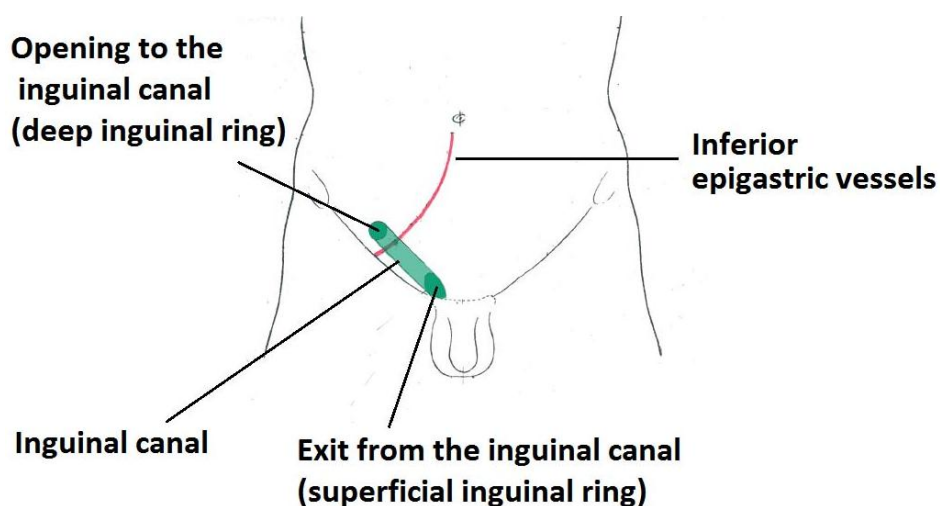


Image 1: Location of the inguinal canal

## Boundaries of the inguinal canal

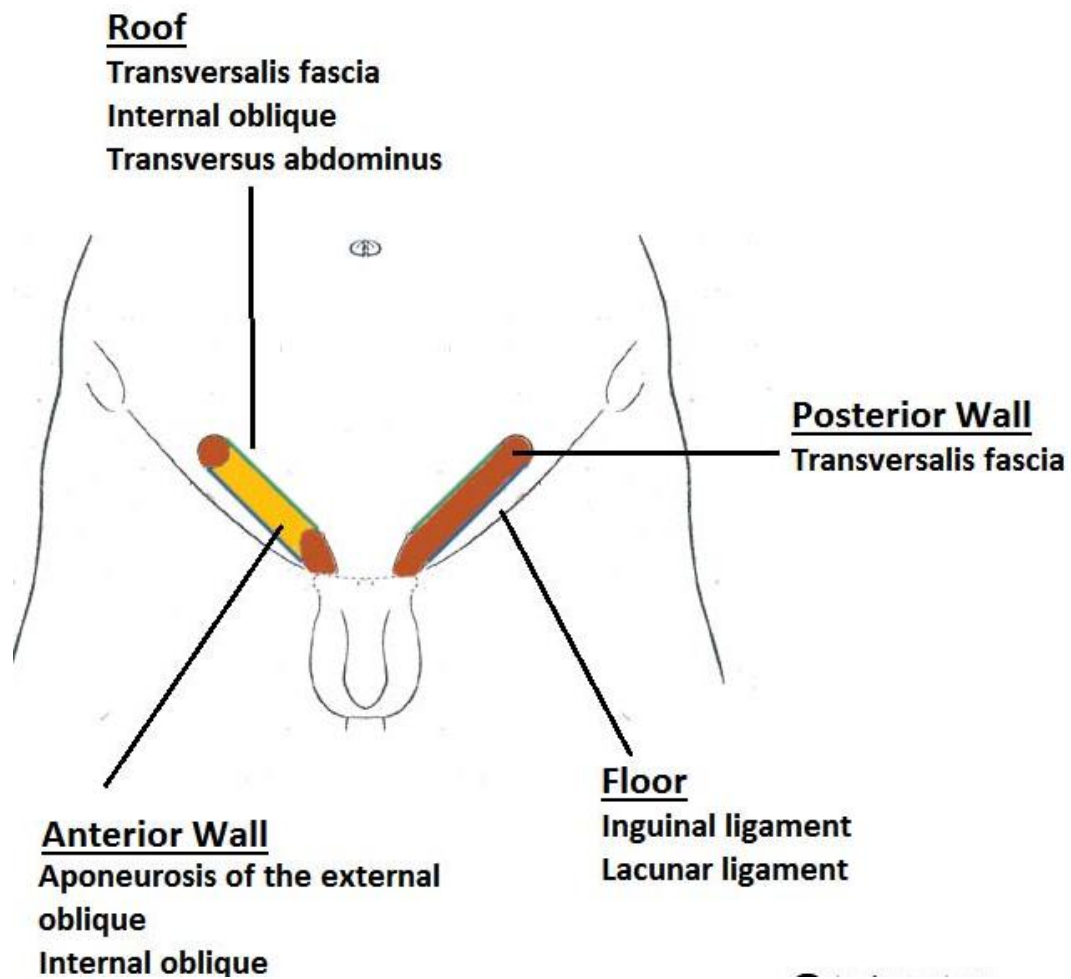


Image 2: Boundaries of the inguinal canal

It has four walls;

- a) Anterior wall
- b) Posterior wall
- c) Roof
- d) Floor

It is bounded by two rings;

- a) Superficial inguinal ring
- b) Deep inguinal ring

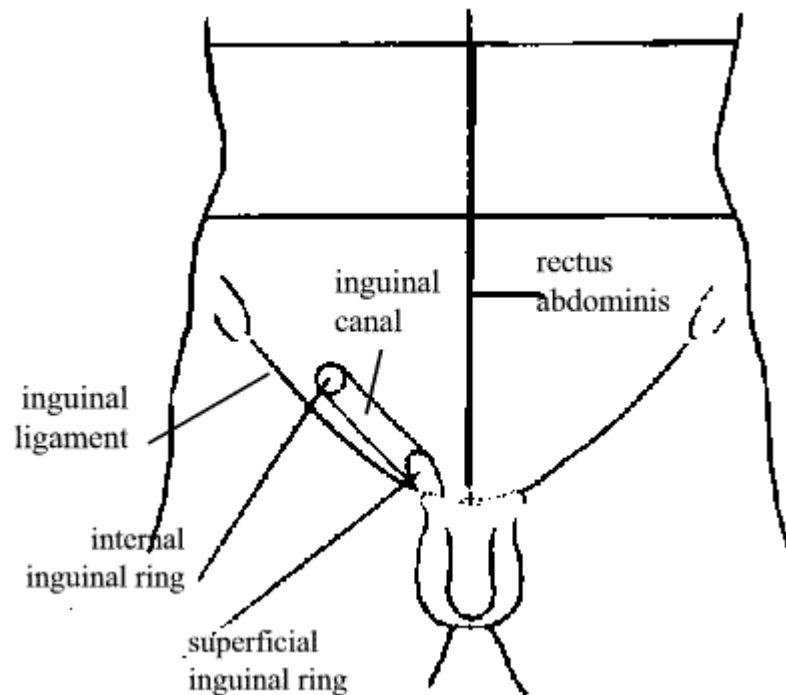


Image 3: Superficial and Deep Inguinal Rings

### ***Contents of the inguinal canal***

The contents slightly differ between males and females.

- a) Spermatic cord in males
- b) Round ligament in females
- c) Ilioinguinal nerve
- d) Genital branch of genitofemoral nerve

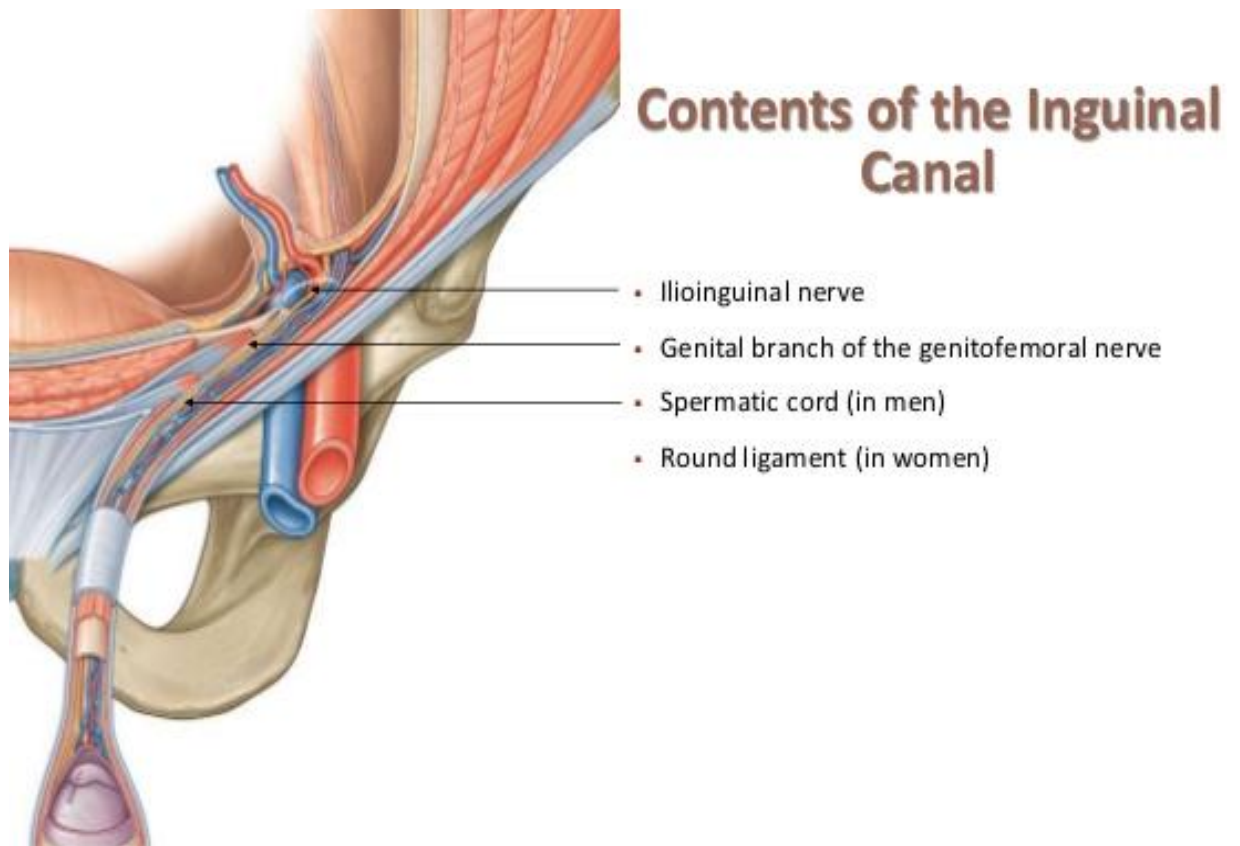


Image 4: Contents of the inguinal canal

### **Types of inguinal hernia**

Clinically inguinal hernia is classified into direct and indirect inguinal hernias.

#### *Indirect inguinal hernia*

In this, the peritoneal sac finds its way into the inguinal canal via the deep inguinal ring

#### *Direct inguinal hernia*

In this, the peritoneal sac finds its way into the inguinal canal via the posterior wall of the inguinal canal.

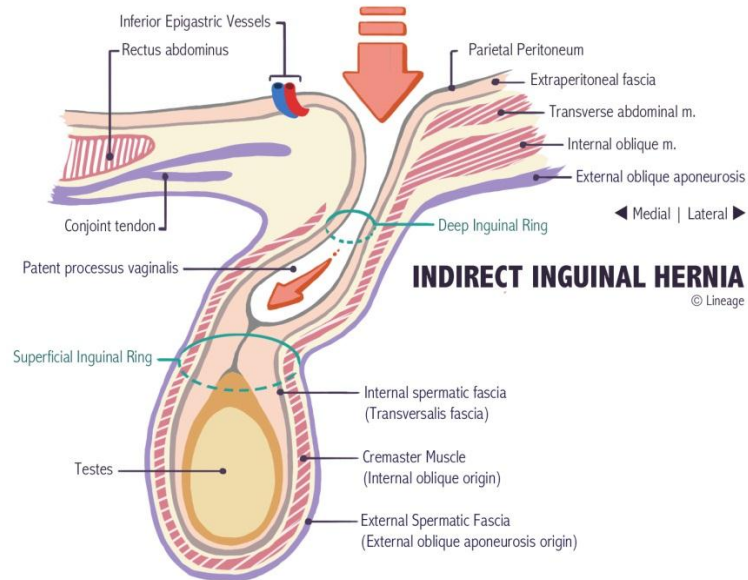


Image 5: Indirect inguinal hernia

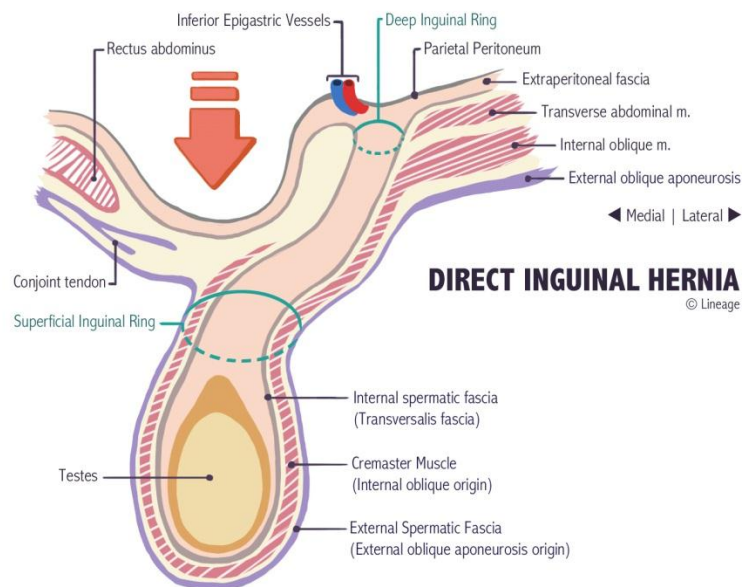


Image 6: Direct inguinal hernia

Surgical methods include;

- a) Tension free prosthetic repairs
- b) Tissue suture repairs

- A. Tension-free prosthetic repairs
    - 1. Anterior repairs
      - a. Lichtenstein repair and its modifications
      - b. Plug repairs
      - c. Patch and plug repairs
      - d. Double-layer devices
    - 2. Posterior (preperitoneal) repairs
      - a. Open techniques via inguinal incision
      - b. Stoppa repair
      - c. Laparoscopic/endoscopic repairs
        - i. Transabdominal preperitoneal
        - ii. Total extraperitoneal
  - B. Tissue-Suture repairs
    - 1. Bassini-Shouldice technique and its modifications
    - 2. Marcy repair

Image 7: Surgical methods for inguinal hernia repair

## **Laparoscopic Hernia Repair**

Laparoscopic hernia repair is being used since the last few decades. There are a number of advantages of laparoscopic repair. Randomised trials show that laparoscopic repairs are more efficacious than open surgeries. A number of issues related to laparoscopic surgery have been resolved like access to abdominal cavity, size of mesh, extent of overlap, etc. However, the prosthetic material and the technique of fixation are yet to be studied in details.

Literature shows that mesh has been fixed with

- a) Single tacks
- b) Double layer of tacks
- c) Transfascial tacks and sutures

When mesh fixation is done using tacks, it is time saving and convenient. But the tensile strength of suture fixed mesh is around 2.5 times greater than tacker fixation.

All the layers of the abdominal wall is penetrated in the transfascial sutures which enables the mesh fixation to the fascial-muscular layer of the abdominal wall. Still certain issues are not resolved like the number of sutures, placement of the sutures, materials used (absorbable or nonabsorbable). Few experimental studies have compared this.

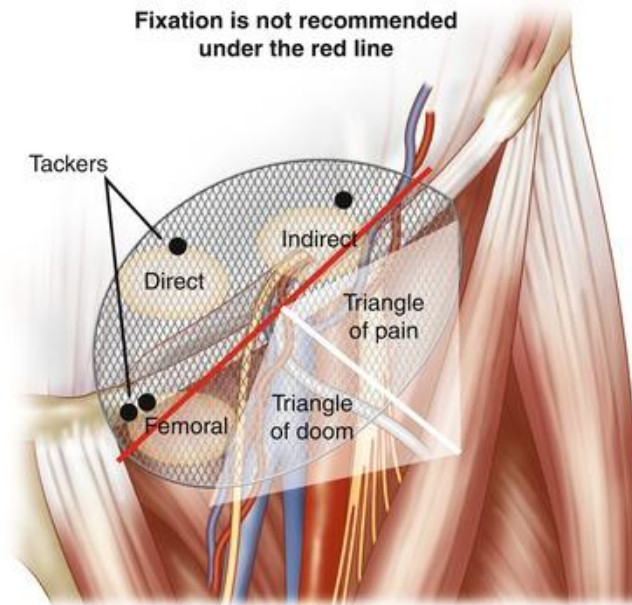


Image 8: Mesh fixation areas

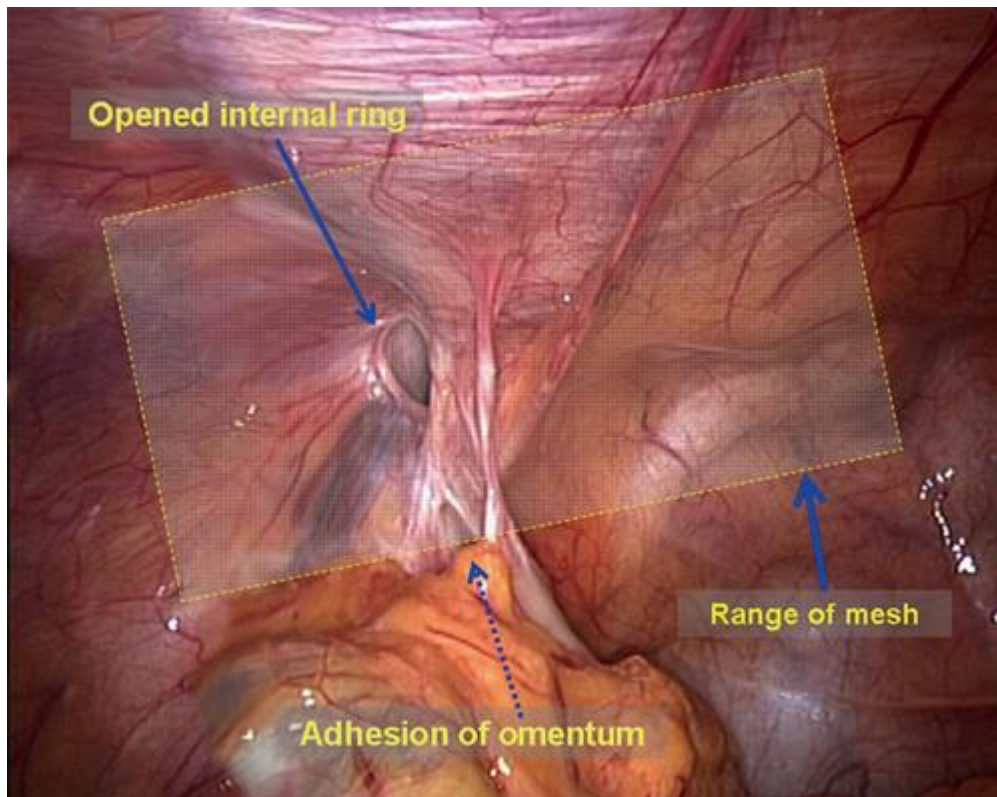


Image 9: Internal view of laparoscopic repair



The study aims to compare the cost effectiveness, duration of surgery, duration of hospital stay and post-operative complications in patients undergoing laparoscopic hernia repair by using tacker and suture fixation of mesh.

# **MATERIALS AND METHODS**

## **MATERIALS AND METHODS**

### ***STUDY DESIGN***

A Comparative study

### ***STUDY POPULATION***

The patients for the study are recruited from the cases admitted in the surgical ward of the Department of General surgery, at Government Mohan Kumaramangalam Medical College Hospital who were diagnosed to have inguinal hernia and planned for laparoscopic hernia repair.

### ***STUDY PERIOD***

Between November 2018 and October 2020

### ***SAMPLE SIZE***

This study is done among 50 patients presenting with reducible inguinal hernia

### ***INCLUSION CRITERIA***

1. Between age group of 20 to 60 years
2. No previous abdominal surgeries
3. Reducible hernia

## ***EXCLUSION CRITERIA***

1. Age < 20 and > 60 years
2. Recurrent hernia
3. Large irreducible hernia
4. Cardiac patients
5. BPH patients
6. Respiratory tract infections

## ***METHODOLOGY***

The patients for the study are recruited from the cases admitted in the surgical ward of the Department of General surgery at Government Mohan Kumaramangalam Medical College Hospital who were diagnosed to have hernia and planned for laparoscopic hernia repair.

They were classified into two groups;

Group A: Suture Fixation

Group B: Tacker Fixation

Data was collected with regards to age, sex, demographic characteristics, socio economic status, detailed history and duration of complaints. A detailed general examination was done.

The following data was extracted from the patient's history, clinical examination and follow up.

1. Patient selection
2. Clinical findings
3. Laboratory investigations
4. Diagnostic tests
5. Complications during hospital stay and on subsequent follow up

***PRIVACY/CONFIDENTIALITY OF STUDY SUBJECTS:***

All ethical procedures were duly followed to ensure that the privacy and confidentiality of the study subjects is not violated.

***STATISTICAL ANALYSIS***

The data was collected using structured questionnaires

The data was entered in Microsoft excel

Data was cleaned using R-studio software

Missing values were imputed using the median technique

Inconsistencies were corrected

Data was then analysed using IBM SPSS v25

Frequencies and percentages were used

Statistical comparison was done using parametric tests

Visualisation was done in Tableau software

# RESULTS

## **Results**

The mean age of all cases is 43.4 years with a standard deviation of 11.5 years. The median age is 46 years and ranges between 21 and 58 years. The mean age of cases in the suture fixation group is 46.9 years with a standard deviation of 10.2 years. The median age is 52 years and ranges between 24 and 58 years.

The mean age of cases in the tacker fixation group is 39.9 years with a standard deviation of 11.9 years. The median age is 45 years and ranges between 21 and 58 years. Comparison of age between the two groups showed that they do not differ significantly in the age distribution and the two groups are comparable. Student t-test shows that the difference is not statistically significant; hence the two groups are comparable.

All the 50 participants of the study are males. Hence, there is no difference between the comparability of the two groups.

All the cases were reducible inguinal hernia. Thus, the two groups are comparable. Out of 50 cases, majority of them (n=30, 60%) had right sided hernia while 40% (n=20) had left sided hernia. In the suture fixation group, out of 25 cases, majority of them (n=14, 56%) had right sided hernia while 44% (n=11) had left sided hernia. In the tacker fixation group, out of 25 cases, majority of them (n=16, 64%) had right sided hernia while 36% (n=9)

had left sided hernia. Chi-square analysis showed that the two groups do not differ significantly in the side of hernia diagnosed.

Out of 50 cases, majority of the cases were indirect hernias (n=43, 86%) while the rest were direct hernias (n=7, 14%). In the suture fixation group, out of 25 cases, majority of them (n=21, 84%) had indirect hernia while 16% (n=4) had direct hernia. In the tacker fixation group, out of 25 cases, majority of them (n=22, 88%) had indirect hernia while 12% (n=3) had direct hernia.

Chi-square analysis showed that the two groups do not differ significantly in the side of hernia diagnosed.

In all cases, majority of them did not have any comorbidities (n=34, 68%). Around 16% (n=8) had type-II diabetes mellitus. Around 10% (n=5) had hypertension. Around 6% (n=3) had both diabetes and hypertension. In suture fixation cases, majority of them did not have any comorbidities (n=17, 68%).

Comparison of comorbidities between the two groups showed that they do not differ significantly.

All the cases were reducible inguinal hernia and were treated using laparoscopic hernioplasty. Thus, the two groups are comparable.

The mean duration of surgery in all cases is 62.5 minutes with a standard deviation of 13.06 minutes. The minimum time required is 45 minutes and



the maximum time required is 90 minutes. The median duration is 60 minutes.

The mean duration of surgery in the suture fixation group is 73.6 minutes while in the tacker fixation group, the mean duration is 51.4 minutes. The two groups differ significantly ( $p < 0.05$ ). Hence, the duration of surgery differs between suture fixation and tacker fixation group.

The mean duration of hospital stay in all cases is 2.3 days with a standard deviation of 0.65 days. The minimum time is 2 days and the maximum time is 4 days. The median duration is 2 days.

The mean duration of hospital stay in the suture fixation group is 2.3 days while in the tacker fixation group, the mean duration is 2.2 days. The two groups do not differ statistically. Hence, the duration of hospital stay is the same between suture fixation and tacker fixation group.

In all the cases there were no wound infections.

Post-operative pain and discomfort was present in 24% ( $n=12$ ) of the cases. There was no difference in the post-operative pain and discomfort in the two groups. Only one case had seroma ( $n=1$ , 2%).

One case in suture fixation had Seroma. None of the cases in tacker fixation had Seroma. . Out of 50 cases, 46 cases came for regular follow-up and none of them had recurrence as well as intestinal obstruction.

## Findings

### Age Distribution

The mean age of all cases is 43.4 years with a standard deviation of 11.5 years. The median age is 46 years and ranges between 21 and 58 years.

S.No	All Cases (N=50)	Age (in years)
1	Mean	43.440
2	Median	46.000
3	Mode	55.0
4	Std. Deviation	11.5567
5	Minimum	21.0
6	Maximum	58.0

Table 1: Age Distribution of all the Participants

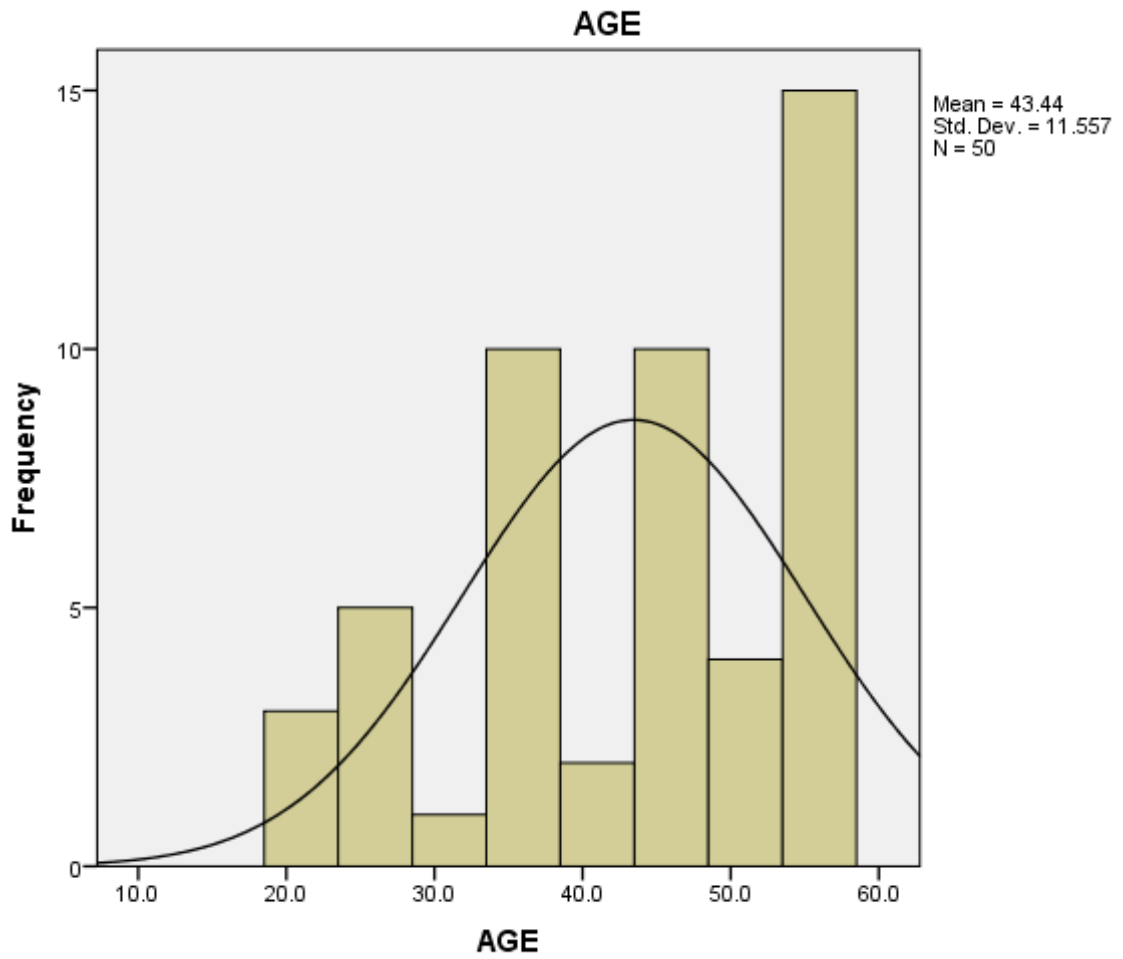


Figure 1: Age Distribution of all the Participants

The mean age of cases in the suture fixation group is 46.9 years with a standard deviation of 10.2 years. The median age is 52 years and ranges between 24 and 58 years.

S.No	Suture Fixation (n=25)	Age (in years)
1	Mean	46.960
2	Median	52.000
3	Mode	35.0 <sup>a</sup>
4	Std. Deviation	10.2489
5	Minimum	24.0
6	Maximum	58.0

**Table 2: Age Distribution of the Participants in Suture Fixation Group**

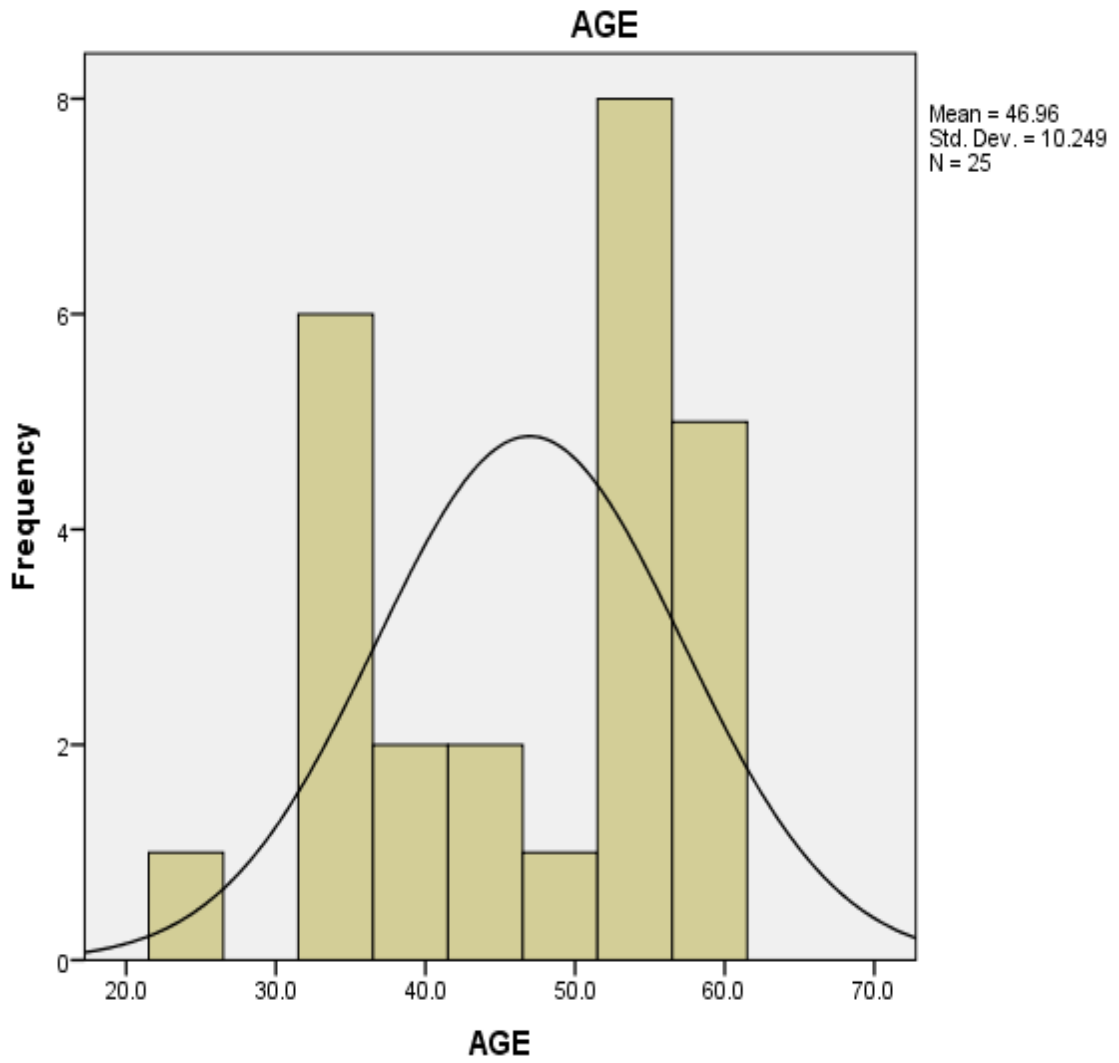


Figure 2: Age Distribution of the Participants in Suture Fixation Group

The mean age of cases in the tacker fixation group is 39.9 years with a standard deviation of 11.9 years. The median age is 45 years and ranges between 21 and 58 years.

S.No	Tacker Fixation (n=25)	Age (in years)
1	Mean	39.920
2	Median	45.000
3	Mode	46.0
4	Std. Deviation	11.9091
5	Minimum	21.0
6	Maximum	58.0

Table 3: Age Distribution of the Participants in Tacker Fixation Group

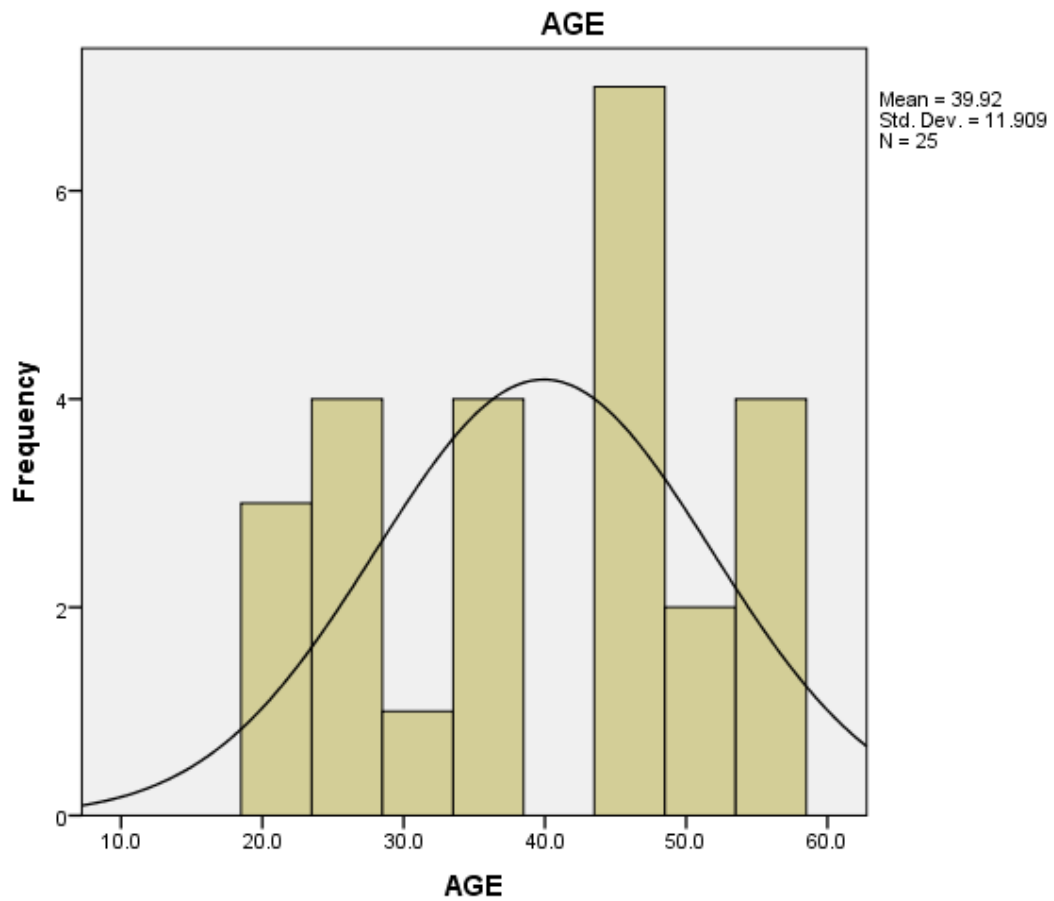


Figure 3: Age Distribution of the Participants in Tacker Fixation Group

### Comparison of age

Comparison of age between the two groups showed that they do not differ significantly in the age distribution and the two groups are comparable.

Student t-test shows that the difference is not statistically significant; hence the two groups are comparable.

S.No	Group	Mean Age (in years)	Median Age (in years)	T-test analysis
1	Suture Fixation	46.960	52.000	P > 0.05
2	Tacker Fixation	39.920	45.000	Statistically not significant

Table 4: Comparison of Age Distribution between the two groups



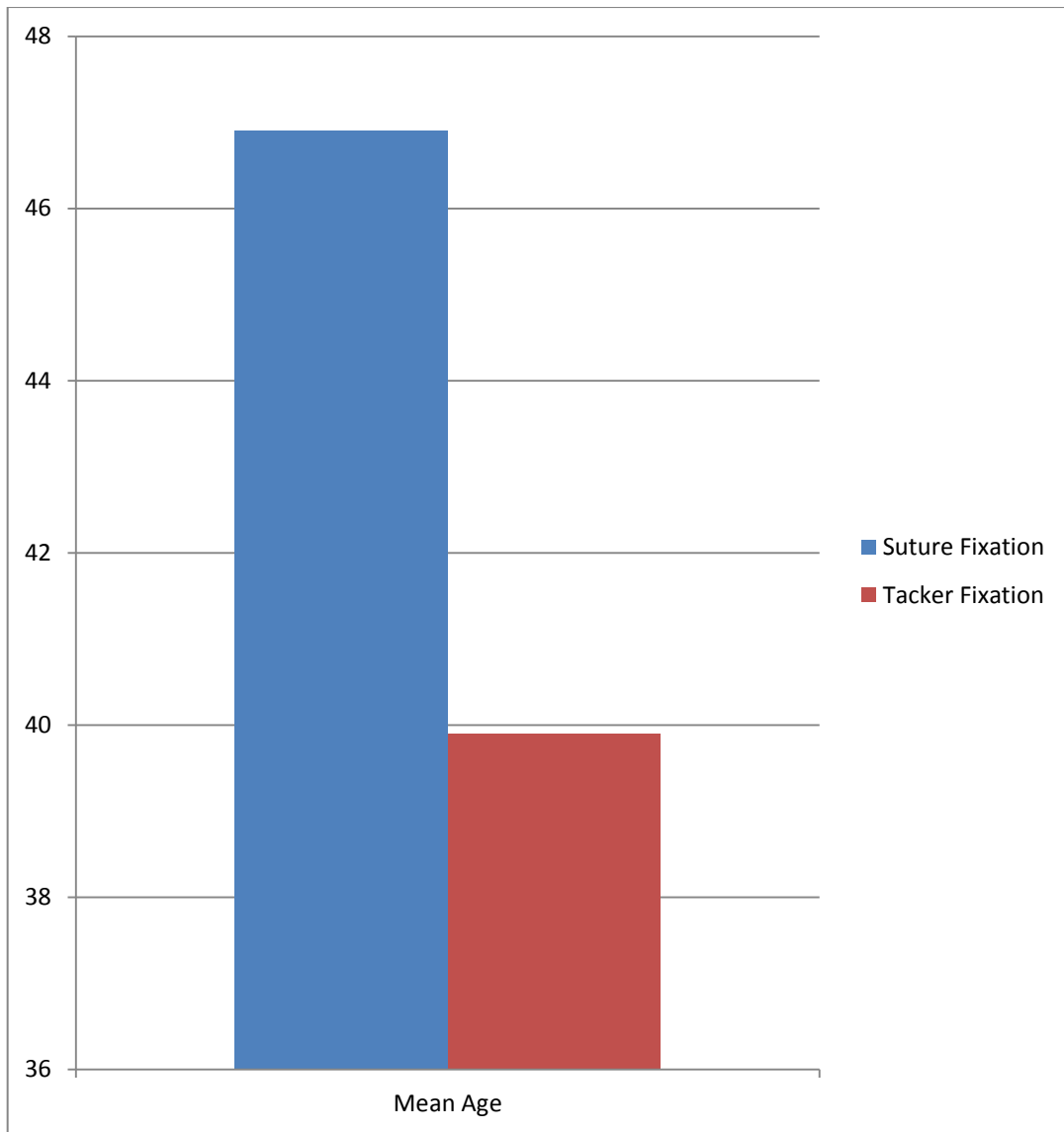


Figure 4: Comparison of Age Distribution between the two groups

## Gender Distribution

All the 50 participants of the study are males. Hence, there is no difference between the comparability of the two groups.

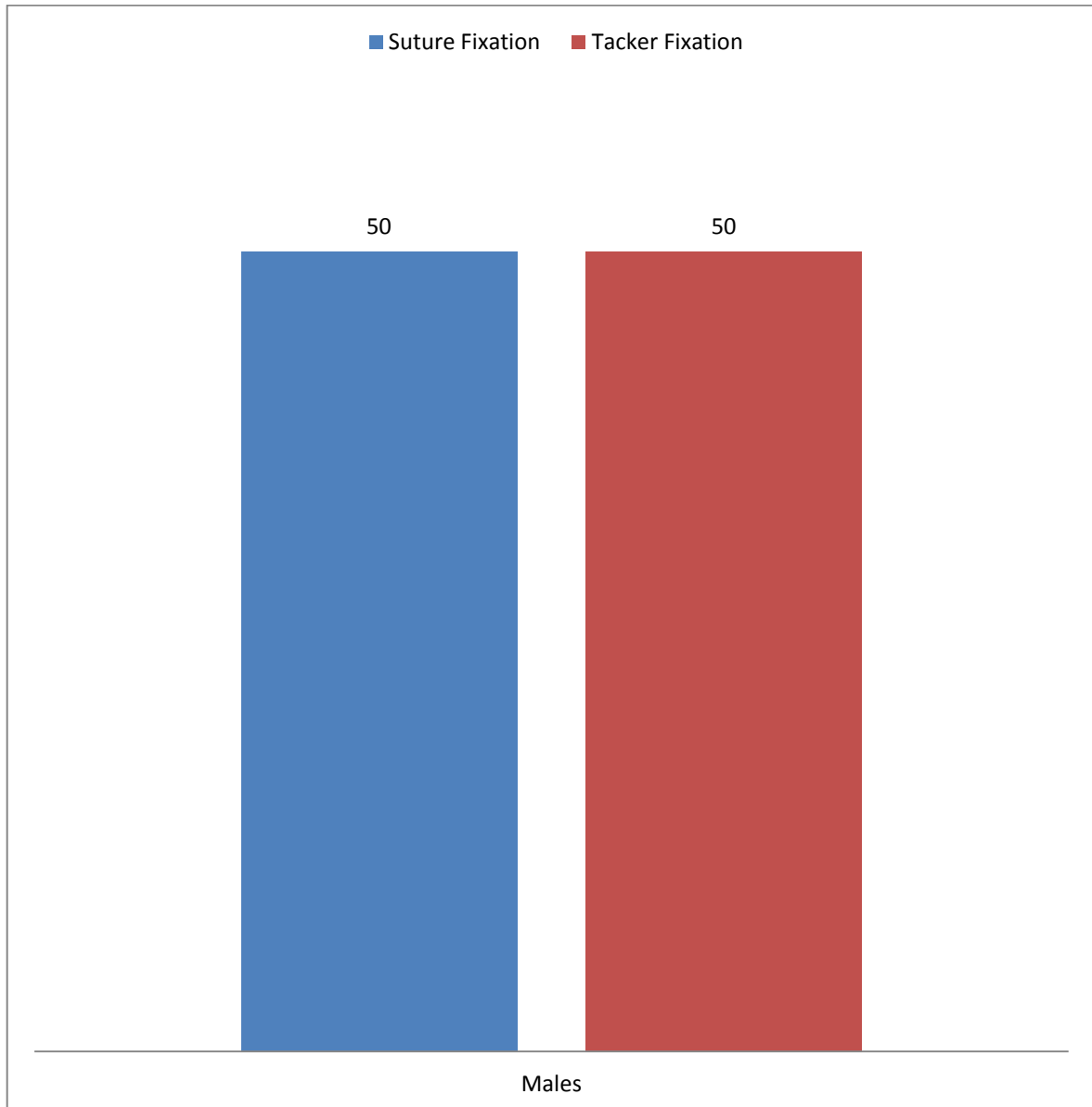


Figure 5: Gender Distribution of the participants

## Diagnosis

All the cases were reducible inguinal hernia. Thus, the two groups are comparable.

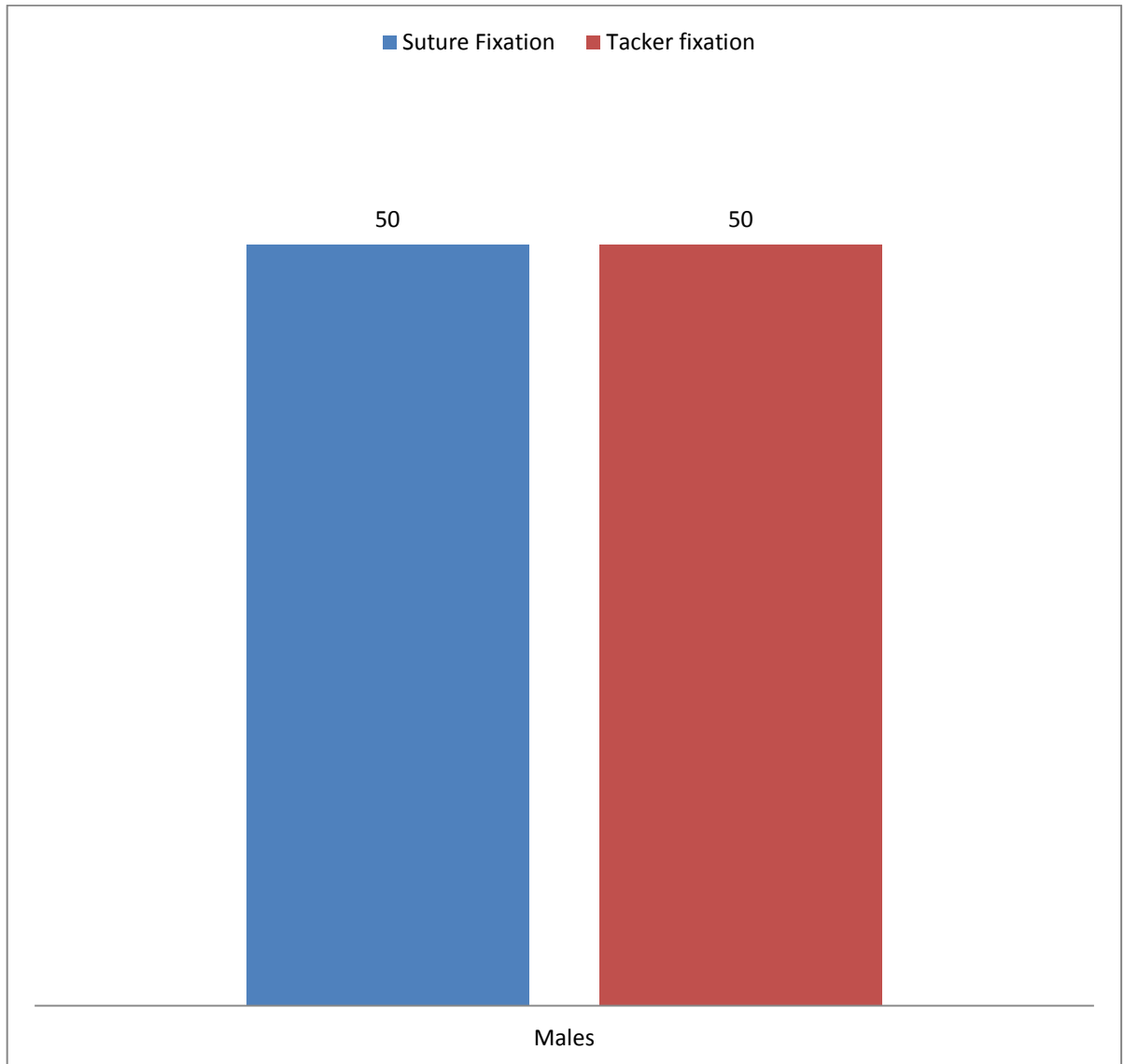


Figure 6: Diagnosis of the participants

### Side of hernia

Out of 50 cases, majority of them (n=30, 60%) had right sided hernia while 40% (n=20) had left sided hernia.

S.No	Side of hernia	Frequency	Percent
1	Left	20	40.0
2	Right	30	60.0
	Total	50	100

Table 5: Side of Hernia

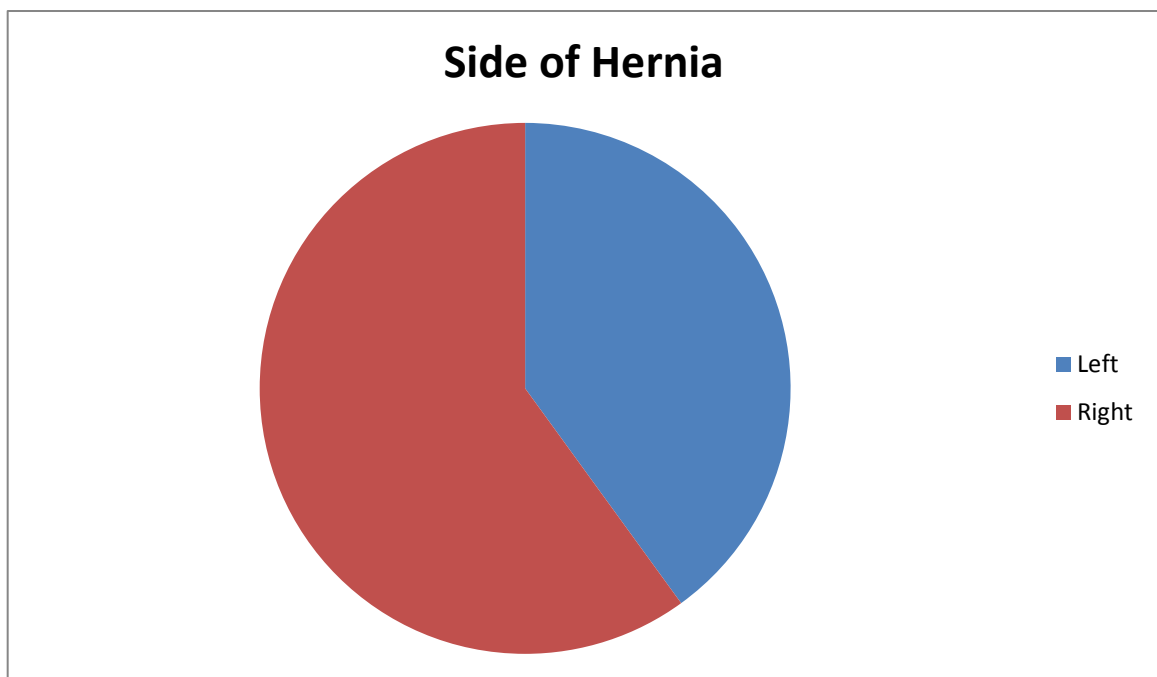


Figure 7: Side of Hernia

In the suture fixation group, out of 25 cases, majority of them (n=14, 56%) had right sided hernia while 44% (n=11) had left sided hernia.

In the tacker fixation group, out of 25 cases, majority of them (n=16, 64%) had right sided hernia while 36% (n=9) had left sided hernia.

Chi-square analysis showed that the two groups do not differ significantly in the side of hernia diagnosed.

S.No	Side of hernia	Suture Fixation (n/%)	Tacker Fixation (n/%)	Chi-Square analysis
1	Left	11 (44%)	9 (36%)	P > 0.05  Statistically not significant
2	Right	14 (56%)	16 (64%)	
	Total	25	25	

Table 6: Comparison of side of hernia between the two groups

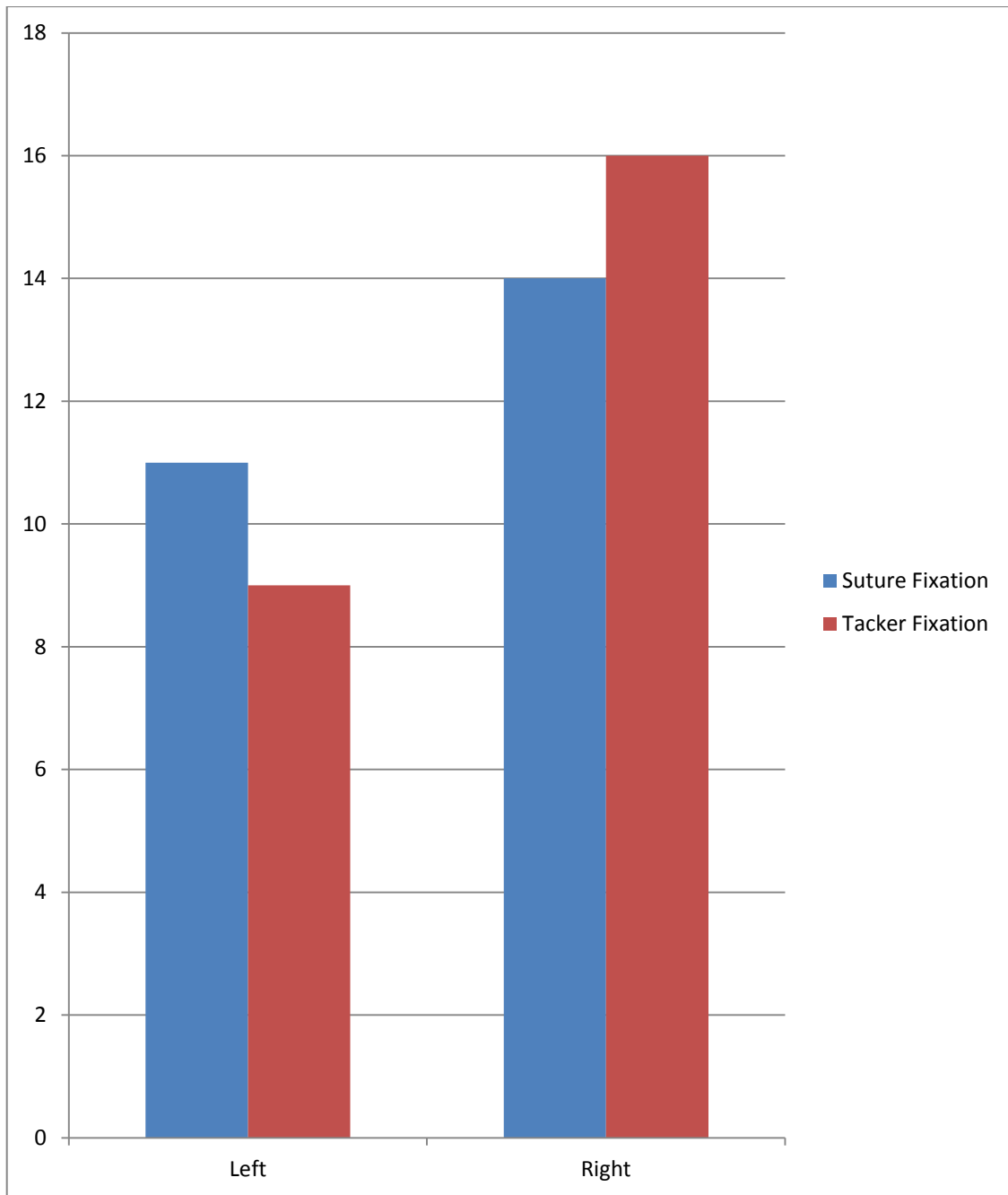


Figure 8: Comparison of side of hernia between the two groups

## Type of hernia

Out of 50 cases, majority of the cases were indirect hernias (n=43, 86%) while the rest were direct hernias (n=7, 14%).

S.No	Type of hernia	Frequency	Percent
1	Direct	7	14
2	Indirect	43	86
	Total	50	100

Table 7: Type of Hernia

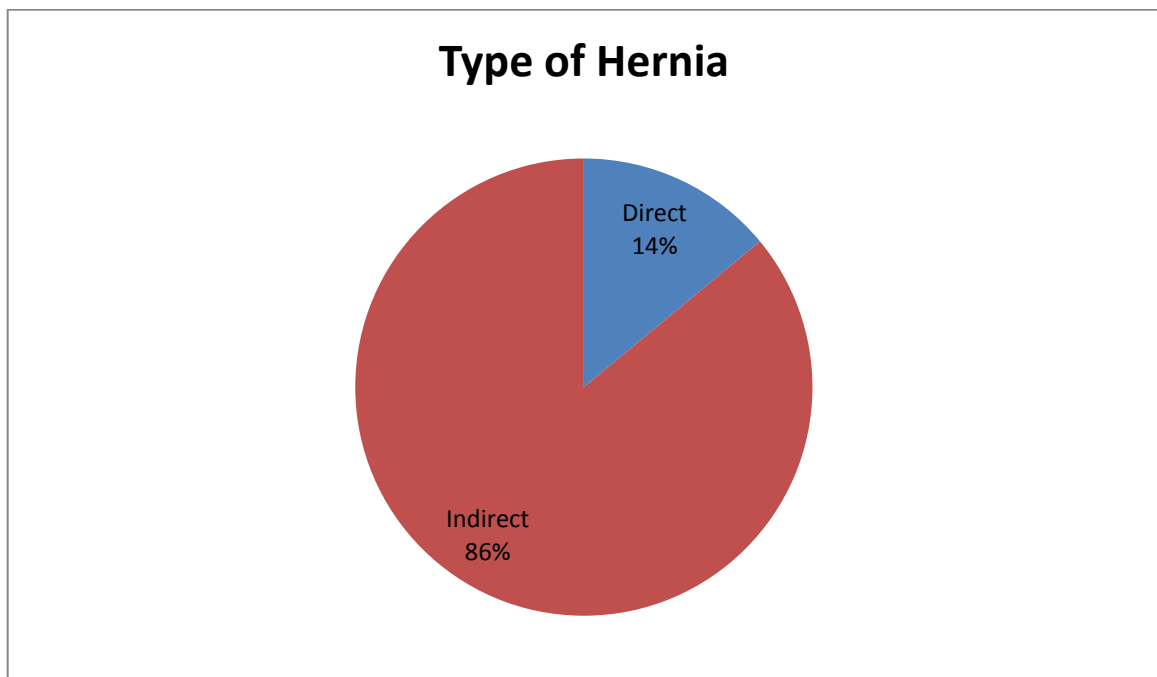


Figure 9: Type of Hernia

In the suture fixation group, out of 25 cases, majority of them (n=21, 84%) had indirect hernia while 16% (n=4) had direct hernia.

In the tacker fixation group, out of 25 cases, majority of them (n=22, 88%) had indirect hernia while 12% (n=3) had direct hernia.

Chi-square analysis showed that the two groups do not differ significantly in the side of hernia diagnosed.

S.No	Type of hernia	Suture Fixation (n/%)	Tacker Fixation (n/%)	Chi-Square analysis
1	Direct	4 (16%)	3 (12%)	P > 0.05  Statistically not significant
2	Indirect	21 (84%)	22 (88%)	
	Total	25	25	

Table 8: Comparison of type of hernia between the two groups



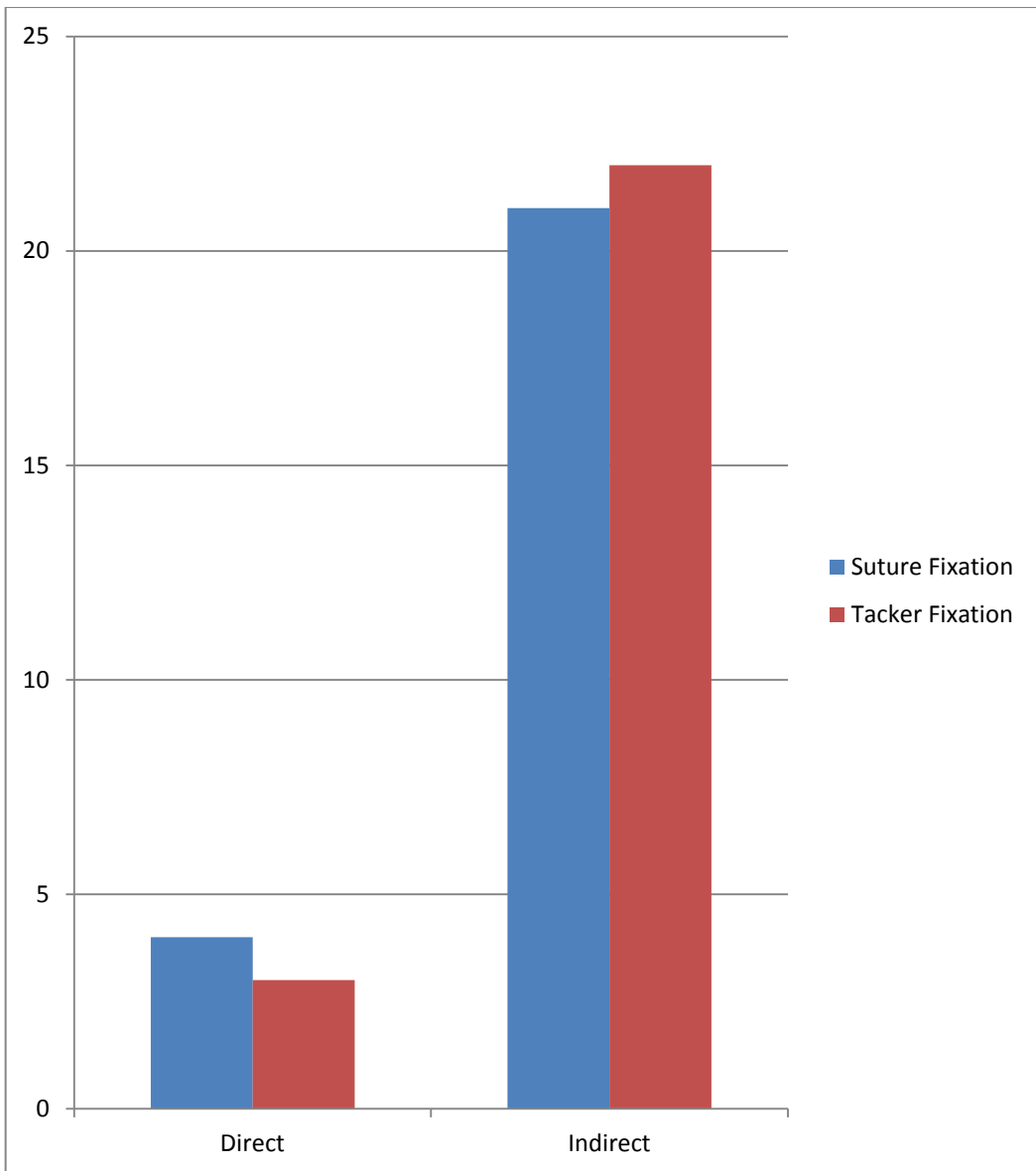


Figure 10: Comparison of type of hernia between the two groups

## Comorbidities

In all cases, majority of them did not have any comorbidities (n=34, 68%).

Around 16% (n=8) had type-II diabetes mellitus.

Around 10% (n=5) had hypertension

Around 6% (n=3) had both diabetes and hypertension

<b>Comorbidities in all cases</b>	<b>Frequency</b>	<b>Percentage</b>
Hypertension	5	10
Type2 DM	8	16
Hypertension/Type 2 DM	3	6
Nil	34	68
Total	50	100

Table 9: Comorbidities in all cases

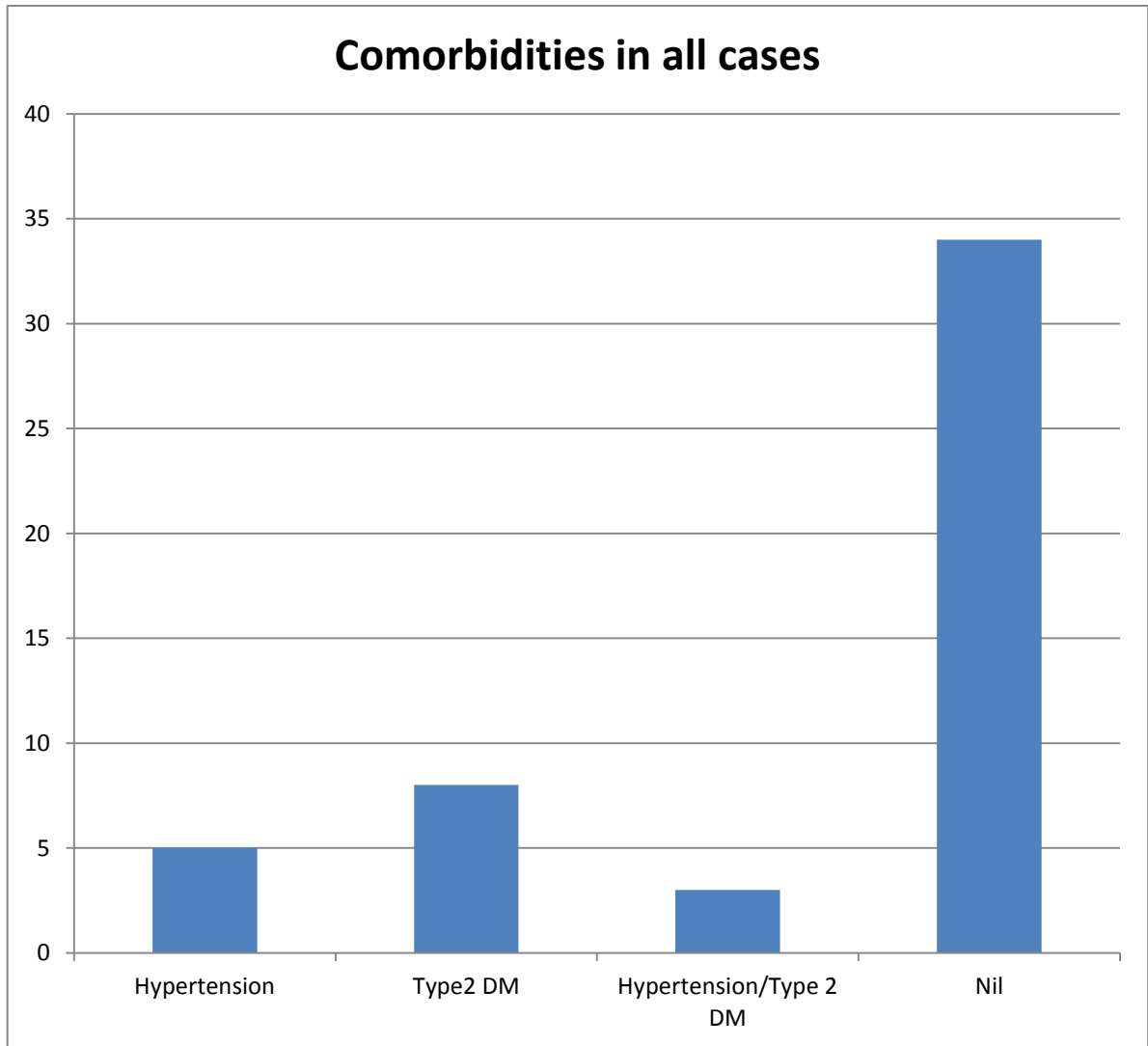


Figure 11: Comorbidities in all cases

In suture fixation cases, majority of them did not have any comorbidities (n=17, 68%).

Around 16% (n=4) had type-II diabetes mellitus.

Around 8% (n=4) had hypertension

Around 8% (n=2) had both diabetes and hypertension

<b>Comorbidities in Suture</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Fixation (n=25)</b>		
Hypertension	2	8
Type2 DM	4	16
Hypertension/Type 2 DM	2	8
Nil	17	68

Table 10: Comorbidities in suture fixation cases

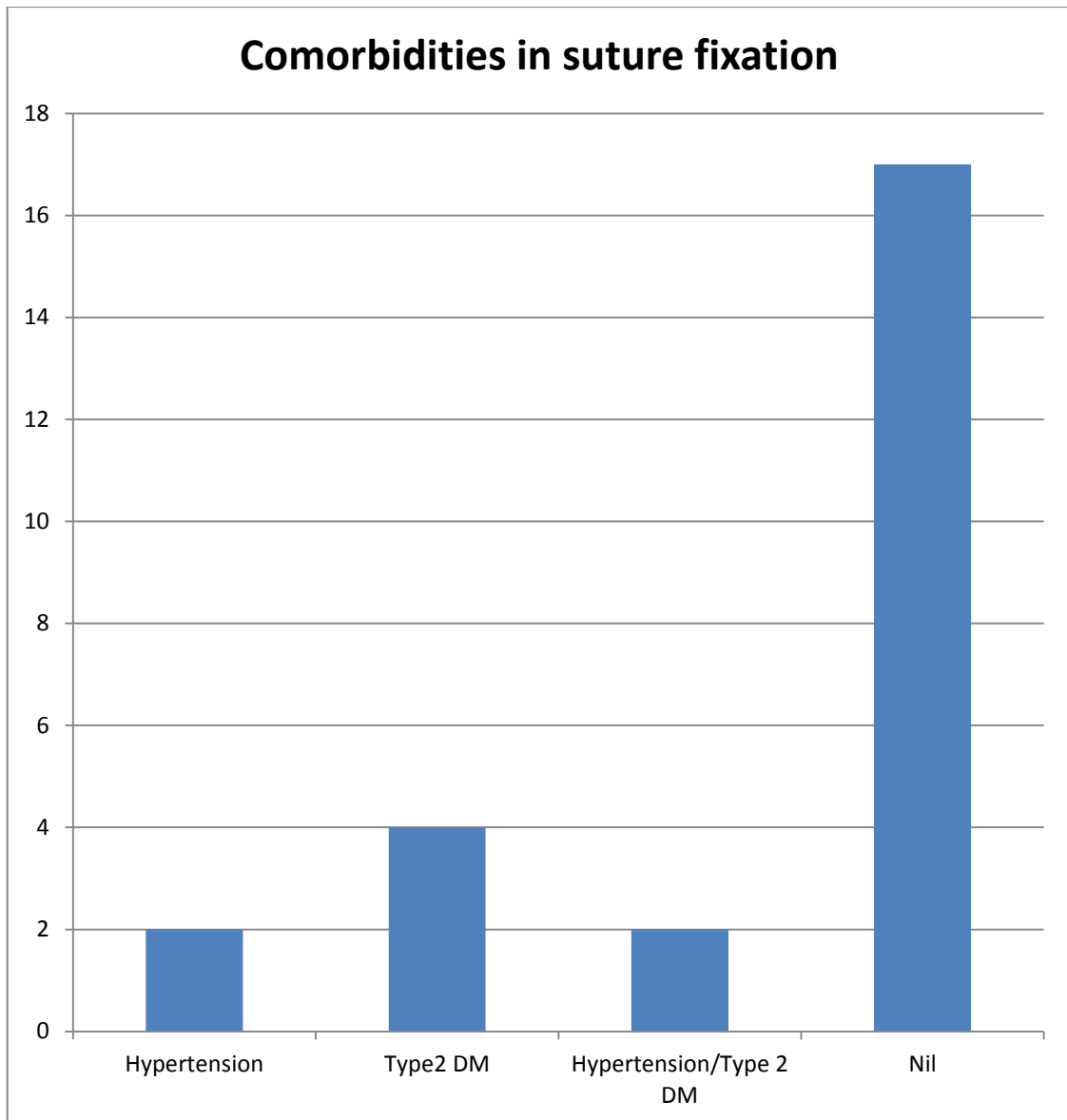


Figure 12: Comorbidities in suture fixation cases

In tacker fixation cases, majority of them did not have any comorbidities (n=17, 68%).

Around 16% (n=4) had type-II diabetes mellitus.

Around 12% (n=3) had hypertension

Around 4% (n=1) had both diabetes and hypertension

<b>Comorbidities in Tacker Fixation (n=25)</b>	<b>Frequency</b>	<b>Percentage</b>
Hypertension	3	12
Type2 DM	4	16
Hypertension/Type 2 DM	1	4
Nil	17	68

Table 11: Comorbidities in Tacker fixation cases

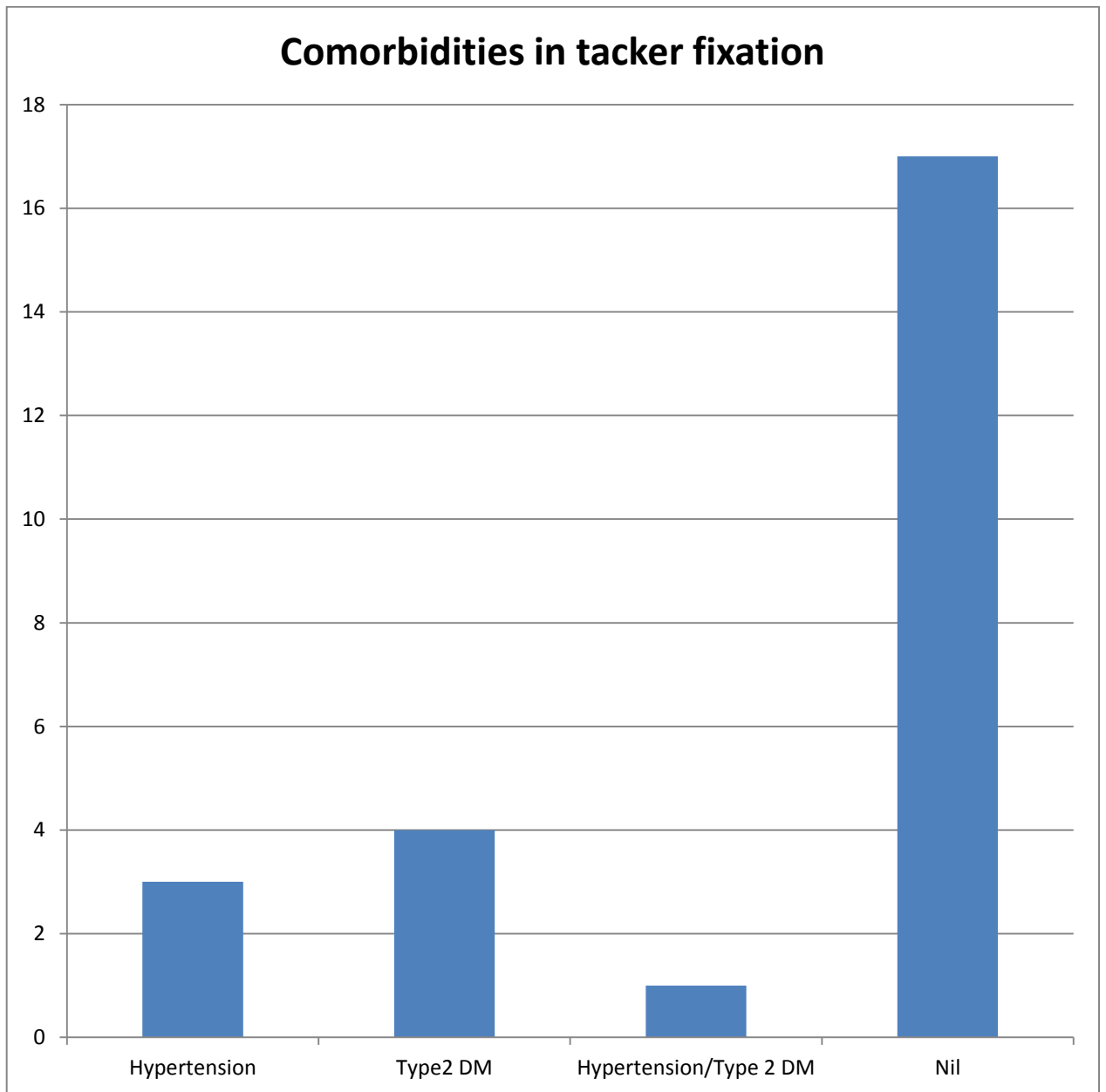


Figure 13: Comorbidities in Tacker fixation cases

### Comparison of comorbidities

Comparison of comorbidities between the two groups showed that they do not differ significantly.

<b>Comorbidities in all cases</b>	<b>Comorbidities in Suture Fixation (n=25)</b>	<b>Comorbidities in Tacker Fixation (n=25)</b>	<b>Chi-Square analysis</b>
Hypertension	2	3	P > 0.05  Statistically not significant
Type2 DM	4	4	
Hypertension/Type 2 DM	2	1	
Nil	17	17	

Table 12: Comparison of comorbidities between the two groups



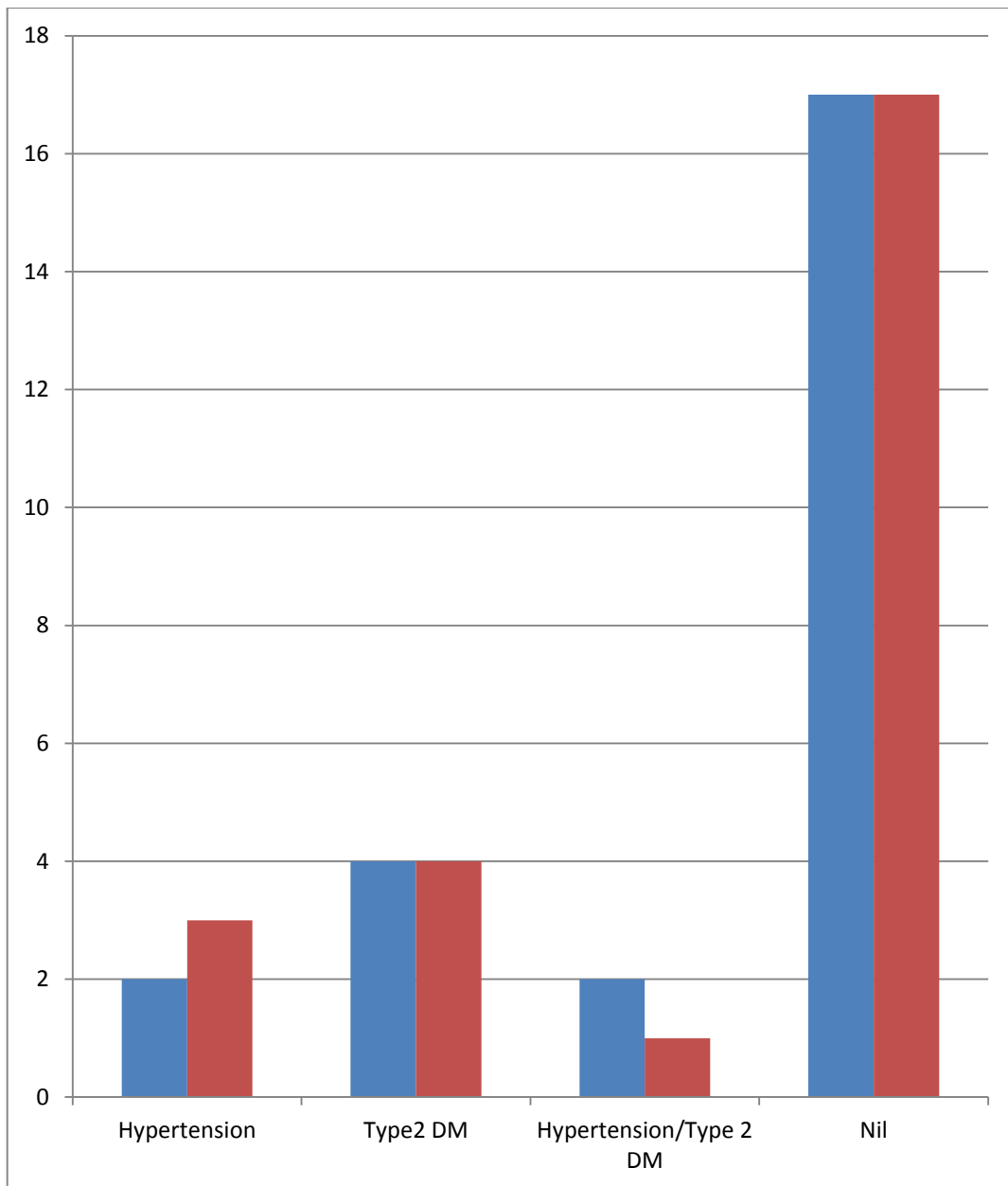


Figure 14: Comparison of comorbidities between the two groups

## Surgery done

All the cases were reducible inguinal hernia and were treated using laparoscopic hernioplasty. Thus, the two groups are comparable.

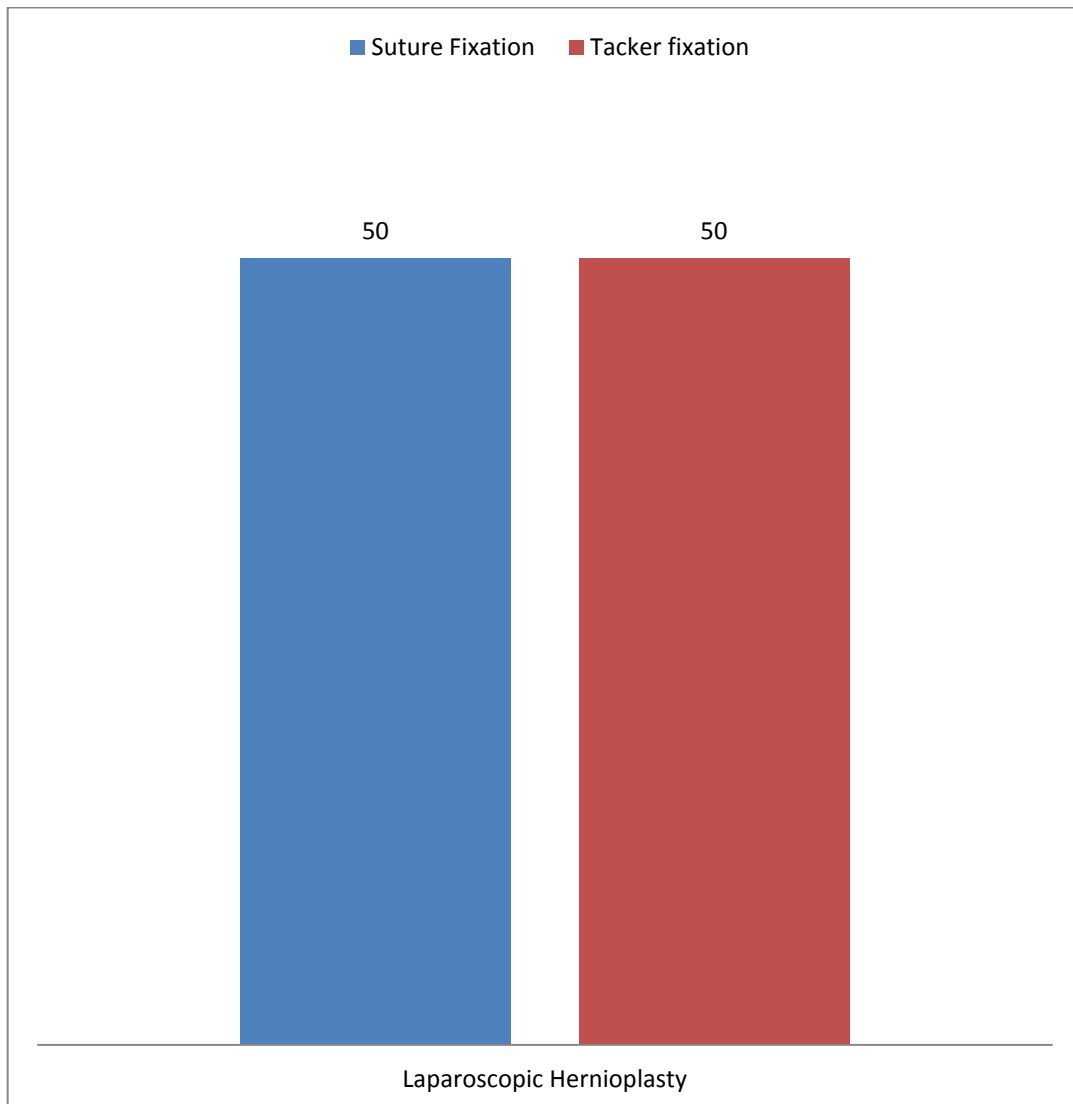


Figure 15: Surgery done

### **Duration of surgery**

The mean duration of surgery in all cases is 62.5 minutes with a standard deviation of 13.06 minutes. The minimum time required is 45 minutes and the maximum time required is 90 minutes. The median duration is 60 minutes.

S.No	All Cases (N=50)	Duration of surgery (in minutes)
1	Mean	62.5
2	Median	60
3	Mode	45
4	Standard Deviation	13.06
5	Minimum	45
6	Maximum	90

Table 14: Duration of surgery

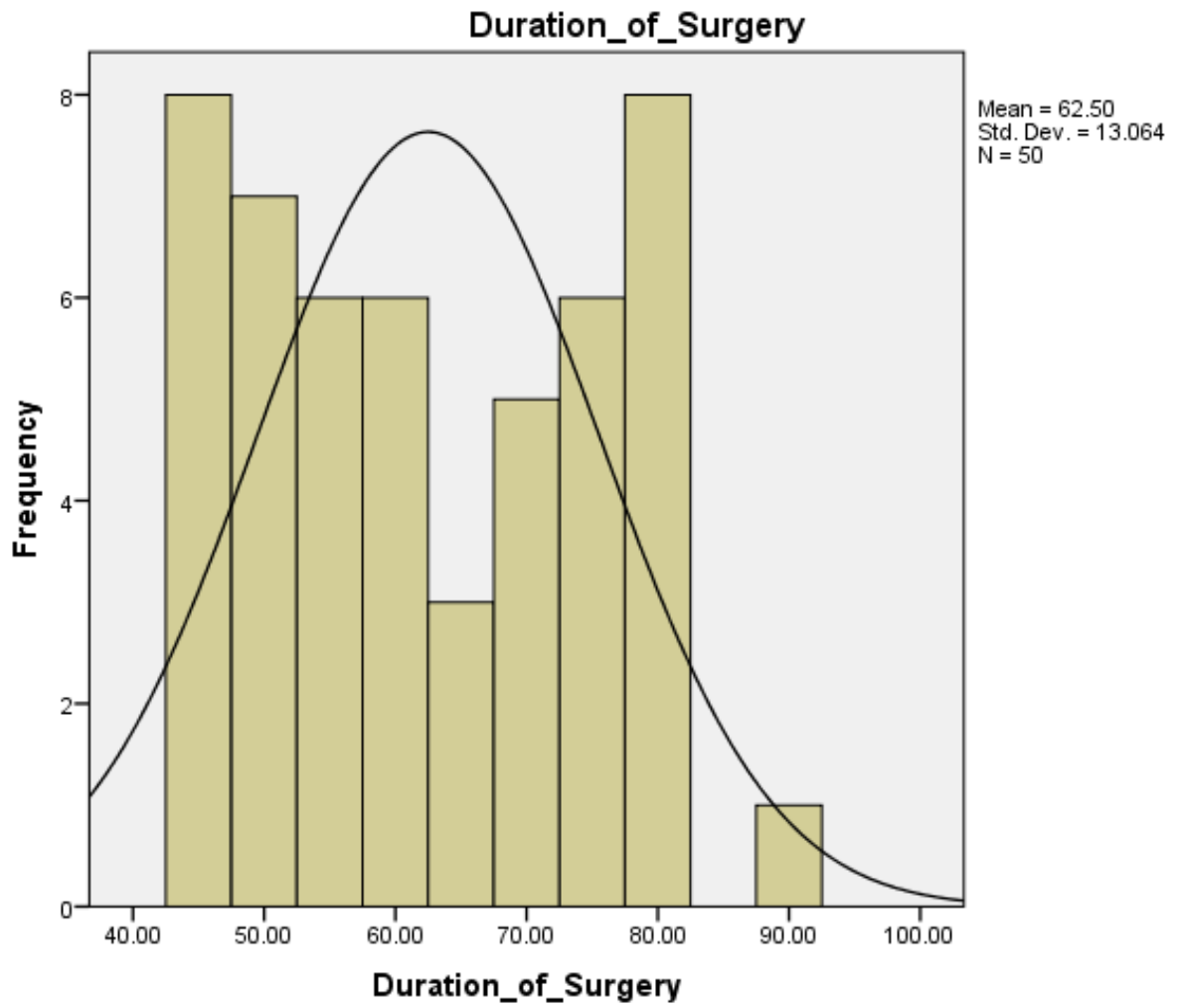


Figure 16: Duration of Surgery

### Comparison of duration of surgery

The mean duration of surgery in the suture fixation group is 73.6 minutes while in the tacker fixation group, the mean duration is 51.4 minutes. The two groups differ significantly ( $p < 0.05$ ). Hence, the duration of surgery differs between suture fixation and tacker fixation group.

S.No	Group	Mean Duration of surgery (in minutes)	Median Duration of surgery (in minutes)	T-test analysis
1	Suture Fixation	73.6	75	$P < 0.05$
2	Tacker Fixation	51.4	50	Statistically significant

Table 15: Comparison of duration of surgery

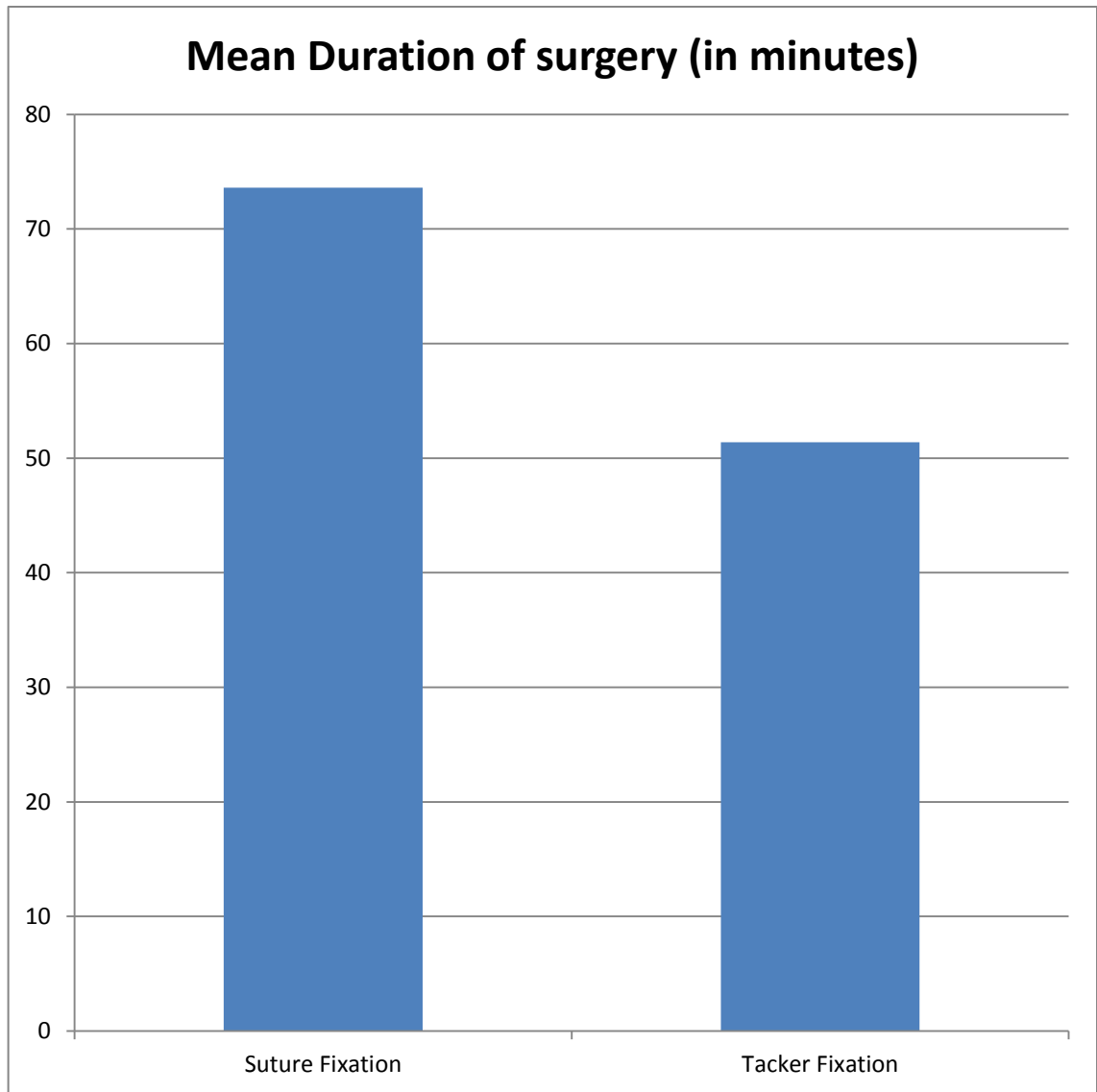


Figure 17: Comparison of duration of surgery

### **Duration of hospital stay**

The mean duration of hospital stay in all cases is 2.3 days with a standard deviation of 0.65 days. The minimum time is 2 days and the maximum time is 4 days. The median duration is 2 days.

S.No	All Cases (N=50)	Duration of hospital stay (in days)
1	Mean	2.320
2	Median	2.000
3	Mode	2.0
4	Std. Deviation	.6528
5	Minimum	2.0
6	Maximum	4.0

Table 16: Duration of hospital stay

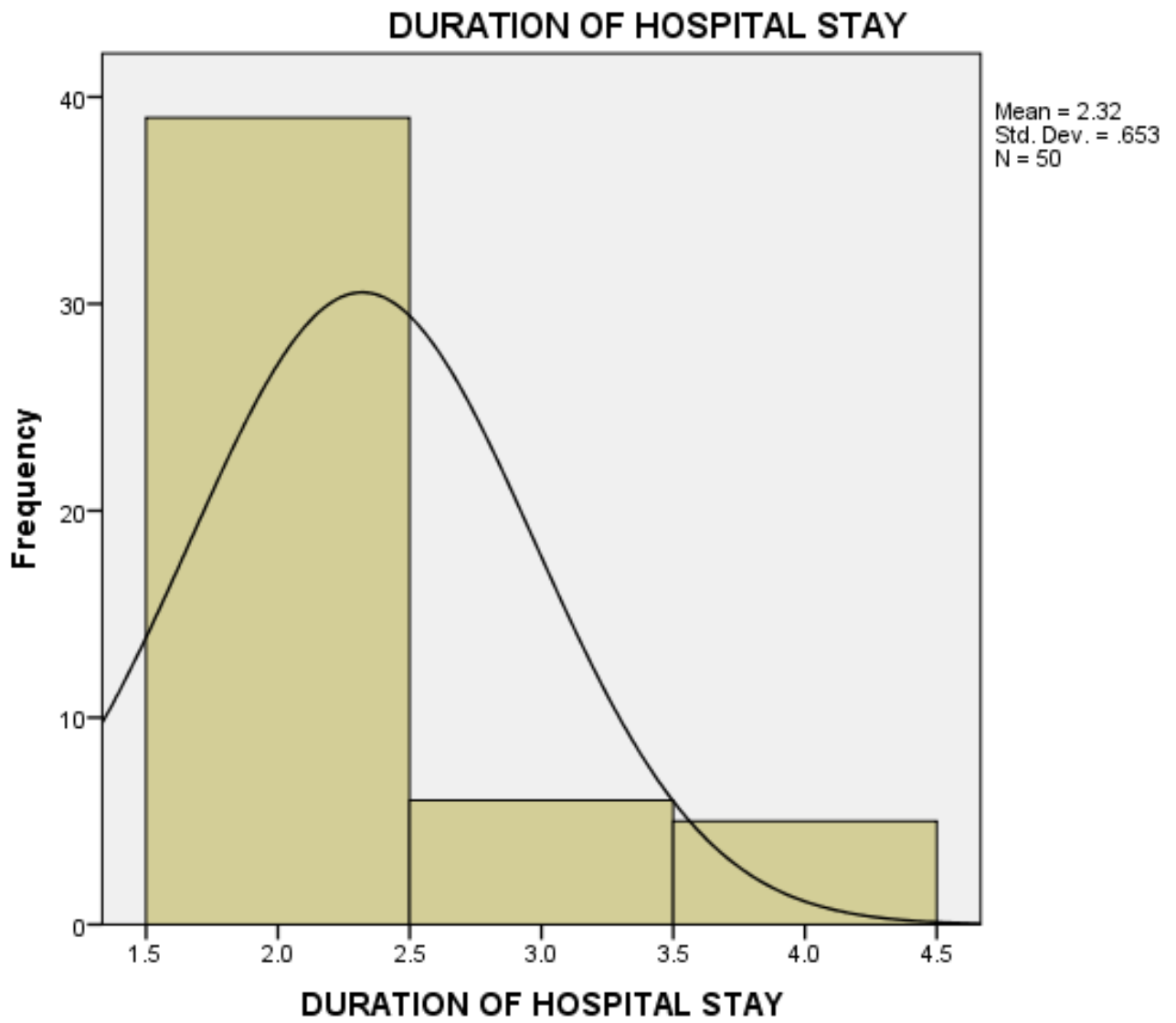


Figure 18: Duration of hospital stay



### Comparison of duration of hospital stay

The mean duration of hospital stay in the suture fixation group is 2.3 days while in the tacker fixation group, the mean duration is 2.2 days. The two groups do not differ statistically. Hence, the duration of hospital stay is the same between suture fixation and tacker fixation group.

S.No	Group	Mean Duration of hospital stay (in days)	Median Duration of hospital stay (in days)	T-test analysis
1	Suture Fixation	2.320	2.000	P > 0.05
2	Tacker Fixation	2.280	2.000	Statistically not significant

Table 17: Comparison of duration of hospital stay

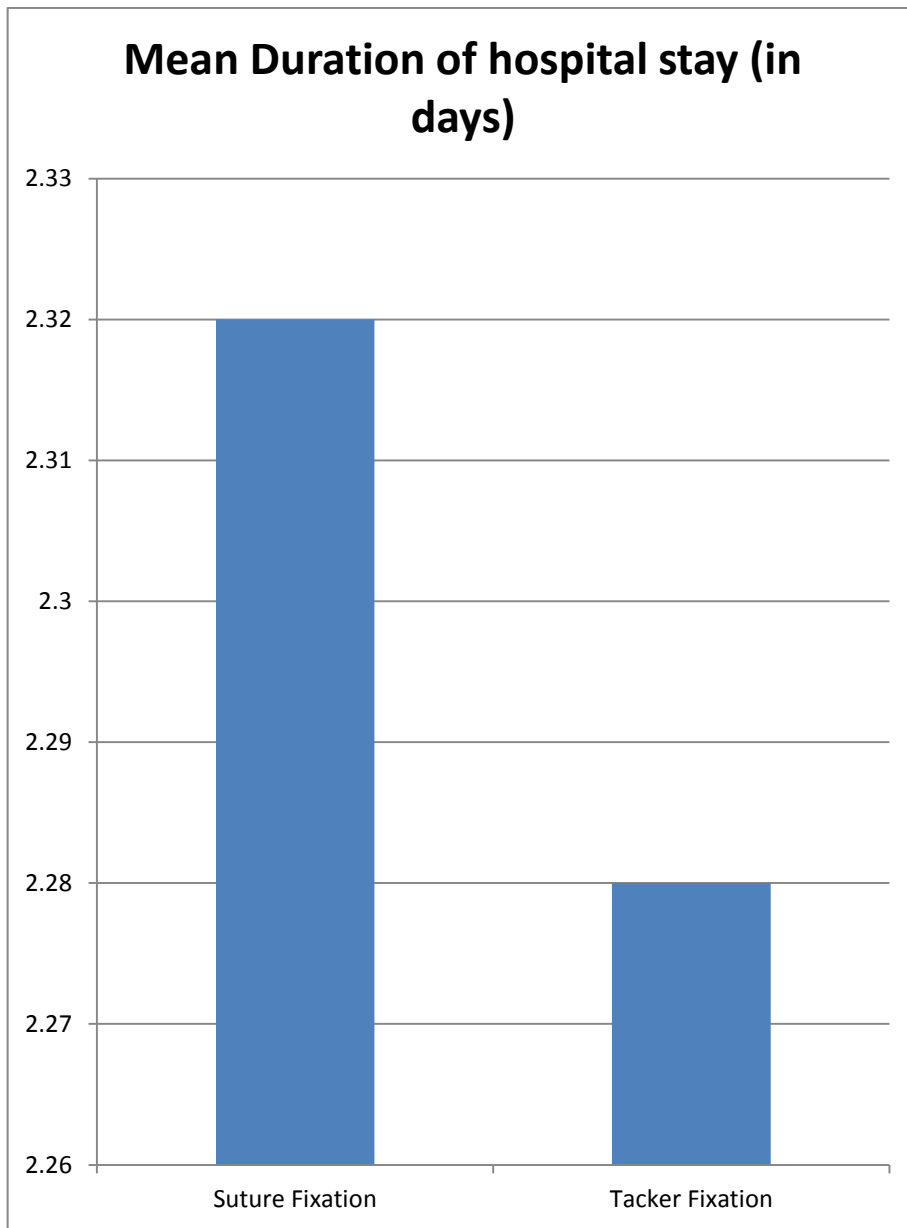


Figure 19: Comparison of duration of hospital stay

## Post-operative follow up

### Wound infections

In all the cases there were no wound infections.

### Post-operative pain and discomfort

Post-operative pain and discomfort was present in 24% (n=12) of the cases.

S.No	Post-operative pain and discomfort	Frequency	Percent
1	Yes	12	24
2	No	38	76
	Total	50	100

Table 18: Post-operative pain and discomfort

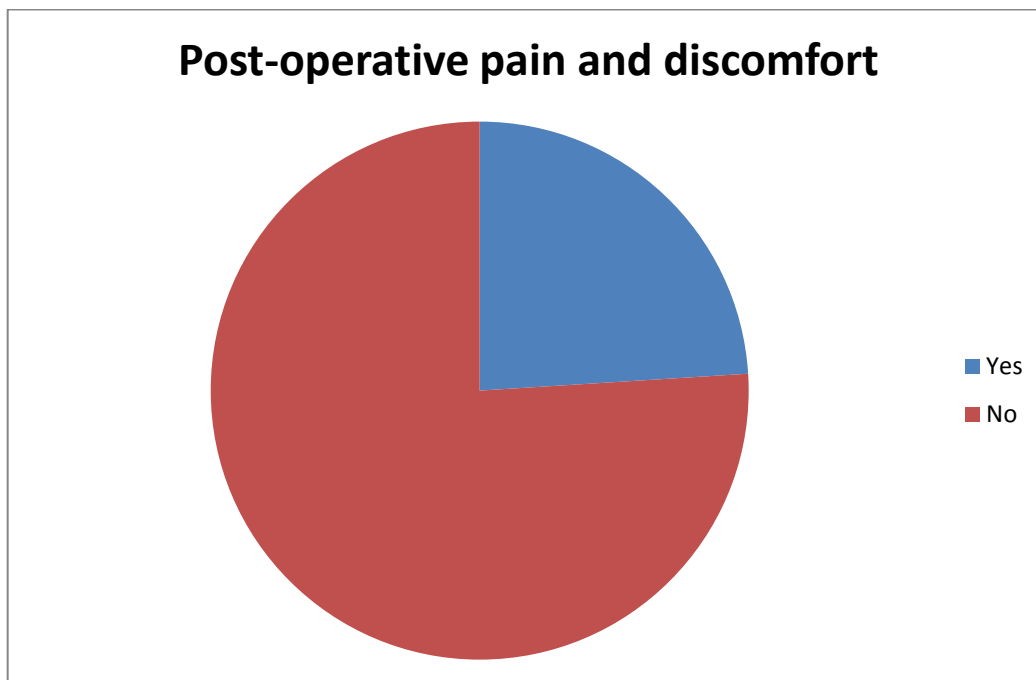


Figure 20: Post-operative pain and discomfort

There was no difference in the post-operative pain and discomfort in the two groups.

S.No	Post-operative pain and discomfort	Suture Fixation (n/%)	Tacker Fixation (n/%)	Chi-Square analysis
1	Yes	6 (24%)	6 (24%)	P > 0.05  Statistically not significant
2	No	19 (76%)	19 (76%)	
	Total	25	25	

Table 19: Comparison of post-operative pain and discomfort

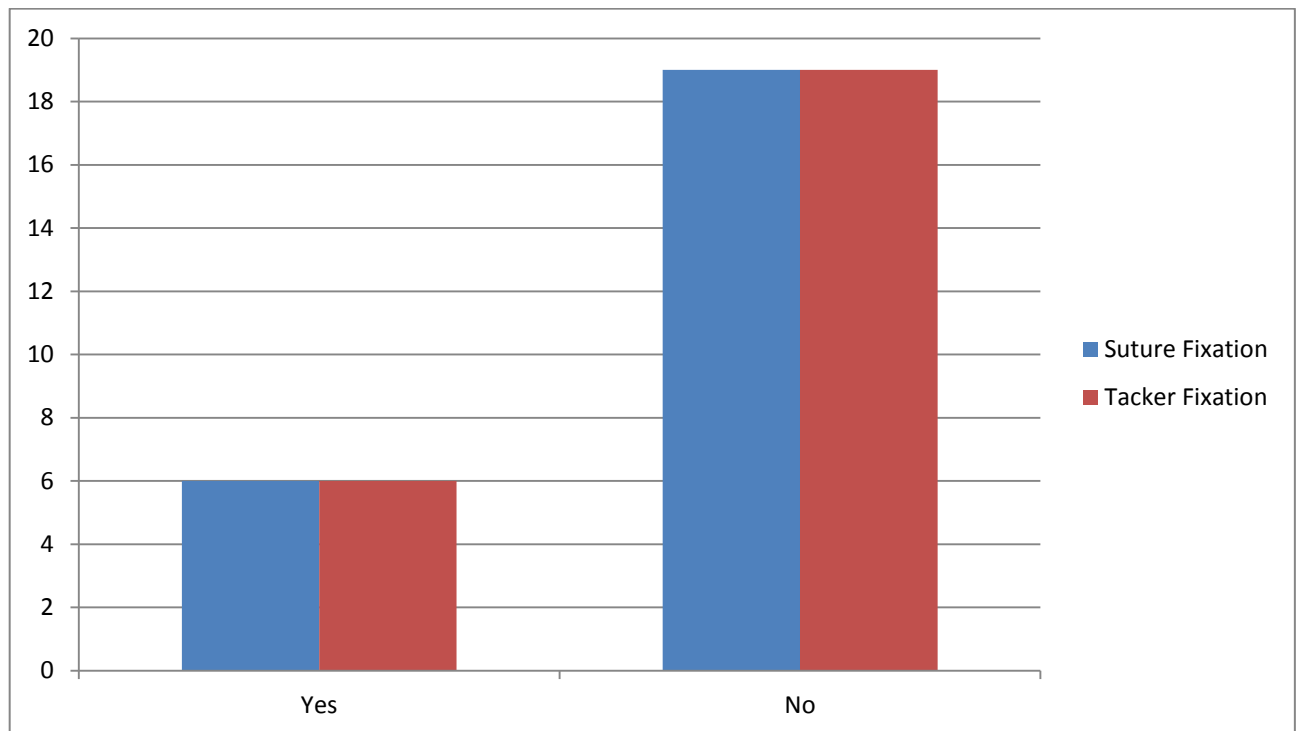


Figure 21: Comparison of post-operative pain and discomfort

## Seroma

Only one case had seroma (n=1, 2%).

S.No	Seroma	Frequency	Percent
1	Yes	1	2
2	No	49	98
	Total	50	100

Table 20: Incidence of Seroma

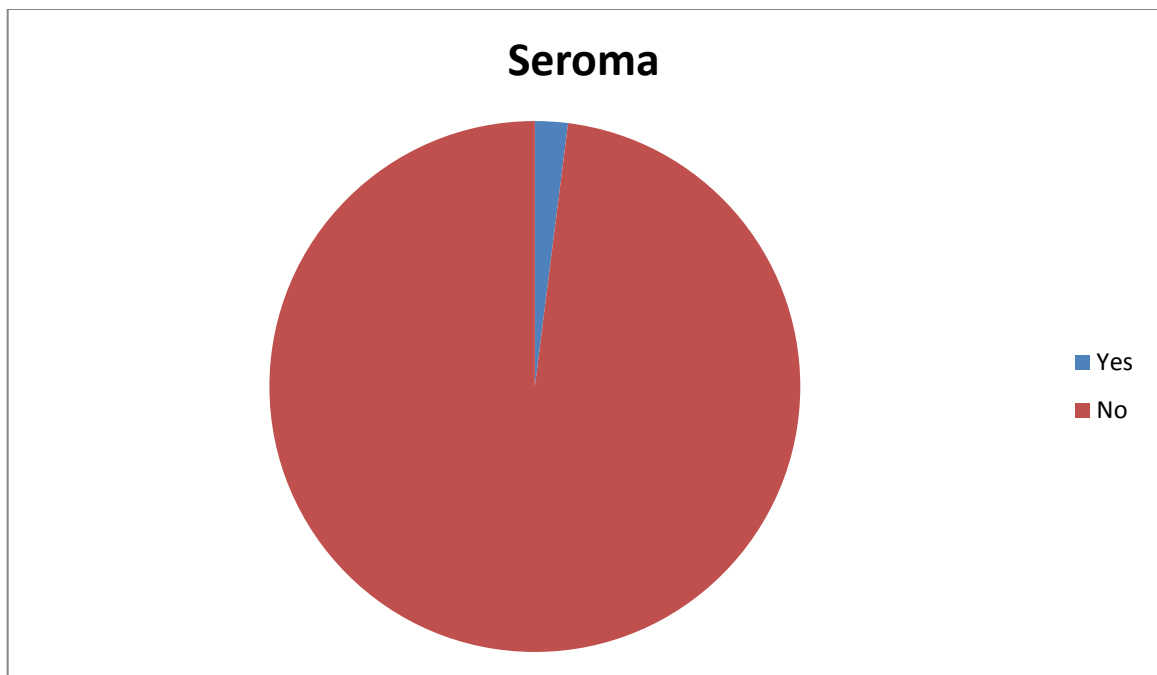


Figure 22: Incidence of Seroma

One case in suture fixation had Seroma. None of the cases in tacker fixation had Seroma.

S.No	Seroma	Suture Fixation (n/%)	Tacker Fixation (n/%)	Chi-Square analysis
1	Yes	1	0	P > 0.05 Statistically not significant
2	No	24	25	
	Total	25	25	

Table 21: Comparison of incidence of seroma

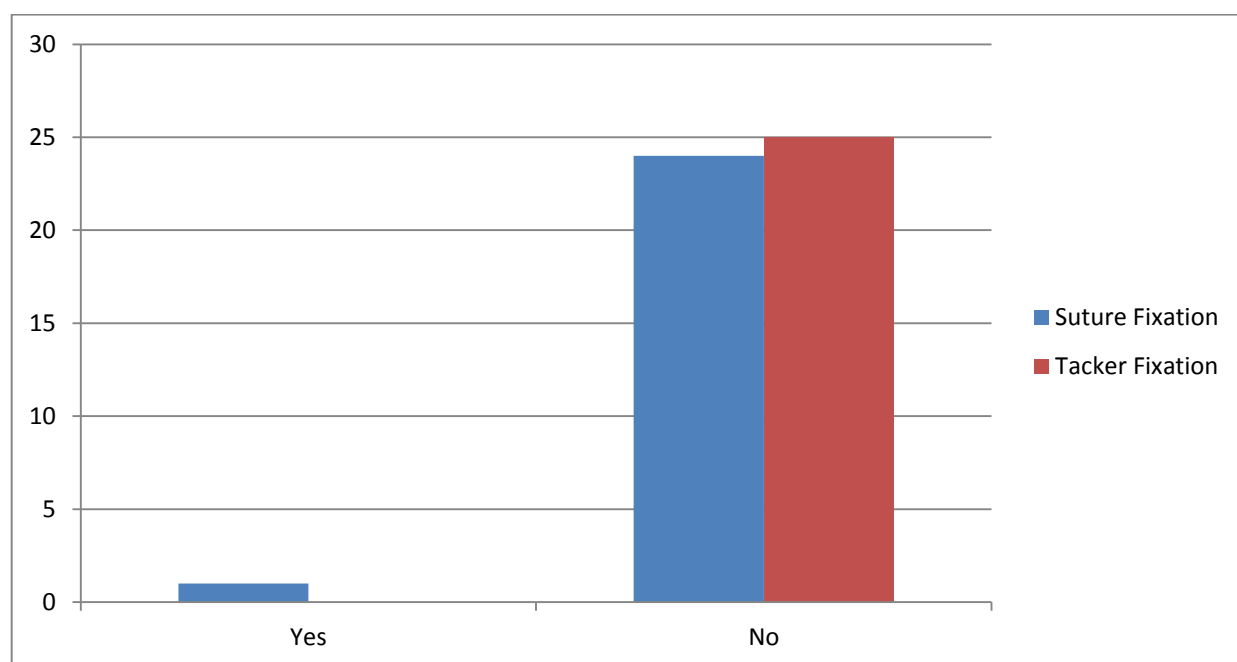


Figure 23: Comparison of incidence of Seroma

### Recurrence on follow-up

Out of 50 cases, 46 cases came for regular follow-up and none of them had recurrence.

# **DISCUSSION**

## Discussion

Laparoscopic hernia repair is being used since the last few decades<sup>1</sup>. There are a number of benefits of laparoscopic repair;

- a) The recurrence rate is very low<sup>2</sup>
- b) Hospital stay is of shorter duration<sup>3</sup>
- c) Wound-related complications are less prevalent<sup>4</sup>

Randomised trials show that laparoscopic repairs are more efficacious than open surgeries<sup>5-8</sup>. A number of issues related to laparoscopic surgery have been resolved like access to abdominal cavity, size of mesh, extent of overlap, etc. However, the prosthetic material and the technique of fixation are yet to be studied in details.

Literature shows that mesh has been fixed with

- a) Single tacks<sup>9</sup>
- b) Double layer of tacks<sup>10</sup>
- c) Transfascial tacks and sutures<sup>11</sup>

When mesh fixation is done using tacks, it is time saving and convenient<sup>12</sup>. But the tensile strength of suture fixed mesh is around 2.5 times greater than tacker fixation<sup>13</sup>.



All the layers of the abdominal wall is penetrated in the transfascial sutures which enables the mesh fixation to the fascial-muscular layer of the abdominal wall. Still certain issues are not resolved like the number of sutures, placement of the sutures, materials used (absorbable or nonabsorbable). Few experimental studies have compared this<sup>14-17</sup>.

The study aims to compare the cost effectiveness, duration of surgery, duration of hospital stay and post-operative complications in patients undergoing laparoscopic hernia repair by using tacker and suture fixation of mesh.

The mean age of all cases is 43.4 years with a standard deviation of 11.5 years. The median age is 46 years and ranges between 21 and 58 years. The mean age of cases in the suture fixation group is 46.9 years with a standard deviation of 10.2 years. The median age is 52 years and ranges between 24 and 58 years.

The mean age of cases in the tacker fixation group is 39.9 years with a standard deviation of 11.9 years. The median age is 45 years and ranges between 21 and 58 years. Comparison of age between the two groups showed that they do not differ significantly in the age distribution and the two groups are comparable. Student t-test shows that the difference is not statistically significant; hence the two groups are comparable.

All the 50 participants of the study are males. Hence, there is no difference between the comparability of the two groups.

All the cases were reducible inguinal hernia. Thus, the two groups are comparable. Out of 50 cases, majority of them (n=30, 60%) had right sided hernia while 40% (n=20) had left sided hernia. In the suture fixation group, out of 25 cases, majority of them (n=14, 56%) had right sided hernia while 44% (n=11) had left sided hernia. In the tacker fixation group, out of 25 cases, majority of them (n=16, 64%) had right sided hernia while 36% (n=9) had left sided hernia. Chi-square analysis showed that the two groups do not differ significantly in the side of hernia diagnosed.

Out of 50 cases, majority of the cases were indirect hernias (n=43, 86%) while the rest were direct hernias (n=7, 14%). In the suture fixation group, out of 25 cases, majority of them (n=21, 84%) had indirect hernia while 16% (n=4) had direct hernia. In the tacker fixation group, out of 25 cases, majority of them (n=22, 88%) had indirect hernia while 12% (n=3) had direct hernia.

Chi-square analysis showed that the two groups do not differ significantly in the side of hernia diagnosed.

In all cases, majority of them did not have any comorbidities (n=34, 68%). Around 16% (n=8) had type-II diabetes mellitus. Around 10% (n=5) had hypertension. Around 6% (n=3) had both diabetes and hypertension

In suture fixation cases, majority of them did not have any comorbidities (n=17, 68%).

Comparison of comorbidities between the two groups showed that they do not differ significantly.

All the cases were reducible inguinal hernia and were treated using laparoscopic hernioplasty. Thus, the two groups are comparable.

The mean duration of surgery in all cases is 62.5 minutes with a standard deviation of 13.06 minutes. The minimum time required is 45 minutes and the maximum time required is 90 minutes. The median duration is 60 minutes.

The mean duration of surgery in the suture fixation group is 73.6 minutes while in the tacker fixation group, the mean duration is 51.4 minutes. The two groups differ significantly ( $p < 0.05$ ). Hence, the duration of surgery differs between suture fixation and tacker fixation group.

The mean duration of hospital stay in all cases is 2.3 days with a standard deviation of 0.65 days. The minimum time is 2 days and the maximum time is 4 days. The median duration is 2 days.

The mean duration of hospital stay in the suture fixation group is 2.3 days while in the tacker fixation group, the mean duration is 2.2 days. The two groups do not differ statistically. Hence, the duration of hospital stay is the same between suture fixation and tacker fixation group.

In all the cases there were no wound infections.

Post-operative pain and discomfort was present in 24% (n=12) of the cases.

There was no difference in the post-operative pain and discomfort in the two groups. Only one case had seroma (n=1, 2%).

One case in suture fixation had Seroma. None of the cases in tacker fixation had Seroma. . Out of 50 cases, 46 cases came for regular follow-up and none of them had recurrence as well as intestinal obstruction.

Both the surgical techniques are equally effective. But suture fixation is cost-effective than tacker fixation whereas the duration of surgery is less in tacker mesh fixation.

**SUMMARY**

**AND**

**CONCLUSIONS**

## Summary

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out of 25 cases, majority of them (n=14, 56%) had right sided hernia while 44% (n=11) had left sided hernia. In the tacker fixation group, out of 25 cases, majority of them (n=16, 64%) had right sided hernia while 36% (n=9) had left sided hernia. Chi-square analysis showed that the two groups do not differ significantly in the side of hernia diagnosed.

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Both the surgical techniques are equally effective. But suture fixation is cost-effective than tacker fixation whereas the duration of surgery is less in tacker mesh fixation

#### **CONCLUSION**

- Suture mesh fixation is less costlier than Tacker mesh fixation in laparoscopic hernioplasty.
- The mean duration of surgery is less in Tacker mesh fixation than Suture mesh fixation.
- The duration of hospital stay is almost equal in both the groups.
- The post-operative complaints like pain and discomfort is equal in both groups with little higher incidence of seroma in suture mesh fixation.
- Wound infection and recurrence are almost absent in both suture and tacker mesh fixation.

# LIMITATIONS

## **Limitations**

Following are the limitations of the study;

- a) The study was done in a single hospital which affects the sample size as well as the extrapolation of the results
- b) Smaller size affected the statistical significance of the results
- c) Lesser parameters were compared

# **FUTURE RECOMMENDATIONS**

## **Future recommendations**

Following are the future directions;

- a) The study must be done in different hospitals with different urban and rural settings for the extrapolation of the results
- b) Larger sample size must be considered with a longer duration of study
- c) A preclinical model must be developed based on literature and then validated through this study

# **ANNEXURES**

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# **PROFORMA**

**PROFORMA**  
**CASE OF INGUINAL HERNIA**

**A.**

**Name:**

**Age/Sex:**

**Address:**

**Occupation:**

**Religion:**

**O.P No:**

**I.P No:**

**Date & time of admission:**

**B. CHIEF COMPLAINTS:**

**Duration of symptoms:**

**C.PAST HISTORY:**

- |            |                    |                 |
|------------|--------------------|-----------------|
| 1. DM      | 2.TB               | 3.EPILEPSY      |
| 1. CARDIAC | 5.PREVIOUS SURGERY | 6. HYPERTENSION |

**D.PERSONAL HISTORY:**

**SMOKER**

**ALCOHOLIC**

**E.GENERAL EXAMINATION**

**1.Vitals:**

PR :

BP :

RR :

Temperature :

**2.GENERAL SIGNS:**

**General Condition:**

Pallor

Icterus

Pedal edema

Lymphadenopathy

**K.SYSTEMIC EXAMINATION:**

CVS

RS

CNS

**ABDOMEN:-**

**EXAMINATION OF INGUINO-SCROTAL REGION:**

**EXTERNAL GENITALIA:**

**PER RECTAL EXAMINATION:**

**CLINICAL DIAGNOSIS**

**INVESTIGATIONS**

A. BLOOD GROUPING & TYPING

B. COMPLETE HEMOGRAM

HB%

PCV

TC

DC

ESR

RBC

PLATELET COUNT

C. BT/CT

D. HBSAG

HIV

E. ECG

F. URINE:

Albumin

Sugar

G. BLOOD:

RBS

BLOOD UREA

SER.CREATININE

H. CHEST X RAY PA VIEW

I. USG ABDOMEN & PELVIS :

J. ECHO

**DIAGNOSIS:**

**INTRA OPERATIVE FINDINGS:**

**SURGICAL PROCEDURE:**

**COMPARATIVE STUDY BETWEEN TACKER MESH FIXATION AND SUTURE MESH FIXATION IN LAPAROSCOPIC HERNIA REPAIR**

- 1. Selection of the patient
  - for suture mesh fixation :
  - for tacker mesh fixation :
- 2. Cost effectiveness :
- 3. Duration of surgery :
- 4. Post-operative complications :
  - a) Recurrence
  - b) Infection
  - c) Obstruction
  - d) Pain/constipation/discomfort
  - e) Seroma
- 5. Duration of hospital stay :

**PATIENT  
CONSENT FORM**



## **PATIENT CONSENT FORM**

***STUDY:***

**COMPARATIVE STUDY BETWEEN TACKER MESH FIXATION  
AND SUTURE MESH FIXATION IN LAPAROSCOPIC HERNIA  
REPAIR**

***HOSPITAL:*** GOVERNMENT MOHAN KUMARAMANGALAM  
MEDICAL COLLEGE HOSPITAL, SALEM

This study has been explained to me in my own language and I understood  
the following

1. What the study involves
2. That the refusal to participate will not affect my treatment in any way
3. That I may withdraw to take part in this study

Signature of the patient:

Full name of the patient:

Address:

Witness: (should be a person not connected with the study)

I have been present while the procedure to be performed has been explained  
to the patient and I have witnessed his/her consent to take part.

Signature of the witness:

Full name of the witness:

Address:

Date:

# **MASTER CHART**

MASTER CHART																
GROUP A (SUTURE FIXATION)																
S.NO	NAME	AGE	SEX	PT.ID	MORBIDIT	DIAGNOSIS	TYPE OF HERNIA/ INDIR	P/D	LOCATION OF SURJ OF HOSP	IND	INFECT	PAIN/DISCUAL	OBSTR	SEROMA	NCE ON FOLLOW UP	
1	ayaprakas	58	Male	8011	Type 2 DM	Inguinal Hernia	Right	Indirect	Indirect	Herniopia	70mins	2 days	no	no	no	no
2	Dhanapal	44	Male	79551	nil	Inguinal Hernia	Right	Indirect	Indirect	Herniopia	70mins	3 days	yes	no	no	no
3	avichandra	46	Male	39523	ypertensio	Inguinal Hernia	Left	Indirect	Indirect	Herniopia	80mins	2 days	no	no	no	no
4	Sivakumar	35	Male	5333	nil	Inguinal Hernia	Left	Indirect	Indirect	Herniopia	60mins	2 days	no	no	no	no
5	Subramani	54	Male	34239	nil	Inguinal Hernia	Right	Direct	Direct	Herniopia	75mins	4 days	yes	no	no	no
6	Sakthivel	41	Male	36378	ypertensio	Inguinal Hernia	Right	Direct	Direct	Herniopia	90mins	2 days	no	no	no	no
7	Sivakumar	34	Male	35716	nil	Inguinal Hernia	Left	Indirect	Indirect	Herniopia	80mins	2 days	no	no	no	no
8	Cristoper	55	Male	35684	nil	Inguinal Hernia	Left	Indirect	Indirect	Herniopia	75mins	2 days	no	no	no	no
9	Rajamuthu	56	Male	28321	Dm/Hypert	Inguinal Hernia	Right	Indirect	Indirect	Herniopia	75mins	2 days	no	no	no	no
10	Eswaran	55	Male	26364	nil	Inguinal Hernia	Right	Indirect	Indirect	Herniopia	65mins	2 days	no	no	no	no
11	Amulraj	57	Male	24440	Type 2 DM	Inguinal Hernia	Left	Direct	Direct	Herniopia	60mins	3 days	yes	no	no	no
12	Sivasamy	55	Male	1161	nil	Inguinal Hernia	Right	Indirect	Indirect	Herniopia	70mins	2 days	no	no	no	no
13	ankatachale	47	Male	131601	nil	Inguinal Hernia	Right	Indirect	Indirect	Herniopia	80mins	2 days	no	no	yes	no
14	Rajagopal	57	Male	17311	nil	Inguinal Hernia	Left	Indirect	Indirect	Herniopia	80mins	4 days	yes	no	no	no
15	angananatha	40	Male	5449	Type 2 DM	Inguinal Hernia	Right	Indirect	Indirect	Herniopia	75mins	2 days	no	no	no	no
16	Baskar	52	Male	21767	nil	Inguinal Hernia	Right	Indirect	Indirect	Herniopia	75mins	2 days	no	no	no	no
17	sheer Aharr	58	Male	72426	ension/Typ	Inguinal Hernia	Left	Direct	Direct	Herniopia	80mins	3 days	yes	no	no	no
18	Islam Bash	53	Male	67559	nil	Inguinal Hernia	Right	Indirect	Indirect	Herniopia	65mins	2 days	no	no	no	no
19	Murugesan	56	Male	57686	nil	Inguinal Hernia	Left	Indirect	Indirect	Herniopia	60mins	2 days	no	no	no	no
20	Periyasamy	57	Male	64371	Type 2 DM	Inguinal Hernia	Left	Indirect	Indirect	Herniopia	70mins	3 days	yes	no	no	no
21	abarinatha	35	Male	61354	nil	Inguinal Hernia	Right	Indirect	Indirect	Herniopia	70mins	2 days	no	no	no	no
22	Ramesh	35	Male	57313	nil	Inguinal Hernia	Right	Indirect	Indirect	Herniopia	80mins	2 days	no	no	no	no
23	shnamoort	24	Male	14907	nil	Inguinal Hernia	Right	Indirect	Indirect	Herniopia	80mins	2 days	no	no	no	no
24	enthilkuma	34	Male	14923	nil	Inguinal Hernia	Left	Indirect	Indirect	Herniopia	80mins	2 days	no	no	no	no
25	Kumar	36	Male	56296	nil	Inguinal Hernia	Left	Indirect	Indirect	Herniopia	75mins	2 days	no	no	no	no

**MASTER CHART**

**GROUP B (TACKER FIXATION)**

S.NO	NAME	AGE	SEX	PT.ID	COMORBIDITIES	DIAGNOSIS	SIDE OF HERNIA/ INDIR	P/D	ION OF SLJ	HOS	FN	INFECT	PAIN/	DISL	OBS	SEROMA	RECURRENCE ON FOLLOW UP
1	Sathish	33	Male	68443	nil	Inguinal Hernia	Right	Indirect	Lap hernioplasty	55mins	2 days	no	no	no	no	no	no
2	Saravanan	27	Male	66211	nil	Inguinal Hernia	Right	Indirect	Lap hernioplasty	60mins	2 days	no	no	no	no	no	no
3	Selvam	55	Male	58151	Hypertension	Inguinal Hernia	Right	Indirect	Lap hernioplasty	60mins	3 days	no	yes	no	no	no	no
4	Arunagiri	48	Male	9197	Type 2 DM	Inguinal Hernia	Right	Indirect	Lap hernioplasty	50mins	2 days	no	no	no	no	no	no
5	Sekar	50	Male	9204	nil	Inguinal Hernia	Right	Indirect	Lap hernioplasty	45mins	2 days	no	no	no	no	no	no
6	Mahendiran	38	Male	9201	Hypertension	Inguinal Hernia	Right	Indirect	Lap hernioplasty	55mins	2 days	no	no	no	no	no	no
7	Senthil	37	Male	50135	nil	Inguinal Hernia	Left	Indirect	Lap hernioplasty	50mins	4 days	no	yes	no	no	no	no
8	Mani	57	Male	54131	Type 2 DM	Inguinal Hernia	Left	Indirect	Lap hernioplasty	50mins	2 days	no	no	no	no	no	no
9	Palanisamy	55	Male	83243	Type 2 DM	Inguinal Hernia	Left	Indirect	Lap hernioplasty	65mins	2 days	no	no	no	no	no	no
10	Srinivasan	47	Male	20358	Hypertension/Type 2	Inguinal Hernia	Left	Indirect	Lap hernioplasty	55mins	3 days	no	yes	no	no	no	no
11	Venkatachalam	23	Male	80612	nil	Inguinal Hernia	Right	Indirect	Lap hernioplasty	45mins	2 days	no	no	no	no	no	no
12	Chandrasekar	22	Male	13247	nil	Inguinal Hernia	Left	Indirect	Lap hernioplasty	45mins	2 days	no	no	no	no	no	no
13	Kumaresan	21	Male	93789	nil	Inguinal Hernia	Right	Indirect	Lap hernioplasty	50mins	2 days	no	no	no	no	no	no
14	Harikrishnan	24	Male	93854	nil	Inguinal Hernia	Right	Indirect	Lap hernioplasty	55mins	2 days	no	no	no	no	no	no
15	Jayaprabakar	28	Male	114503	nil	Inguinal Hernia	Left	Indirect	Lap hernioplasty	55mins	2 days	no	no	no	no	no	no
16	Palanisamy	47	Male	67709	Type 2 DM	Inguinal Hernia	Left	Indirect	Lap hernioplasty	60mins	2 days	no	yes	no	no	no	no
17	Sunya	27	Male	1847	nil	Inguinal Hernia	Right	Indirect	Lap hernioplasty	45mins	2 days	no	no	no	no	no	no
18	Marimuthu	45	Male	7234	Hypertension	Inguinal Hernia	Left	Indirect	Lap hernioplasty	45mins	2 days	no	no	no	no	no	no
19	Ganesan	34	Male	25920	nil	Inguinal Hernia	Right	Indirect	Lap hernioplasty	50mins	2 days	no	no	no	no	no	no
20	Madesh	46	Male	19618	nil	Inguinal Hernia	Right	Direct	Lap hernioplasty	45mins	2 days	no	no	no	no	no	no
21	Tamilselvan	34	Male	97825	nil	Inguinal Hernia	Right	Direct	Lap hernioplasty	50mins	2 days	no	no	no	no	no	no
22	Marimuthu	46	Male	23965	nil	Inguinal Hernia	Right	Direct	Lap hernioplasty	55mins	2 days	no	no	no	no	no	no
23	Duraiasamy	46	Male	69895	nil	Inguinal Hernia	Right	Indirect	Lap hernioplasty	45mins	2 days	no	no	no	no	no	no
24	Thomas	58	Male	1643	nil	Inguinal Hernia	Right	Indirect	Lap hernioplasty	45mins	4 days	no	yes	no	no	no	no
25	Munusamy	50	Male	42618	nil	Inguinal Hernia	Left	Indirect	Lap hernioplasty	50mins	3 days	no	yes	no	no	no	no