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RESEARCH ARTICLE

ANALYTICAL STUDY ON INCISIONAL HERNIA.

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Abstract

Incisional hernia is a common complication of abdominal surgery and an important source of morbidity. It may be repaired using anatomical, mesh or laparoscopic methods. This study analyses the age and sex incidence, etiopathogenesis, modes of presentation, modalities of treatment like anatomical, mesh repair.

Methods*:* one hundred patients with incisional hernia who got admitted at rims medical college & hospital, kadapa in the department of surgery were enrolled in this study based upon the inclusion and exclusion criteria between march 2015 to february 2017. The data was collected and analyzed.

Results*:* data regarding age and sex incidence, clinical presentation, site of incisional hernia, previous surgery, time of occurrence after previous surgery, risk factors, size of hernial defect, type of operation, post operative complications were studied. We found that incisional hernia was more common in middle-aged patients (31-50 yrs) and in females. Majority of hernias have occurred within one year (75%) of previous surgery. Commonest risk factors were midline infra-umbilical incision (59%), post operative infection (38%) and obesity. Seroma formation was the most common post operative complication seen. There were no recurrences found in our study.

Conclusion*:* incisional hernia was found more commonly between 3rd and 5th decade of life with female preponderance. Most common presenting complaint was midline infra-umbilical swelling with cough impulse and reducibility positive. Majority of hernias have occurred within one year of previous surgery. Onlay reinforced primary repair using prolene mesh has given good results and prolene mesh appears to be best tolerated by body tissues.

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Introduction:-

Incisional (postoperative ventral) hernia is an iatrogenic abdominal wall defect that occurs at the site of previous incision following breakdown in the continuity of the fascia closure[1]. Incisional hernia is a truly iatrogenic hernia[2], also termed eventration, laparocele or post operative hernia, is the protrusion of abdominal contents through orifices or areas of the abdominal wall weakened by trauma or surgical incisions[3]. The exact incidence of incisional hernia has not been well defined, although a number of reports in the literature suggested the probability of incidence between 2-11% following all abdominal surgeries[1,4,5,6,7,8]. The incidence of incisional hernia has increased with each increment of abdominal surgical intervention. The recent introduction of continuous ambulatory peritoneal dialysis has been followed by its own unique harvest of incisional hernias. Laparoscopic surgery has also added a new entity : "port site hernia" although infrequent with advent of smaller ports and the currently available instrumentation[2].

Many factors singly (or) in various combinations may cause failure of the wound to heal satisfactorily and may lead to the development of incisional hernia. These include age, sex, obesity, chest infections, type of suture material used, smoking, site of incision, sepsis, primary wound healing defects, malnutrition, Diabetes Mellitus, post operative abdominal distension, immune-compromised state (renal failure, steroid use, diabetes), pregnancy, multiple prior procedures, prior incisional hernias, malignancy etc. All these presenting a challenging problem to the surgeon[2,7,9]. Factors singly or in various combinations may cause failure of the wound to heal satisfactorily and lead to development of incisional hernia, main causes being poor surgical techniques and sepsis[10]. It may also starts early after surgery, as a result of defective closure following laparotomy[6].

The hernias especially through a lower abdominal scar usually increases steadily in size and more and more of its contents become irreducible. Patients who develop these hernias have an unusually high number of co morbidities (or) risk factors prone to abdominal wound dehiscence and they may be restricted from work as the hernias enlarge. Hernias are also responsible for considerable economic loss to the patient and the family. It is therefore, important to perform the type of operation, which will offer the best chance for a permanent cure with minimal risk.

In 1955,1966: Bourgeon reported that the mesh could also be applied intra-peritoneally and fixed to the aponeurotic muscle plane with single sutures. In recent times, numerous kinds of synthetic prostheses have rapidly appeared. This succession has included nylon, Dacron, Teflon, Avalon, velour lined silicone, and, above all, polytetrafluoroethylene (PTFE), the latter reducing the formation of adherences. A great variety of surgical techniques have been proposed to repair incisional hernias, all using a prosthetic mesh placed in different locations. Polypropylene mesh has been used extensively because it has the greatest tissue ingrowths of all the mesh products available with least complication rate[11]. With progress in surgical techniques, the number of cases of limited-sized incisional hernia treated by laparoscopy has increased now-a-days.

Methodology:-

This is a prospective study, which examines the various risk factors involved in causation of incisional hernia, its various clinical presentations, role of anatomical repair as well as mesh repair in its management and complications. Study includes all incisional hernias admitted and treated in Rims Medical College & Hospital, Kadapa from March 2015 to February 2017.

Inclusion Criteria:-

One hundred cases of incisional hernia who got admitted at Rims Medical College & Hospital, Kadapa in the department of surgery were enrolled in the study.

Exclusion Criteria:-

Patients with Strangulated incisional hernias, intra abdominal malignancies and patients with severe co-morbid conditions (severe cardio-pulmonary disease, uncontrolled ascites), pregnant women with incisional hernias and recurrent incisional hernias are excluded from the study.

Methods:-

Patients demographic and clinical data was collected and recorded in the study proforma. History was taken regarding duration of hernia, progression in size, associated complaints like pain in the swelling or abdomen, vomiting, reducibility, chronic cough, constipation, difficulty in micturition, abdominal distension, history suggestive of ascites and other causes of abdominal distension, number of pregnancies. History regarding previous surgeries with respect to nature of operations, duration, type of incisions, type of closures, post-op complications, is

enquired. General and physical examinations was done. In local examination special attention was given to the position, size, shape, composition, cough impulse, reducibility, and skin over the swelling, and size of the defect and tone of the muscles, position of the previously operated scar.
All cases were clinically diagnosed and all patients included in the study underwent surgery following routine pre-operative investigations.

Cases were prepared for surgery after preoperative correction of anaemia, hypertension, diabetes and local skin conditions. They were subjected either to anatomical repair or mesh repair by the affordability of the patient to buy polypropylene mesh. All patients underwent surgical procedure after routine preoperative preparations. Informed written consent was obtained after explaining the surgical procedure, its results, risk factors and complications. Naso-gastric tube is inserted for 24-36hrs. Post operatively all patients were kept nil orally for 24-36hrs.

Patients were treated with IV fluids, broad spectrum antibiotics covering both aerobic and anaerobic organisms for 5 days along with proton pump inhibitors and adequate analgesics. Temperature/pulse/respiration/BP monitored every 4th hourly and Input/output over 24hrs chart maintained. Patients were allowed oral sips of water after 24-36 hrs and liquids as tolerated and subsequently patients were allowed to take soft diet. Quantity and nature of the suction drain noted down daily and Drain removed when the bowel sounds were present, after patients passed flatus & stools and the draining fluid has become nil or less than 20ml.

Operative wound inspected on 4th post-operative day. During wound inspection special attention was given to signs of inflammation and discharge from the wound. If swelling was noticed following drain removal and prior to discharge of patient to home , which was soft in consistency (at the wound site), contents were aspirated with 18G needle and nature of collection noted. If it was serous or bloody, aspiration completed with the same needle. If it was purulent, collection was let out by removing one or two stitches and pus was sent for culture and sensitivity.

Post-operative infection in our study was defined as presence of erythema of greater than 1cm from wound margin, tenderness on palpation and presence of sero-sanguinous or purulent discharge. If the wound is healthy, alternate sutures were removed after about 8-10 days and remaining sutures were removed one day later. After complete wound healing patient was advised to come for review once a month for at least 3 months and subsequently after 3 and 6 months thereafter. Also, on discharge patients were advised to stop smoking (if smoker), to reduce weight (if obese), not to lift heavy weights for at least 3 months, light work and abstinence from sexual activity for at least 1 month. During follow up patient was examined for fresh symptoms and signs pertaining to recurrence and surgical procedure. Details regarding duration of hospital stay following surgery, post operative wound complications and recurrence were recorded.

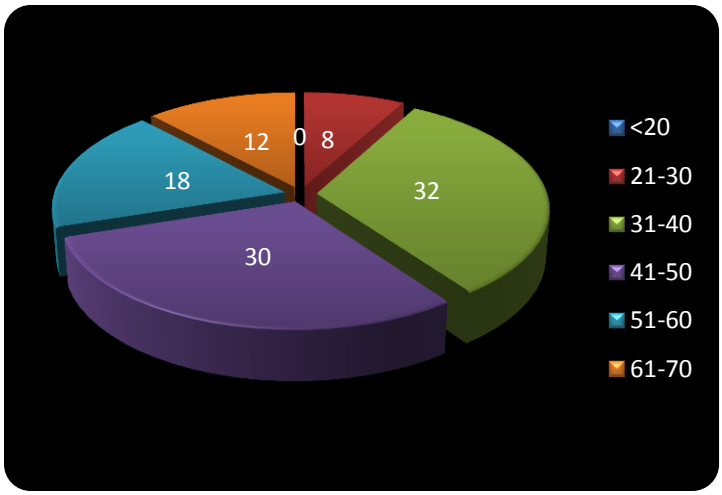
Results:-

100 cases of incisional hernia which were admitted in Rims Medical College & Hospital, Kadapa were studied. The statistical data and analysis of the cases studied during this period are presented in this study.

Age incidence:-

Table 1:- Age Incidence Of Incisional Hernia

AGE	NO.OF CASES (n=100)	PERCENTAGE
< 20	0	0
20-30	8	8%
31-40	30	30%
41-50	32	32%
51-60	18	18%
61-70	12	12%



Graph 1:- Age Incidence Of Incisional Hernia

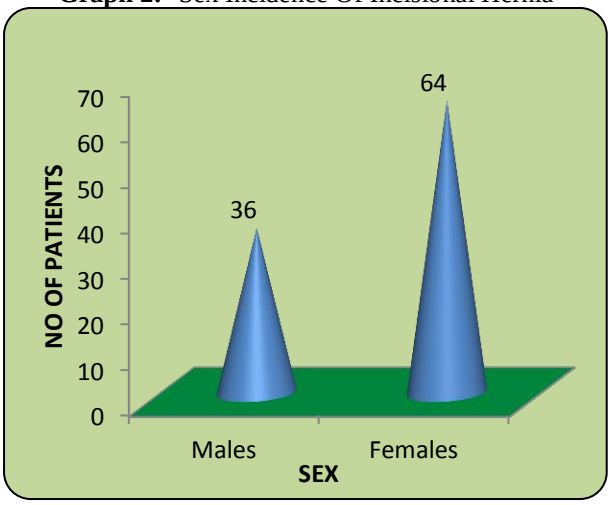
In Our study the maximum age incidence of incisional hernia is seen in 31-50 years.

Ii. Sex incidence:-

Table 2:- Sex Incidence Of Incisional Hernia

SEX	NO OF CASES (n=100)	PERCENTAGE
Male	36	36 %
Female	64	64 %

Graph 2:- Sex Incidence Of Incisional Hernia



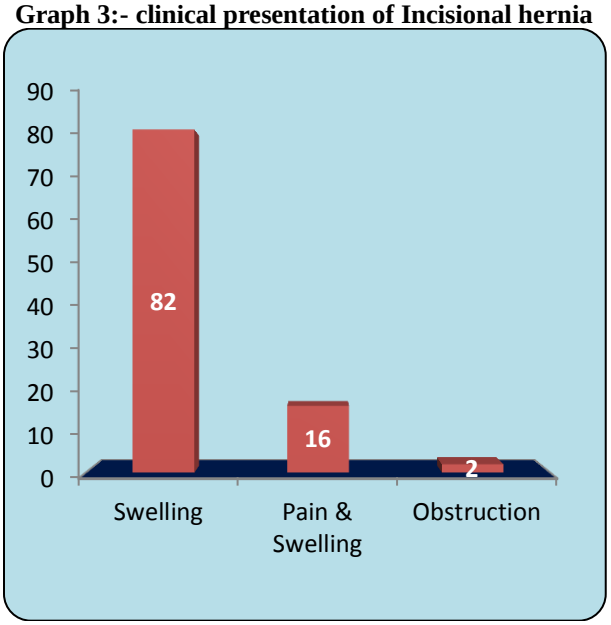
In our study of the 100 patients, 64 were females and 36 were males.

Clinical presentation:-

Table 3:- Clinical Presentation Of Incisional Hernia

MODE OF PRESENTATION	NO. OF CASES (n=100)	PERCENTAGE
Swelling only	82	82 %
Swelling & Pain	16	16 %
Obstruction	2	2 %

Graph 3:- clinical presentation of Incisional hernia



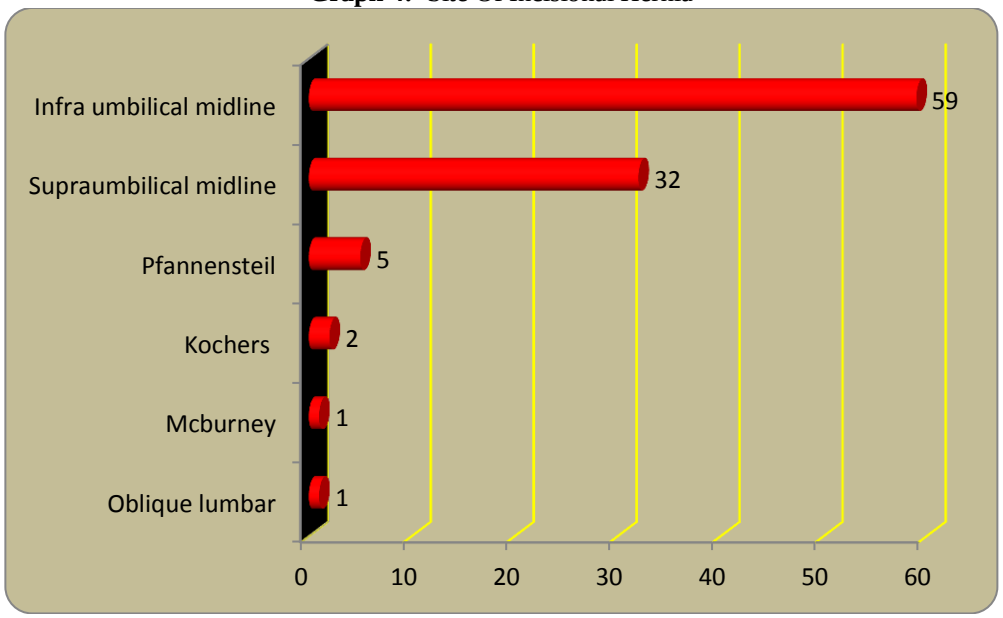
In this study swelling has present in all 100 cases and pain in 16 cases.

iv. site of incisional hernia:-

Table 4:- Site Of Incisional Hernia

SITE	NO. OF CASES (n=100)	PERCENTAGE
Infra umbilical midline	59	59 %
Supra umbilical midline	32	32 %
Pfannensteil	05	5 %
Mcburney	01	1 %
Kochers	02	2 %
Lumbar	01	1%

Graph 4: Site Of Incisional Hernia



In Our study , 59 cases showed incisional hernia at the infra umbilical midline, 32 at supra umbilical midline and 9 at other sites.

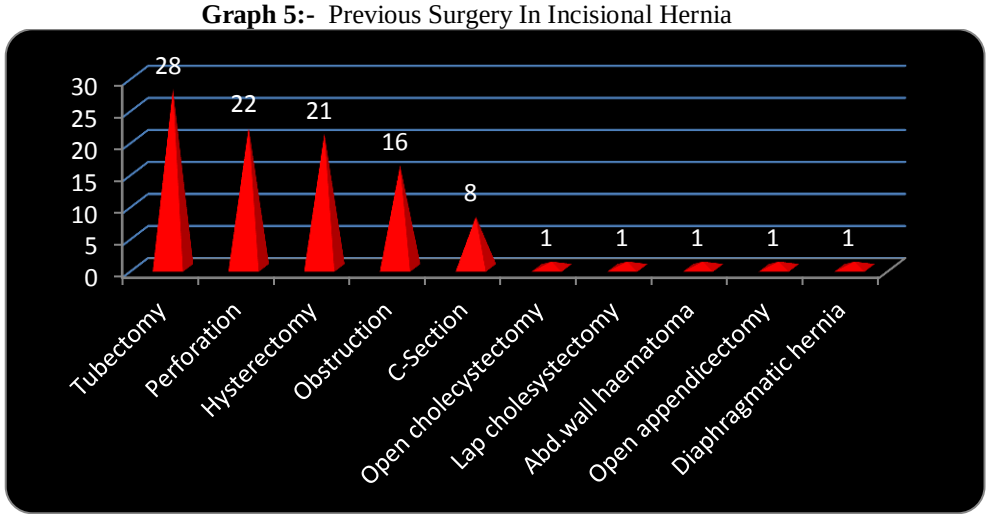
V. Nature of previous surgery:

Table 5:- previous surgery:

SURGERY DONE	NO OF CASES (n=100)	PERCENTAGE
Tubectomy	28	28 %
Intestinal Perforation	22	22 %
Hysterectomy	21	21 %
Intestinal Obstruction	16	16 %
Caesarean Section	8	8 %
Abdominal Wall Haematoma	1	1 %
Lap Cholecystectomy	1	1 %
Open Cholecystectomy	1	1 %
Open Appendicectomy	1	1 %
Diaphragmatic Hernia	1	1 %

Fig.1:- Incisional Hernia In A Female After Previous Hysterectomy

Graph 5:- Previous Surgery In Incisional Hernia



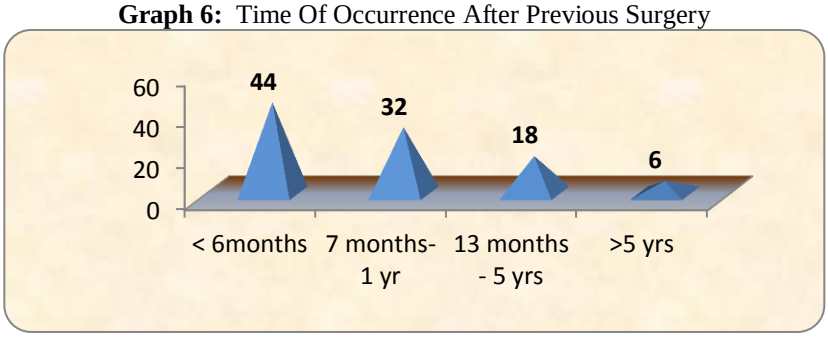
In our study 49 % of cases is seen with incisional hernia after gynecological surgeries.

Vi. Time elased between the date of surgery and the appearance of incisional hernia:

Table 6:- time of occurrence after previous surgery :

TIME AFTER SURGERY	NO OF CASES (n=100)	PERCENTAGE
Within 6 months	44	44 %
Within 7-12 months	32	32 %
Within 13 months - 5 years	18	18 %
More than 5 years	6	6 %

Graph 6: Time Of Occurrence After Previous Surgery



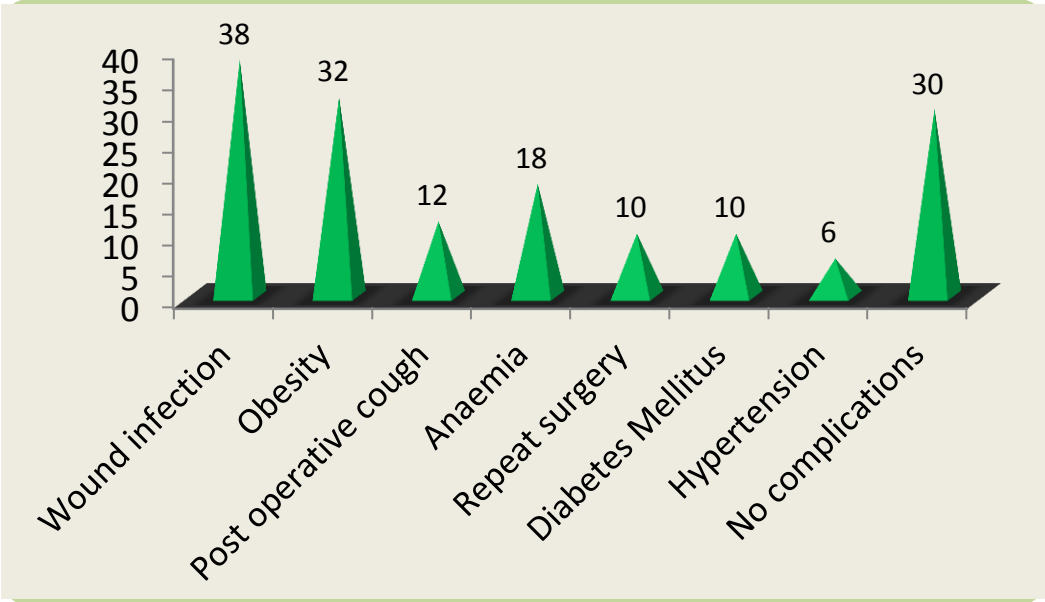
In our study most cases (76 cases) occurred within one year.

Risk factors:-

Table 7:- probable risk factors :

RISK FACTORS	NO OF PATIENTS (n=100)
Wound infection	38
Obesity	32
Post operative Cough	12
Anaemia	18
Repeat surgery	10
Diabetes Mellitus	10
Hypertension	6
No complications	30

Graph 7:- Risk Factors For Incisional Hernia



- Many patients had one or more risk factors.

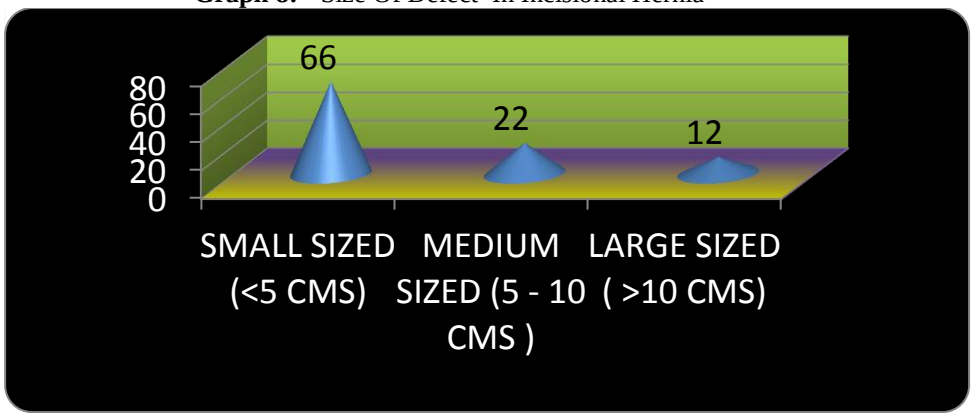
- In the present study out of the 100 cases of incisional hernia, 38 cases had infection post operatively . Chronic cough is identified in 12 patients .

Size of hernial defect:-

Table 8:- size of hernial defect :

SIZE IN CMS	NO.OF CASES (n =100)	PERCENTAGE
< 5 cms	66	66 %
5-10 cms	22	22 %
>10 cms	12	12 %

Graph 8:- Size Of Defect In Incisional Hernia



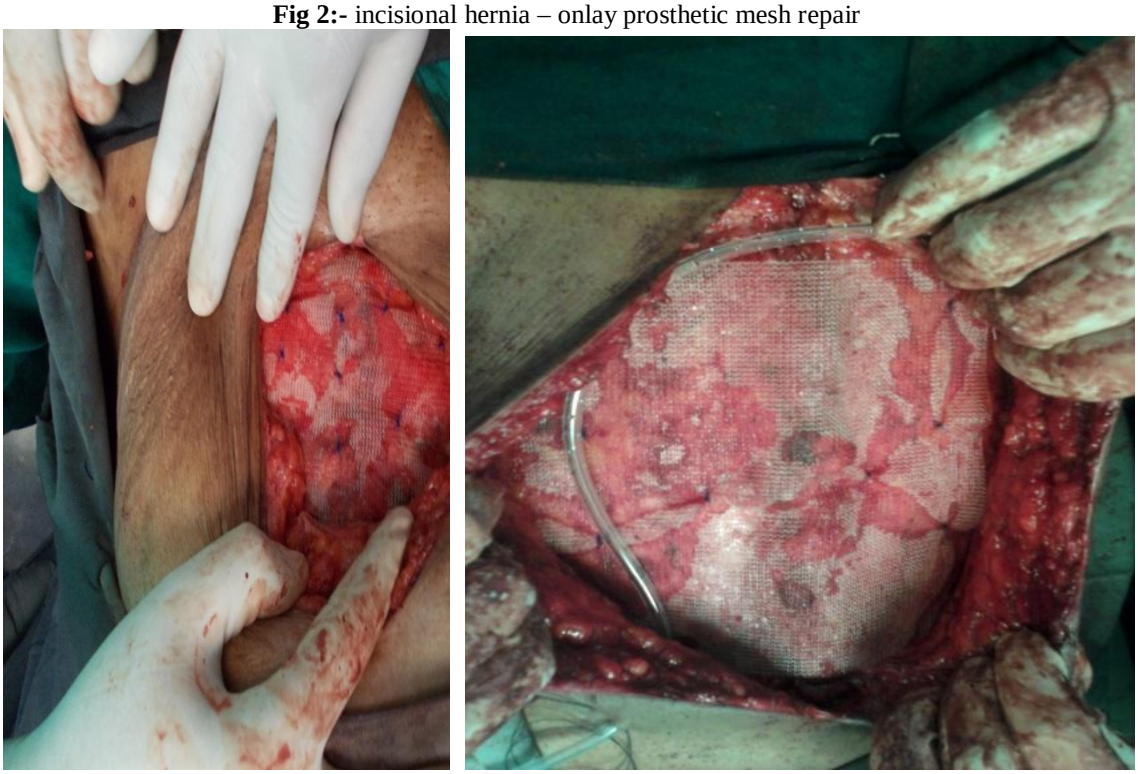
In the present study out of the 100 patients, very large hernias is seen in twelve patients. The muscle tone in these patients was poor and the recti were widely separated. In 22 Cases moderate sized hernias is seen. All the other patients had small hernias(< 5cms).

Type of operations performed:-

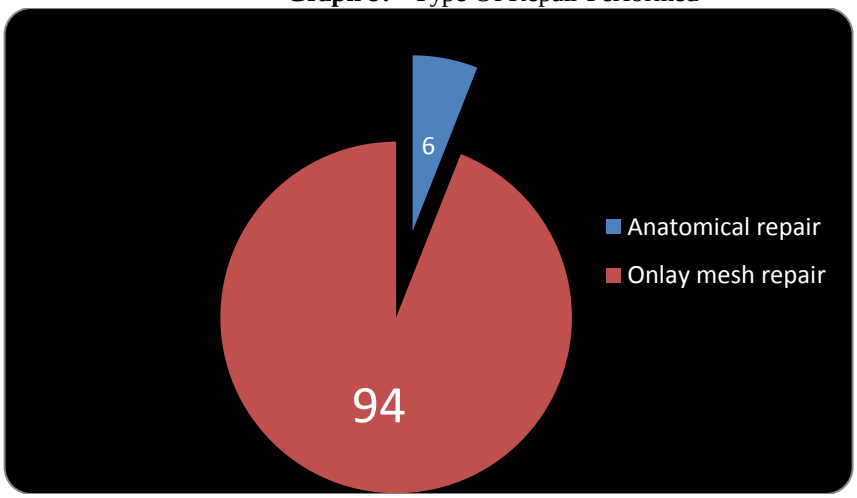
Table 9:- type of operations performed

TYPE OF REPAIR	NO OF PATIENTS (n=100)	PERCENTAGE
Onlay mesh repair	94	94 %
Anatomical repair	06	6 %

Fig 2:- incisional hernia – onlay prosthetic mesh repair



Graph 9:- Type Of Repair Performed



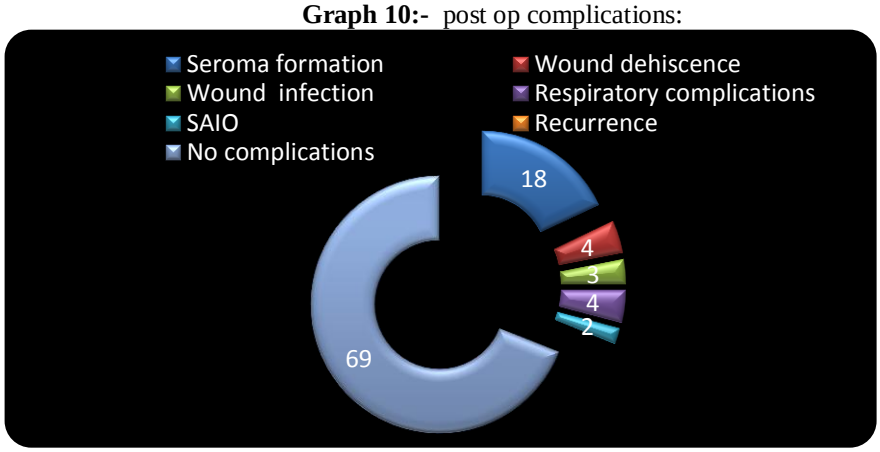
94 out of 100 were treated with polypropylene mesh repair and 6 with anatomical repair.

Post operative complications:-

Table 10:- post operative complications:

COMPLICATIONS	NO OF PATIENTS (n=100)	PERCENTAGE
Seroma formation	18	18 %
Wound dehiscence	4	4 %
Wound infection	3	3 %
Respiratory complications	4	4 %
Sub acute intestinal obstruction	2	2 %
Recurrence	0	-
No complications	69	69 %

Graph 10:- post op complications:



Follow Up And Recurrence:-

The follow up was advised for all the cases after discharge once in every 2 months. 68 cases were followed up for more than 1 year with a maximum follow up period of 2 years, minimum period of follow up was 2 months in three cases. There was no recurrence and no mortality in the present study group.

Discussion:-

In Our study the maximum age incidence of incisional hernia has seen in 31-50 years. Brendan Devlin[12] states that in most series, the incidence is more around 40 years. Ellis, Gajraj and George [13] in their study noticed a mean age of 49.4 years. In the Tulaskar et al[14] study mean age was 41.8 yrs. In the study of Agbakwuru EA et al[15] the highest incidence was between 31 – 50 years. This goes well with the present series. In the present study highest incidence was between 31-50 years. This may be due to the fact that certain operations like Hollow viscus perforation, LSCS, Hysterectomy are done in a large number of cases in this age group. Our study is correlated with these studies.

In our study 100 patients were enrolled in that 64 were females and 36 were males. Ellis, Gajraj and George[13] obtained an incidence of 64.6% female population in their study of 383 patients. Goel and Dubey [43]series have male to female ratio 1:1.25 ratio. Tulaskar et al[14] series have 81.2 % of female population. This study confirms that incidence in female was higher. These studies are similar to our study. The incidence of female is higher may be because of laxity of abdominal muscles due to multiple pregnancies and also an increased incidence of obesity in females.

Table 11:- comparison studies of age & sex :

STUDY GROUP	MEAN AGE INCIDENCE	SEX INCIDENCE
Ellis, Gajraj and George et al[13]	49.4 yrs	64.6 %
Agbakwuru EA et al[15]	35 yrs	100 %
Tulaskar et al[14]	41.85 yrs	81.2 %
Present study	45 yrs	64 %

In our study swelling is seen in all 100 cases. and pain in 16 cases, 2 cases showed obstruction. In Tulaskar et al[14] study, history of swelling was present in all 64 (100%) cases; pain was noted in 43(67%) patients and vomiting in 7(11%) patients. This study is similar to our study.

In Our study, 59 cases of hernia occurred through the infra umbilical midline, 32 cases were through the supra umbilical midline and 9 through other sites. In Agbakwuru EA et al[42] series the infra umbilical incision was responsible for 81.9 % of herniation and supra umbilical midline scar was responsible for 4.5%, periumbilical 13.6 %. In Nilesh Tulaskar et al[14] study 71.8 % of Hernia's occurred in lower midline incision followed by upper midline 15.6 %, pfannensteil, kochers , paramedian, lumbar incision each 3.1 % . In Parekh JN et al[14] studies (67.1%) and Goel and Dubey[15] studies (44.6%) infra umbilical incision was responsible for most of cases which correlates with our study.

Table 12:- Comparison Studies Of Previous Incision & Surgeries:

STUDY GROUP	LOWER MIDLINE INCISION	GYNAECOLOGICAL SURGERIES
Agbakwuru EA et al[15]	81.9 %	70.4 %
Tulaskar et al[14]	71.8 %	78 %
Present study	59 %	49 %

In this series about 59 cases of incisional hernias occurred in midline infra umbilical incision. This is due to the fact that, intra peritoneal pressure is hydrostatic and in the erect posture, the upper abdominal pressure remain at 8 cms of water while the lower abdominal pressure increases by 2 to 20 cms of water, with the change of posture from recumbency to standing. Absence of posterior rectus sheath below the arcuate line in the lower abdomen. Most of the lower abdominal incisions were mainly used for pelvic operations. Since all vertical incisions are subjected to more stress when compared to the transverse incisions, greater care should be exercised in preventing disruption in these cases with more meticulous and careful closure of lower abdominal wound[18].

In our study 49 % of cases occurred after gynaecological surgeries . Ponka[19] in his study noted 36% incidence and Goel and Dubey[16] noted 28.76% incidence, Tulaskar et al[14] noted 78 % incidence among gynaecological procedures which is not similar to our study.

In our study, 44% of cases of hernia was seen in the 1st six months, 76% within the 1st year, 94% within 5 years. In Akman's[20](1962) series, more than 65% of the incisional hernias occurred within one year after previous operation. In Agbakwuru et al[21] series 77.4 % of the incisional hernias occurred within one year after previous operation.

The etiology of late occurring hernia is not clear. The hernia develops in what apparently is a perfectly healed wound that has functioned satisfactorily for 5, 10 or even more years after the operation. The incidence is presumably due to the failure of the collagen in the scar, although there seems to be no obvious reason why mature collagen that has served well for a number of years should change its structure. The ageing and weakening of the tissues and the raised intra abdominal pressure associated with chronic cough, constipation and prostatism are cited as factors[22].

Obesity:-

Obesity has been described as one of the aetiological factor in incisional hernia. In the present series 32 % of patients are moderate to extremely obese. In Shouldice surgery, 87% were obese and in Agbakwuru's[15] study 27.3 % were obese. Obesity was associated with a threefold increase in herniation in Bucknell's[7] study. Thus the prevalence of obesity among patients with incisional hernia is clearly established.

Associated pathology:-

About 18 cases were anemic with the hemoglobin percentage below 8 gm%. Six of them were hypertensives, Ten of them were diabetic.

Number of surgeries prior to diagnosis of incisional hernia:-

In this series out of the 100 cases, 10 patients had undergone more than one operation previously. Brenden Devlin[12] states that repeated wound in the same region or just parallel to each other will often lead to the development of herniation. Almost 25% of patients in Ponka's[19] series had undergone more than one operative procedure.

In our study 30 cases showed, no complication of any sort. This represents that in most of the cases there is no cause seen, however wound infection is a major predisposing factor. This is comparable with that of Bose et al[23] studies in which wound infection (59 out of 110 patients-53.63%), obesity (33/110-30%), COPD (23/110 – 20.90%) and stricture urethra (10/110 – 9.09%).

In our study polypropylene mesh and the suture material of the same type was used to repair the incisional hernias and the technique of the repair was decided by the size of the hernial defect, abdominal muscle tone, whether hernial defect could be approximated without tension and general condition of the patient.

Closed suction drain catheters placed over the mesh and brought out through separate stab wounds remote from the incision were used in all the cases. Broad spectrum Antibiotics were used in majority of cases during post operative period.

Table 13:- Comparison Studies Of Post Op Complications After Incisional Hernia Surgery :

POST OP COMPLICATIONS AFTER INCISIONAL HERNIA SURGERY	Tulaskar et al[14]	amjad hossain S M et al[24]	Present Study
Seroma formation & Wound infection	20.25 %	15.3 %	21 %
Wound dehisence	3.1 %	-	4 %
Respiratory Complications	3 %	4.9 %	4 %
Recurrence	Nil	2.5 %	Nil

An extra fascial accumulation of serum in some degree is to be anticipated after every incisional hernia repair involving a prosthetic onlay. The use of closed suction drainage showed a marked decrease in the incidence of post operative complications like seroma, hematoma, and wound infection.

Seroma occurred in 18 of cases which have healed after regular dressings and systemic antibiotics. Wound gaping occurred in four which required secondary suturing. There were 3 cases of Wound infection followed by Mesh infection, Removal of mesh done. 4 patients had post operative lung infections managed conservatively. Two patients had post operative sub acute intestinal obstruction relieved on conservative management. Khaira H.S.[5] et al reported seroma formation in 6 out of 35 patients and wound infection in 1 out of 35 patients.

With thorough patient evaluation, pre operative skin preparation, meticulous operative technique, use of non absorbable sutures for musculo aponeurotic tissue, use of suction drain, use of peri-operative broad spectrum antibiotics, nasogastric aspiration, early ambulation and chest physiotherapy, complication rates in our study were minimized.

In our study we had no recurrences, however the follow-up period was variable and short to comment upon. Usher[25] reported zero percent recurrence in 48 patients who were treated by polypropylene mesh repair. Jacobus W.A et al[26] reported a 10 year cumulative rate of recurrence of 63% in anatomical repair and 32% in mesh repair. The recurrence rate thus varies in different studies but all studies favour mesh repair to decrease the recurrence rate.

Conclusion:-

100 cases of incisional hernia were selected and the data was recorded based on the inclusion and exclusion criteria. Results were analyzed based on the statistical data. Following are the conclusions drawn.

1. The incidence of incisional hernia is more common in the age groups 31-50 years.
2. The incidence of incisional hernia is more common in females especially in obese and multiparous women and after gynaecological surgeries.
3. The majority of incisional hernia occurred within first one year of previous operation.
4. The size of the hernial defect less than 5 cms was found in 66% of patients.
5. 94 patients underwent mesh repair and 31 patients had post operative complications- wound infection being the commonest.
6. The use of closed suction drainage tubes has significantly reduced the post operative complications.
7. The incidence of incisional hernia is more common in midline infra umbilical incision.
8. There was no recurrence in our study though the period of follow up was not adequate to make correct assessment of recurrence.
9. There was no mortality in our study.
10. Wound infection following previous surgery was the most important risk factor associated with wound failure.
11. Onlay reinforced primary repair using prolene mesh has given good results and prolene mesh appears to be best tolerated by body tissues.

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