

**ORIGINAL ARTICLE**

**A CLINICAL STUDY OF POSTOPERATIVE COMPLICATIONS FOLLOWING REPAIR OF  
INCISIONAL HERNIA USING MESH AMONG PATIENTS ADMITTED IN RAJAH  
MUTHIAH MEDICAL COLLEGE HOSPITAL**

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*Article History: Received 1<sup>st</sup> September, 2014, Accepted 6<sup>th</sup> October, 2014, Published 7<sup>th</sup> October, 2014*

**ABSTRACT**

**STUDY** A clinical study of postoperative complications following repair of incisional hernia using mesh among patients admitted in Rajah Muthiah medical college hospital. **OBJECTIVE:-** 1. To study the immediate post operative complications following incisional hernia using mesh repair of hernia. 2. To identify the risk factors for the complications. **METHODS** 100 patients who are diagnosed to have incisional hernia and undergoing mesh repair for the same in RMMCH from 1<sup>st</sup> OCT 2012 to 1<sup>st</sup> OCT 2014 would be evaluated for this study. **RESULTS:-** Out of 100 patients, 73 (73%) were females and only 27 (27%) were males. Age groups in which maximum cases found is 41-50 years about 39(39%). More number of incisional hernia cases were found in patients with midline infraumbilical incisions and those who underwent gynaecological operations previously. All 100 patients were underwent elective mesh hernioplasty and complications were recorded. The complications like - Seroma 12 (12%), Hematoma 3(3%), Infection 5(5%), Skin Necrosis 3(3%), wound dehiscence 3(3%), mesh FB 1(1%), Sinus 1(1%) were found. Pulmonary complications 4(4%), and GIT complications 5(5%) were seen. **CONCLUSION** :- In the present study Females were more affected. Maximum number of cases were seen between 4<sup>th</sup> decade to 5<sup>th</sup> decade. Incisional hernia was seen in more than 50% of the cases who had previously undergone gynaecological operations with midline infraumbilical incisions. In all the cases, wound sepsis, postoperative cough, paralytic ileus and obesity were the main predisposing causes. All incisional hernia patients presented with (100%) swelling in the abdominal wall. 22% of patients (22) presented with pain, 18 cases (18%) presented with vomiting. The complications in our series were equal or nearer to the different studies done earlier. These cases were followed up further for any recurrences. In this study no recurrence of hernia was found. Local wound complications in the post operative period was the most common aetiology for the development of incisional hernia which correlates with the studies done previously. Using good asepsis and use of mesh judiciously in all cases of ventral hernia will reduce the recurrences.

**Keywords:** Ventral hernia; incisional hernia; prolene mesh; inlay; onlay; preperitoneal plane.

**1. INTRODUCTION**

Hernia word is derived from greek word "Hernios" means branch or offshoot (Main Got's).

**Ventral Hernia:** Is defined as a collective term of all extrusions of peritoneum and abdominal contents through the antero lateral abdominal wall excluding groin hernia. This includes.

**1. Incisional hernia or post operative hernia:**

Incisional hernia fall into undesirable sequelae of the surgery. So considered as Iatrogenic problem. 'The extrusion of the

peritoneum and abdominal contents through a weak scar of an operation or accidental wound (Ian Aird-1957). Second most common type of hernia of all Ventral hernias.

Patient may unaware of its presence when it is small or it may attain such dimension as to form a second abdomen out side of the natural abdominal boundaries, forcing the patient to seek medical advice either because of discomfort or disability and cosmetic problems.

The complications of incisional hernia are minimum but still danger does exist. The hernia can obstruct, strangulate, incarcerate, or can cause skin necrosis and perforation. All of which markedly increase the risk of the patients life. Hernias

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are responsible for considerable economic loss to the patient family and the nation specially when complicated.

It is there fore important to perform the type of operation which will offer the best chance for a permanent cure with minimal risk. The ideal treatment is surgery only. Various techniques have been developed from time to time for this challenging disease. As the anatomical repair is associated with lot of post operative complications especially recurrence after sometime. So the use of sheets of non absorbable synthetic mesh prosthesis across the defect and stitched to the abdominal wall has revolutionized the repair of abdominal wall defects.

The use of Synthetic plastic material like Prolene Mesh, Marlex Mesh, Merseline (Dacron) Mesh has changed the surgical treatment of the ventral (incisional) hernia. The recurrence of the hernia rate has been reduced from 39% to 11 %. This procedure has some post operative complications following mesh repair.

In this clinical study post-operative complications following repair of incisional hernia using mesh has been considered. Some emphasis has been laid on the etiological factors. In this clinical study, the Short-term complications following repair of incisional hernia using mesh done in our hospital during 2012 -2013, the results were compared to the literature standards. In literature studies have showed that the local wound infection/other complications are responsible for recurrence of the hernia. This study helps to identify the complications, cause for the complications and treatment of these complications. So to reduce the morbidity i.e. recurrence of hernia

## 2.MATERIALS AND METHODS

All patients detected to have ventral hernia during the period of 1<sup>st</sup> OCT 2012 to 1<sup>st</sup> OCT 2014 were studied at RMMCH. The total number of cases studied were 100 which includes all incisional hernia All patients underwent thorough clinical examination and a detailed history of earlier operation were asked. All patients were simultaneously evaluated for any systemic disease or any precipitating cause. Patients who had associated hypertension, diabetes mellitus or cough were controlled and monitored pre operatively.

Routine investigations like Hb, TC, DC, BT, CT, Urine analysis and blood grouping and cross matching were done. All cases were underwent ECG, Blood Sugar (Fasting and Postprandial), blood urea and serum creatinine, HIV/ HbsAg investigations. Chest X-ray and USG was done in all cases. Pre-operative fitness was obtained. Some cases cardiology opinion taken and ECHO was done as per the cardiologist advise. 100 cases were operated on elective basis.

All cases were admitted prior to surgery to permit pre-operative investigations and preparation. A day prior to surgery, shaving of the abdomen, genitalia, perineum and back was done. Overnight patient was kept fasting. All patients were asked to take scrub bath in the morning on the day of surgery. A Ryle's tube was passed and broad spectrum antibiotic was given to all patients in the operation theatre.

In the operation room patients underwent thorough skin preparation over area of operation with povidone - iodine solution. Abdomen was draped. Operations were done under general anaesthesia / spinal anaesthesia or epidural anaesthesia.

In all cases of incisional hernia old operative scar was existed. Generous skin incisions were used to permit adequate exposure of hernial sac and defect, depending upon the type of hernia. Type of operation was decided based on the size of defect, muscle tone of abdominal wall, whether hernial defect margins could be approximated without tension or not, age of the patient or any earlier recurrence. Skin flaps were raised till hernial defect could be clearly defined and peritoneum was opened and hernial contents were reduced after lysis of adhesions. Redundant hernial sac was excised and muscular - aponeurotic structures repaired with prosthetic mesh, care was taken to place suture in the healthy tissues only. Prosthetic mesh repair was done with inlay technique, onlay technique or placed properitoneally. Wound was then closed after insertion of suction drain. In all cases non absorbable suture material was used to close musculoaponeurotic structures. Suction drain tube was meticulously anchored to the abdominal wall.

In post operative period naso gastric aspiration was done 2nd hourly in first 24 hours. Ryle's tube was removed once patient passed flatus. Bladder catheterization was done if patient was unable to pass urine. Suction drain was removed once drainage was below 25cc in 24 hours. Antibiotics were continued till the removal of sutures. Post operatively deep breathing exercises and movement of limbs in bed was advised as soon as patient recovered from anaesthesia. Early limited ambulation was done once patient was able to bear pain. IV fluids were continued till passage of flatus, thereafter patient received liquid diet and later soft diet.

Skin sutures were removed on 8<sup>th</sup> day or 10th day and patient discharged on same day or next day. At discharge patients were advised to restrict their activities for first six months. Obese patients were advised to shed weight. Patients were called for review every weekly upto 6 weeks. At the time of review the patients were asked for any symptoms and operative site examined for any short term complications. These cases were then analyzed and results were compared with existing literature. An extensive review of literature is also carried out.

## 3.RESULTS

The total number of cases studied in this series was 100 cases of incisional hernia admitted in surgical wards of RMMCH from 1<sup>st</sup> OCT 2012 to 1<sup>st</sup> OCT 2014

Study Design: A Prospective clinical study consisting of 100 patients with incisional hernia is undertaken to study the short term complications following the repair incisional hernia with Prosthetic mesh and its association with risk factors.

Incidence : In the year between 1<sup>st</sup> OCT 2012 to 1<sup>st</sup> OCT 2014 a total number of 100 cases of incisional hernia were admitted at our hospitals of which the incidence of different hernias are as follows

**Table 1 Age Distribution with Sex**

| Age (in Years) | Male   |       | Female |       | Total  |       |
|----------------|--------|-------|--------|-------|--------|-------|
|                | Number | %     | Number | %     | Number | %     |
| 10-20          | -      | -     | 1      | 1.4   | 1      | 1.0   |
| 21-30          | 1      | 3.7   | 9      | 12.3  | 10     | 10.0  |
| 31-40          | 3      | 11.1  | 16     | 21.9  | 19     | 19.0  |
| 41-50          | 10     | 37.0  | 28     | 38.4  | 38     | 38.0  |
| 51-60          | 6      | 22.2  | 6      | 8.2   | 12     | 12.0  |
| 61-70          | 6      | 22.2  | 9      | 12.3  | 15     | 5.0   |
| 71-80          | 1      | 3.7   | 4      | 5.5   | 5      | 5.0   |
| Total          | 27     | 100.0 | 73     | 100.0 | 100    | 100.0 |

Mean + SD 39.51 ± 16.80 38.04 ± 15.04 47.32 ± 13.97

From the above table, it is learnt that the ventral hernia is maximum in the age group of 41-50 years. In this study the youngest is 22 years and the oldest is 77 years. Mean age was 47.3

**Table – 2 Types of Incision**

| Sl. No. | Type of Incision           | Number (n=63) | %    | In S.N. Bose series (%) |
|---------|----------------------------|---------------|------|-------------------------|
| 1       | Midline Supra umbilical    | 5             | 7.9  | 8.1                     |
| 2       | Midline Intra umbilical    | 36            | 57.1 | 31.8                    |
| 3       | Laparotomy                 | 7             | 11.1 | 42.7                    |
| 4       | Subcostal                  | 5             | 7.9  | 8.1                     |
| 5       | Paramedian (Right + Left)  | 6(5+1)        | 9.5  | -                       |
| 6       | Intra Umbilical transverse | 11            | 17.5 | -                       |
| 7       | Nephrectomy incision       | 2             | 3.2  | 4.5                     |
| 8       | Laprosopic Port Site       | 1             | 1.6  | 4.5                     |

Incisional hernia common with midline infra umbilical incisions.

**Table – 3 Emergency / Elective surgeries in Incisional Hernia**

| Emergency/Elective | Number (n=100) | %  |
|--------------------|----------------|----|
| Emergency          | 68             | 68 |
| Elective           | 32             | 32 |

Incisional hernia is common following emergency surgery.

**Table – 4 Post-operative Complications**

| Sl. No. | Post -operative complications | Number (n=100) | In our series % |
|---------|-------------------------------|----------------|-----------------|
| 1       | Seroma                        | 12             | 12.0            |
| 2       | Hematoma                      | 3              | 3.0             |
| 3       | Wound Infection               | 5              | 5.0             |
| 4       | Skin necrosis                 | 3              | 3.0             |
| 5       | Wound Dehiscence              | 3              | 3.0             |
| 6       | Sinus formation               | 1              | 1.0             |
| 7       | Pulmonary Complications       | 4              | 4.0             |
| 8       | Gill complications            | 5              | 5.0             |
| 9       | Mesh foreign body reaction    | 1              | 1.0             |
| 10      | None                          | 68             | 68.0            |

**Table – 5 Association of Risk factors with Post-op Complications**

| Assoc Risk factors | Absent (n=68) | Present (n=32) | Total (n=100) | P value | OR (Present) |
|--------------------|---------------|----------------|---------------|---------|--------------|
| Age < 45 years     | 45 34(50.0)   | 17(53.1)       | 51            | 0.771   | 1.13         |
| Age > 45 years     | 34(50.0)      | 15(46.9)       | 49            | 0.771   | 0.88         |
| Male               | 13(19.1)      | 13(40.6)       | 26            | 0.022*  | 2.89         |
| Female             | 55 (80.9)     | 19(59.4)       | 74            | 0.022*  | 0.34         |
| Obesity            | 25(36.8)      | 23(71.8)       | 48            | 0.001** | 4.39         |
| Cough              | 11 (16.2)     | 5(15.6)        | 16            | 0.944   | 0.95         |
| BPH                | 2(2.9)        | 4(12.5)        | 6             | 0.081   | 4.71         |
| HTN                | 20(29.4)      | 6(18.9)        | 26            | 0.257   | 0.55         |
| DM                 | 10(14.7)      | 9(28.1)        | 19            | 0.111   | 2.27         |
| Constipation       | 2(2.9)        | -              | 2             | -       | -            |
| DM                 | 10(14.7)      | 9(28.1)        | 19            | 0.111   | 2.27         |

Age is not significantly associated with post-op complications, Male, Obesity, BPH and DM are positively associated with the post-op complications patients presented with obesity are 4.39 times more likely to develop post-op complications with P=0.001.

#### 4.DISCUSSION

One hundred cases of incisional hernia were studied in this series. The incidence of incisional hernia has been stated variously. Rodney maingot states that, incisional hernia form nearly 11% of all hernia and umbilical hernia about 10% of all hernia. In S.M.Bose series 175 cases of Ventral hernia were studied and the incidence was, Incisional hernia-62.86%, umbilical hernia 6.85%), Paraumbilical hernia 18.26%) Epigastric hernia 12%, and Spigelian hernia - nil. In our series the incidence was Incisional hernia-63%>, Paraumbilical hernia-17%, Epigastric hernia-7%, umbilical hernia- 7%, and spigelian hernia-3%). This goes well with the literature.

The maximum age incidence of incisional hernia in the present series has been 41-50 years, with mean age of 47.32 years. In S.M.Bose series the age range was 18 years to 76 years, with mean age of 44.96. This goes well with the present series. The sex incidence was 73% females and 27% males; this clearly indicates that the incidence of incisional hernia is more common in females than in males. In S.M.Bose series, of the 175 patients, 79 (45.14%) were males and 96 (54.86%>) were females. The incidence in female patients is more because of the laxity of abdominal muscles due to multiple pregnancy. In males, the incidence of incisional hernia is rare as most of the operations are above the umbilicus and the integrity of the abdominal wall is good because of well developed muscles and fascia.

In the present series 57.1% of the incisional hernias occurred in midline infra umbilical incision. This is due to the fact that Intra peritoneal hydrostatic pressure and in the erect position varies. The upper abdominal pressure remain at 8 cms of water while the lower abdominal pressure increases to 20 cms of water in erect position

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.

Male to female ratio of different type of hernias were given in table no.2. Female preponderance in all other types of hernia except in umbilical hernia, in which male preponderance is seen.

All details of previous surgery were therefore not available in these patients. However, in the final analysis wound infection at the time of primary surgery emerged as the commonest factor; chest infection and abdominal distension were the other significant factors found responsible for the development of incisional hernia. 70% of cases following Gynaecological procedure and 30% of cases following general surgical procedures.

In this series, out of 100 patients, 68 patients had undergone emergency surgery previously, 32 patients had Elective Surgery.

In our series 64% of patients had undergone more than one surgery previously. Brenden Devlin states that repeated wound in the same region or parallel to each other will often leads to the development of herniation. Almost 25% of the patients in the Ponka's series had undergone more than one operation.

In our series 19 patients had Diabetes mellitus 19 patients had hypertension, 6 patients had BPH. These co-morbid conditions are positively associated with post operative complications.

Obesity is also another prominent predisposing factor. In our series 48 % of patients were obese, and 2 patients are morbid obese. 46 patients were moderate to severe obese. Patients presented with obesity are 4.39 times more likely to develop post operative complication with  $p = 0.001$  as shown in table 10.

Obesity was associated with three fold increase in herniation in Bucknell's study.

The criteria for the obesity are taken as per national institute of health. All patients BMI was calculated using standard formula = weight in Kgs / Height in cm<sup>2</sup>

Almost all patients in this series, presented with swelling in the anterior abdominal wall 22% of patients complained of pain at the site of hernia 18 % complained of vomiting. The duration of hernia ranged from 6 months to 10 years 75% of patients sought medical advice within 5 years of the onset of symptoms. This goes well with the literature.

The position of mesh was based on the size of the hernial defect, no. of defects, abdominal muscle tone, age and general condition of the patient. 37 patients underwent inlay mesh hernioplasty, 58 patients underwent onlay mesh hernioplasty and 5 patients underwent pro-peritoneal mesh hernioplasty. The association of position of mesh with complications

showed that patients who underwent pro-peritoneal mesh repair are 9.57 times more likely to develop post operative complications with  $p = 0.035$ .

**General Complications:** All 100 cases were followed up during the immediate post operative period for short term complications. Two patients had intra operatively bowel injury. Another patient had intra operative hypotension. Five patients developed paralytic ileus. Post operative cough was present in 6 patients, of these 3 were asthmatic. Of this 6 patients who presented with post operative cough, 2 patients cough settled with chest physiotherapy and steroid inhalation. Rest of the 4 patients developed severe breathlessness, decreased oxygen saturation, for which chest x-ray was done which showed pneumonic consolidation and the antibiotics were changed, broncho dilators used and good physiotherapy given three patients recovered. But 1 patient continues to have breathlessness and he was admitted in MICU and the patient recovered after 10 days. All these patients had associated co-morbid conditions like diabetes mellitus and old age.

**Local Complications:** In our series 12% of patients had seroma and were treated with drainage under aseptic precaution. Hematoma was found in 3% of cases, wound infection in 5% of patients, skin necrosis in 3% of patients, wound dehiscence in 3% of patients and sinus formation in 1 patient.

In our series males obesity, BPH and diabetes mellitus are positively associated with post operative complications Obese patients are 4.39 times more likely to develop post operative complications with  $p = 0.001$ .

All cases were followed up to 6 weeks of post operative period. In the first follow-up all the 100 cases came in for follow up. In the second follow up 3 patients and in third follow up 9 patients did not come. There was an improvement seen in all the cases of soon after treatment during the follow up. All these patients were followed up to 2 years for any recurrence of hernia. Out of 100 cases 22 cases were followed up to 2 years, 32 cases up to 1 1/2 years, 15 of cases followed up to 1 year. And 19 cases up to 6 months. No recurrence is seen in our series. There was no mortality in the present series.

## 5.CONCLUSION

1. Ventral hernias is the second most common hernia after inguinal hernia.
2. Maximum age incidence, in the present series is between 40-50 years, more in females compared to males.
5. Incidence of ventral hernia is more common in obese and multiparous women and also in patients with associated disease like DM. BPH and chromi cough.
4. Incisional hernia is more common in the infra umbilical midline incisions. (57.1%)
5. Wound sepsis is the main factor leading to the development of incisional hernia in 60.3% of cases.
6. In all incisional hernia, the common presentation is swelling.
7. 90% of incisional hernia are reducible
8. In umbilical hernia - male preponderance is seen
9. Surgery is the treatment of choice.
10. Use of prosthetic mesh has reduced the recurrence rate.

11. Recent trend in the management of incisional hernia is to use prosthetic mesh repair.
12. Use of suction drainage through a separate stab incision has significantly reduced the post operative wound complication.
13. There was no recurrence in our series.
14. Thorough preoperative skin preparation, selection of appropriate operation with expertly administration of anesthesia are essential for excellent results. Meticulous operative technique, use of non absorbable sutures to close musculo apponeurotic layer is also needed for good results. Musculo apponeurotic layer closed with simple anatomical closure or double breasting, avoidance of any undue tension on suture line, use of suction drain, perioperative good antibiotic coverage, Nasogastric aspiration, prompt treatment of paralytic ileus by good electrolyte balance, good chest physiotherapy are all essential steps to reduce the complication rates to a minimum and the recurrence rates to nil.
15. Short term complications in our series are equal to the literature standard.
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