

A PROSPECTIVE STUDY ON MANAGEMENT OF INCISIONAL HERNIASDeepak R. Chavan¹, Sanjay Shantappa Namadar², Poojakiran³**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: OBJECTIVE: To study the age and sex incidence, various factors leading to incisional hernia, methods to control them and various types of surgical repair by mesh and their complications.

BACKGROUND DATA: Incisional hernia is a common surgical condition with a reported incidence of 5-11% of patients subjected to abdominal operations. Many factors are associated with incisional hernia like age, sex, obesity, chest infections, type of suture material, type of incision and most important wound infection. All of them present a challenging problem to the surgeon. So this study has been undertaken to assess the magnitude of this condition and different modalities in surgical repair by mesh in our setup. **MATERIALS & METHODS:** This is a prospective study of 70 cases of incisional hernia who attended to OPD and emergency department of Sri B. M. Patil medical college Hospital & Research Centre from March 2012 to March 2014. Data were collected from the patients ie, clinical history, examination and appropriate investigations. Documentations of patients which include identification, history, clinical finding, investigative tests, operation findings, operative procedures and complications during the stay in hospital and during subsequent follow up period, were all recorded in a proforma specially prepared. **RESULTS:** In our series of 70 patients, clinical details of 70 patients were available. Females (80%, n=48) out- numbered males (20%, n=12) and the highest incidence was in the age group of 30 to 60 years with mean age of 45 years. Gynecological operation accounted for 73.3% (n=50) of the index operations, with lower midline incision resulting in 53.3%(n=44) of the incisional hernias. The polypropylene mesh placed overlay or inlay method. All patients attended our follow up ranging from 3 months to 2 year. Two recurrences were noticed in inlay mesh repair group. **CONCLUSION:** Based on our analysis, we believe that overlay mesh repair is superior to inlay mesh repair for incisional hernia repair. There are however, very few publications covering this technique of repair.

KEYWORDS: Incisional hernia, inlay or overlay mesh repair, mesh repair.

INTRODUCTION: Mankind is posed with the problem of hernia ever since its evolution. The problem of incisional hernia appeared with the development of abdominal surgery.

Harold Ellis¹ defines incisional hernia as the one that develops in the scar of surgical incision. It may be a small, even insignificant bulge, through the wound; it may be a large, unsightly and uncomfortable affair too.

Incisional hernia occurs in approximately 5-11% of patient's subjects to abdominal operations². Many factors are associated with incisional herniation like age, sex, obesity, chest infection, type of suture material used and most important wound infection. All these present a challenging problem to the surgeon.

Recent studies have shown that about 2/3rd appear within the first five years and that at least another third appears 5-10 year after operation.³ If left unattended they tend to attain large size and cause discomfort to the patient or may lead to strangulation of abdominal contents. Bowel may more

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often incarcerate in small hernias, whereas bowel obstruction due to adhesions in the hernial sac or the hernial orifice is more often encountered in large hernias.

The repair of ventral incisional hernia, is a significant operation not to be taken lightly. Careful preoperative planning combined with meticulous surgical technique and experienced judgment is important in order to minimize the risk of complication and hernia recurrence. Almost every surgeon has got own techniques and may modify it to the situation.

This study has been undertaken to assess the magnitude of various factors leading to development of this condition and the different modalities of treatment practiced in our setup.

OBJECTIVES OF THE STUDY:

1. To study age, sex incidence and various risk factors leading to incisional hernia and methods to control them.
2. To evaluate various types of surgical repair by mesh and their complications.

MATERIALS AND METHODS: The study of incisional hernias has been carried out at BLDE University Sri B. M. Patil medical college & RC Bijapur, Karnataka.

A prospective study of 70 cases of incisional hernias treated and data collected consequently during the period from March 2012 to March 2014. No particular criteria were adopted during selecting the patients for the study and cases were studied as per the proforma. Detailed history of the illness was taken as this is very important for the type and cause of hernia. A detailed general and local examination was made.

All the cases were analyzed in various aspects like age, sex, parity, relative incidence, clinical presentation, nature of previous operation, site of previous scar, precipitating factors like obesity, wound infection, abdominal distension. The contributory factors like chronic bronchitis, chronic constipation and enlarged prostate were considered.

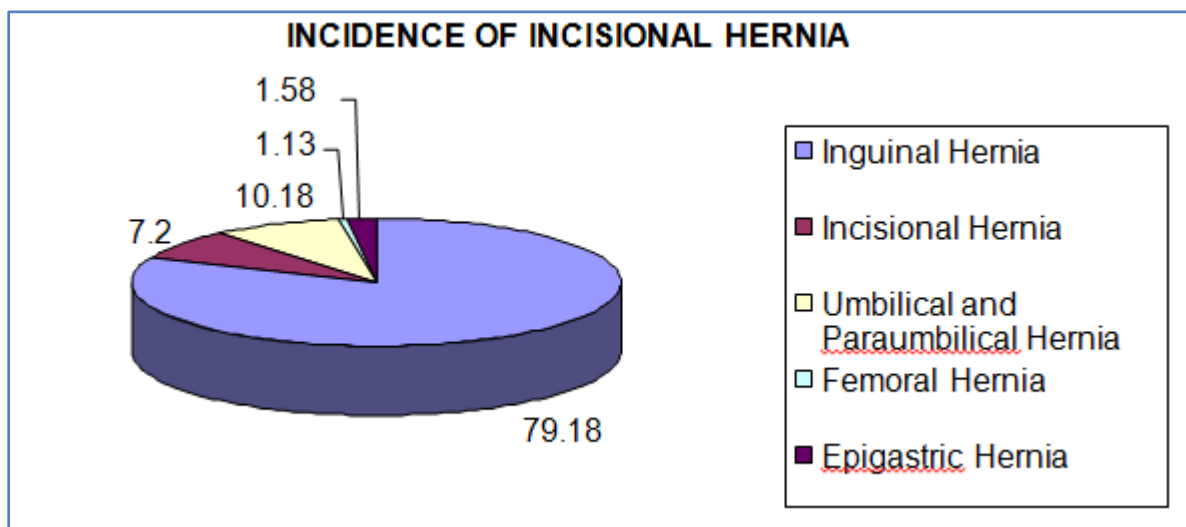
While presenting the cases, only relevant and positive findings were recorded in the proforma case sheet and a master chart dealing with all the aspects has been designed and presented. The diagnosis was made clinically in all the cases. Routine investigations were done to obtain fitness for surgery.

RESULTS: A study of 70 cases of incisional hernia admitted to Sri B.M. Patil medical college, Bijapur. during the year of March 2012 to March 2014 was made. The following is the analytical results of all the cases and conclusion drawn from it.

Incidence of Incisional Hernia: Out of 450 cases of hernias operated 81.25% constitutes inguinal hernia, 7.5% constitute incisional hernia, 8.75% constitute umbilical and paraumbilical hernias, 0.62% constitute femoral hernia, 1.87% constitute epigastric hernia.

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Types of Hernia	B.L. Coley series		J.B. Shah Bombay		BLDEU 2012-2014	
	No. of cases	%	No. of cases	%	No. of cases	%
Inguinal Hernia	2793	93	880	88	350	79.18
Incisional Hernia	38	1.3	50	5	35	7.2
Umbilical and paraumbilical Hernia	14	0.5	36	3.6	45	10.18
Femoral Hernia	54	1.5	22	2.2	9	1.13
Epigastric Hernia	101	3.3	12	1.2	7	1.58

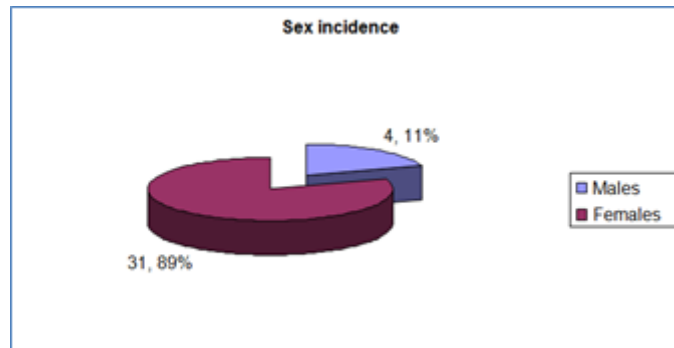


Sex Incidence: In the study of 30 cases, it has been found that incidence of incisional hernia is more common in females than males and overall males: female ratio is 1:4

Sex	No. of cases	%
Males	4	11
Females	31	89
Total	35	100

Series	Total No. of cases	Males	Females	M:F ratio
J. B. Shah	50	23	27	1:1.7
Goel & Dubey	146	65	81	1:1.25
Present study	70	8	62	1:7.8

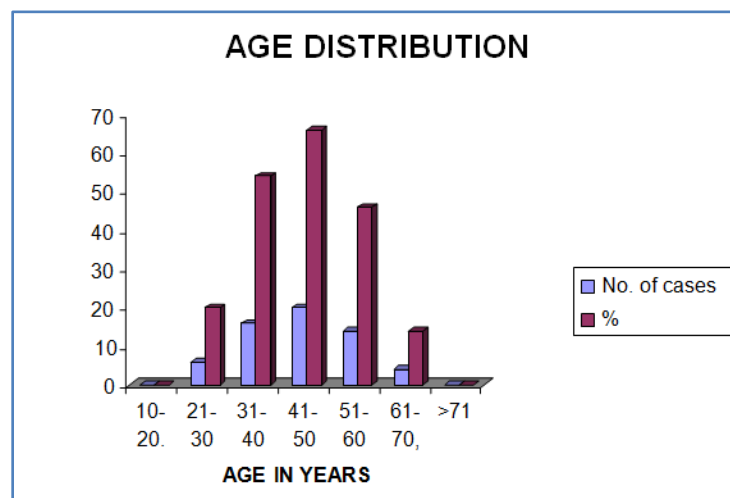
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Age Incidence:

Age group	Goel & Dubey		Anantha Krishnan et al		Present study	
	No. of cases	%	No. of cases	%	No. of cases	%
11-20	6	12	3	1.4	0	0
21-30	35	17.0	51	23.1	16	22.8
31-40	51	34.1	69	31.3	22	31.4
41-50	40	40.2	67	30.5	16	22.8
51-60	14	6.1	23	10.5	12	17.1
61-70,			2	0.9	2	2.8
>71			5	2.3	2	2.8

Incidence of incisional hernia is more common in 30-60 age groups. This is comparable with that of N. Anantha Krishnan et al³⁰ studies and Goel and Dubey studies.³¹

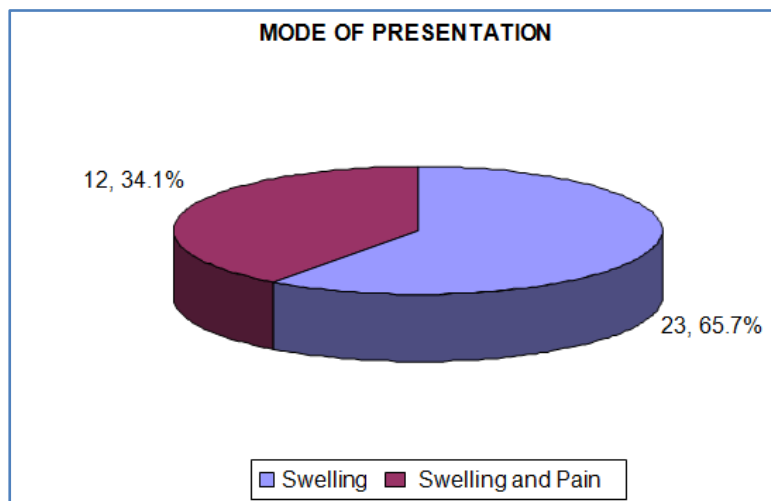


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Occupation: Majority of the patients with incisional hernia were house wives. Agricultural workers were the next common occupants.

Mode of Presentation: 18 patients presented only with swelling and 12 with pain and swelling. Out of 12 patients with swelling and pain, 2 had obstructive features, 3 had appendicitis. 25 patients presented with swelling in the infraumbilical region and 5 patients with the supraumbilical swelling.

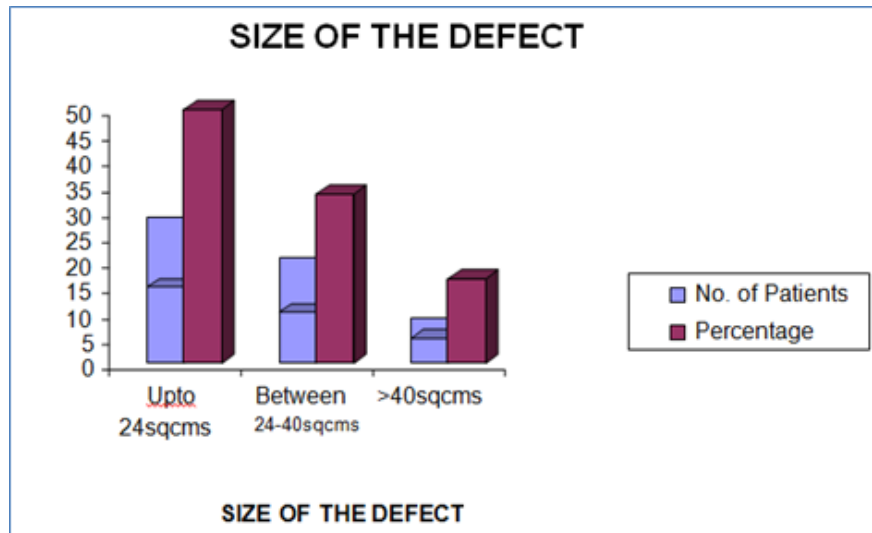
Mode of presentation	No. of patients	Percentage
Swelling	46	65.7
Swelling and Pain	24	34.2



Size of the Defect: 34 patients had hernia defect which measured up to 24sqcms. 20 people had defects between 24-40sqcms. Only 10 patients had defects more than 40sqcms, out of which patients had huge defect was one measuring 56sqcms (7x8).

Size of the defect	No. of Patients	Percentage
Up to 24sqcms	34	49
Between 24-40sqcms	26	37
>40sqcms	10	14

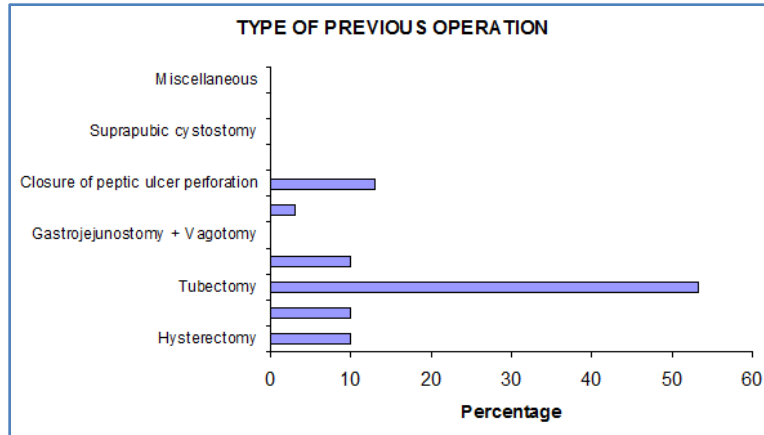
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Previous Surgery: All the patients were enquired about the type of operation they had undergone and complication in the postoperative period. 74% of patients under went gynecological procedures. The gastrointestinal surgeries accounts up to 26%.. This is compared with Ponka studies and Goel and Dubey studies.³¹

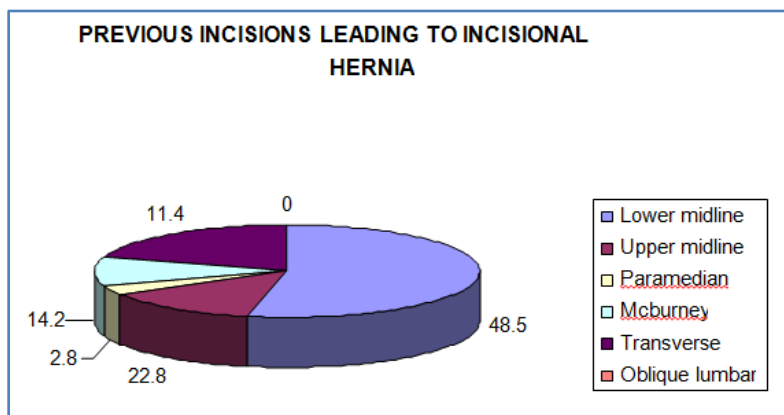
Name of operation	Ponka %	Goel & Dubey %	Present Study %
Hysterectomy	34	-	10
LSCS	2	28.76	10
Tubectomy	-	-	54
Appendicectomy	16	3.42	10
Gastrojejunostomy + Vagotomy	11	12.32	-
Cholecystectomy	21	-	3
Closure of peptic ulcer perforation	-	15.06	13
Colon and colostomy operations	9	-	-
Suprapubic cystostomy	-	15	-
Kidney operations	-	9.58	-
Miscellaneous	17	15.74	-

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Previous Incisions Used: Midline lower abdominal incisions was used in 53.3%, upper midline abdominal incisions in 13.3%, Paramedian incisions in 3.3%, Mc Burney's in 10%, Transverse (Pfannestial) incision in 20% of patients was used, This is comparable with A.B. Thakore et al studies³² and Goel and Dubey studies.³¹ Previous incision leading to incisional hernia.

Incision	A.B. Thakore et al		Goel – Dubey		Present Study	
	No. of cases	%	No. of cases	%	No. of cases	%
Lower midline	51	67.10	65	44.6	34	48.5
Upper midline	6	7.8	41	28.0	8	11.4
Paramedian	15	19.65	21	14.2	2	2.8
Mc burney	4	5.2	5	3.6	10	14.2
Transverse					16	22.8
Oblique lumbar			14	9.6	-	-
Total	76	100	146	100	70	100



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Previous pre and post-operative complications leading to Incisional Hernia: Wound infection and wound gaping constituted 30%. Obesity constitutes 20%, Diabetes mellitus constitute 16.6%, postoperative respiratory complication accounted for 16.6%. In 16.6% of patients, no complications were found.

Risk factors	A.B. THAKORE et al		PRESENT STUDY	
	Number	%	Number	%
Wound Infection	35	46.05	8	13.3
Wound gaping	10	13.15	10	16.6
Late eventeration	1	1.3	-	0
Chest complication	10	13.15	12	17.14
Retention of urine	2	2.63	-	0
Obesity	-	-	12	20
Diabetes mellitus	-	-	10	16.6
No complications	24	31.5	18	25.7
Not mentioned	14	18.42	-	0

Time of onset of hernia after the previous Surgery: In the evaluation of history it revealed that 13% of patients presented with incisional hernia within 6 months of the previous surgery. 23% of patients noticed swelling at the operated site within a year of surgery and 30% within 3yrs after the operation i.e., nearly 53.3% of them had developed incisional hernia within 3years of the operation.

Time	Anantha Krishnan et al studies		Present Study	
	No.	%	No.	%
0-3months	57	25.9	6	10
4-6 months	38	17.3	2	3.3
7months - 1 year	49	22.3	6	10
1-3 year	26	11.8	18	30
4-5 year	20	9.2	-	-
6-10 years	12	5.4	10	16.6
>10 years	12	5.4	16	26.6
Unknown	6	2.7	12	3.3
Total		100%	70	100%

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Type of Anaesthesia: 10 patients were operated with general anaesthesia & 20 patients with spinal anaesthesia.

SURGICAL TECHNIQUE:

Type of repair	Kingsnorth AN et al ³⁴		Present Study	
	No. of cases	%	No. of cases	%
Sublay	33	63.4	0	0
Overlay	16	30.7	41	60
Inlay	1	1.92	29	40
Ramirez abdomino plasty	2	3.84	0	0

Out of 70 patients with incisional hernia, 41 were treated by overlay mesh repair and 29 by inlay repair. Patients were selected random irrespective of size of hernial defect and obesity.

DRAINS: In majority of the patients Redivac drain was used and in all the cases, drain was brought out through separate incision.

Post- operative Complications:

Complication	Inlay repair (N = 12)	Overlay repair (N=18)	IL vs OL P-Value*
Seroma	6(25%)	4 (11.1%)	0.364, NS
Wound Dehiscence	2 (8.3%)	-	0.400, NS
Recurrence	4 (16.6%)	-	0.152, NS
Total	8 (33.3%)	4 (11.1%)	0.184, NS

*Fisher's Exact Test, NS-Not significant

5 patients had postoperative cough, which was treated by Benzyl inhalation, chest physiotherapy and cough syrup. One patient had retention of urine and was treated by Foley's catheterization. 6 patients who underwent inlay mesh repair and 4 patients treated with overlay mesh repair had seroma collection (P= 0.364, NS) in suture line which was treated by drainage and dressing. One patient in of inlay repair had wound dehiscence (F= 0.400, NS), which was treated by secondary suturing.

There was no case of major wound infection. There was no surgery related mortality in this study.

RECURRENCE: No patients with Inlay mesh repair presented with recurrent incisional hernia (p=0.152, NS). No patients treated with Overlay mesh repair showed recurrence. The recurrence rate in my study was zero which was comparable with that of Fenn, Maingot, J. B. Shah series. Both recurrences occurred within a year of the operation. The follow up period was very short to comment up on real recurrence rate.

Recurrence Rate:

Series	Total cases	Recurrence No.	Recurrence %
Fenn (1968)	73	5	7
Maingot(1969)	103	7	7
J.B. Shah (1977)	50	3	6
Kingsnorth A N (2004)	52	3	5.7
Present study (2012-2014)	70	0	0%

DISCUSSION: In my study out of 450 cases of hernias operated in our hospital, incisional hernia constitutes 7.2%. In Zimmerman and Anson studies, Macvay studies, J. B. Shah studies, B. L. Coley series the incidence is 1.7%, 11.5%, 5%, 1.3% respectively.

Female pre-dominated the picture in my study with 7:1 ratio (88%) with that of males. Though Thomas. A. Santora and Joel. J. Roslyn³⁵ stated the male gender has propensity to develop incisional hernia. Ellis, Gajraj and C.D.George³⁶ have obtained a 64.6% of female population in their study of 342 patients. J. B. Shah studies and Goel and Dubey³¹ series have 1:1.17 and 1:1.125 ratios respectively.

Incidence of incisional hernia is more common in females in our country. This may be because of multiple child births which leave the abdominal wall weak.

The incidence of incisional hernia is higher in 30-60 years age group with mean age of 45 years in my study. Ellis. H, Gajraj and George³⁶ in their study noticed a mean age of 49.4 yrs. The youngest patient in my study was 23 years old and oldest was 70 yrs old.

Majority of patients were house wives and agricultural workers were the next common occupants.

In nearly 48.5% of patients, the site of hernia was infraumbilical, of which only three patients had incisional hernia following appendectomy, the rest of patients underwent gynecological operations, most commonly tubectomy, hysterectomy and caesarian section. This may be due to the frequency of female pelvic surgery through infraumbilical midline approach, where the linea alba is thinner and less well protected compounded by multiparity.

Jack Abrahamson³ stated that lower abdominal incision apart from other causes is one of the factors with a higher rate of incisional hernia and recurrence after repair. In my study also, incisional hernia is more common after lower midline incisions.

In considering risk factors promoting incisional hernia, chest infection is one of the commonest. It occurred in 30% of patients in my study. This is comparable with that of A. B. Thakore, J. B. Shah and J. N. Parekh studies.³²

There were six obese patients with incisional hernia out of 35 cases (20%) in my study. Harrold.Ellis¹ noted 30 obese patients who developed incisional hernia out of 200 cases i.e. 15%, though other factors also play a role in causation of incisional hernia.

Ellis group found that obesity was associated with a three-fold increase in herniation and recurrence, but it is difficult to pin point the actual cause for this or technical factors involved.

All studies that show that most of the incisional hernia appears within the first year or second year after surgery. In my study, the history reveals 54% of them developed hernia within 3 yrs of

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operation. Jack Abrahamson³ noticed 80% of hernia appearing within first 2 years and Anantha Krishnan et al studies³⁰ 77% developed within 3 years after operation.

Late hernias were not common up to 5 years after operation. Mudge and Hughes³⁷ noticed 35% manifesting after 5 years and in my study they accounted for 46%. The probable cause may be because of aging and weakening of tissues and raised intra-abdominal pressure associated with chronic cough, constipation.

During clinical examination in my study 17 patients (50%) were found to have defect of up to 24 sq.cm and 2 patients had defect up to 60 sq.cm. Irrespective of size of defect, patients were selected randomly for mesh repair i.e. overlay/inlay repair. Thomas. A. Santora et al³⁴ believes that the size of fascial defect and the appearance of fascia should dictate the selection of most appropriate method of hernia repair.

The range of hernial defect in study was 6-60 sq.cm. Roland et al showed the range of 1-125 sq. cm. of hernial defect. But Roland et al in their study have not considered the size of defect to select the type of repair contrary to the statement of Thomas. A. Santora.³⁵ Jack Abrahamson³ believes that mesh repair is excellent method of repair for large ventral abdominal hernias, but has not specified the size of defect.

In my study, polypropylene mesh and the suture material of same type was used to repair incisional hernias, as it meets the requirements of ideal prosthesis. Now days it is the most commonly used material for repair of all types of hernia. Eighteen out of thirty cases were treated with overlay mesh repair and twelve with inlay repair. Two patients developed post-operative wound seroma collection in suture line in both groups, which were treated with proper drainage and dressing. One patient developed wound dehiscence, which was treated by secondary suturing.

This study showed no recurrence of incisional hernia in patients of inlay mesh repaired group. No patients in overlay mesh repair group noticed recurrence. Roland et al reported a recurrence of 24% among patients who underwent mesh repair. The recurrence rate was significant in Roland et al study (p-value, 0.02). In my study the result was not significant (P value-0.152).

However, the follow up period was variable and short to comment upon the real recurrence rate. In techniques for repair of incisional hernia, in which inlay mesh repair was used, there was greater contact between prosthesis and viscera with consequent wound infection and subsequent wound dehiscence and recurrence. With overlay repair, there was no recurrence as it is a tension free closure and infections are easier to treat. Thus my study establishes the superiority of overlay mesh repair over inlay repair with regards to recurrence of incisional hernia.

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**INCISIONAL HERNIA THROUGH
TUBECTOMY SCAR**



INFRAUMBILICAL MIDLINE DEFECT

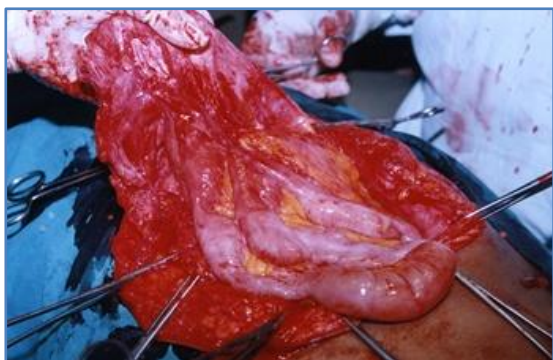
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INLAY REPAIR



INCISIONAL HERNIA THROUGH SUPRAUMBILICAL SCAR



OPENED SAC WITH BOWEL AS CONTENT

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