



## USE OF STERILISED NYLON MOSQUITO NET MESH IN INCISIONAL HERNIAS.

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### ABSTRACT

Hernioplasty is mainstay in treatment of abdominal wall hernias including incisional hernias. But in the developing countries like India everyone can not afford the commercial mesh used for this procedure. So, in this study we used sterilised nylon mosquito net mesh in our patients, efficacy of which has been proved already in the repair of both inguinal and incisional hernias. In this study consecutive patients of incisional hernias, admitted in R.D. Gardi Medical College, Ujjain from March 2008 to March 2014 were included. The included patients were informed and consent was taken for the use of mosquito net mesh. The patients who gave consent for the use of sterilised mesh made the case group in whom mosquito net mesh was used. Those who refused for mosquito net mesh were included in the control group in whom hernia repair was done by conventional non-mesh methods. During the follow up in the post operative period up to six months the main complications in the case group were prolonged discharge (12%), seroma (9.33%), stitch abscesses (8%) and gross infection (5.3%). There was no recurrence noted in the case group. In the control group the gross infection was found in 8 (11.76%) cases followed by prolong infection in 6 (8.82%) cases, seroma and stitch abscess in 5 (7.35%) cases. The recurrence was found in 2(2.94%) cases. Cost of locally purchased and sterilised nylon mosquito net mesh of standard size 10 x15 cm used here was 2 rupees [about 0.0404US \$] as compared to 800 rupees [16.16 US\$] for the prolene mesh of same size. On the basis of this study, we can say that properly sterilised mosquito net can be a mesh of the choice in the institutional setups for incisional hernia surgery in the rural areas of the developing countries like India where the population cannot afford the higher cost of surgery with commercially available costly meshes. Also it was found safer to use and can be used in place of conventional methods of primary repairs.

**KEYWORDS** - Hernioplasty, Mesh, Mosquito net.



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## INTRODUCTION

Incisional hernia is a term used to describe the hernia that develops in the wound of the previous operation in the postoperative period. It is one of the forms of ventral hernia. The most common surgical procedures in which it can occur are exploratory laparotomy, Lower segment caesarean section, hysterectomy and appendectomy. The other causes include anticancer surgeries, nephrectomies etc. (1). The various risk factors involved in the development of incisional hernia are wound infections,

emergency operations, obesity, underlying disease process, type of closure, choice of incision and suture material used (2). Before the use of mesh in hernia surgeries, the primary repairs like Mayo's, Keels were popular (2,3,4). In nineteen fifties the prosthetic mesh use was started (4) and became popular in the late nineties in the developing countries like India. Now days there are various types of mesh available like Prolene, Teflon, Decron, Vicryl in the market (Table-1).

**Table-1**  
**Various Mesh available in market.**

| Material                      | Product name                     |
|-------------------------------|----------------------------------|
| Polypropylene                 | Marlex, Prolene, Surgipro, Vypro |
| Polytetrafluorethylene [PTFE] | Teflon, Gore-Tex                 |
| Polyester                     | Mersilene, Dacron                |
| Polyglycolic acid             | Vicryl                           |

The above listed prosthetic mesh material are excellent in use, but they are costly, the standard mesh of prolene of size 10cm x 15cm costs about 800 rupees [16.16US\$] and are not easily available in all the areas. During 1996-2006, Indian surgeon Tongaonkar [5] investigated the use of locally produced nylon mosquito net mesh in 359 patients in various centres in inguinal and incisional hernias with minor infection rates of 4.7%. Freudenberg [6] in 2005 compared the use of 100% nylon mosquito net mesh in 18 patients with no severe complications. M.G. Clarke [7] studied the use of sterilised polyester mosquito net mesh for inguinal hernia repair in Ghana with 7% complication rates. We started our study to prove the safety and effectiveness of mosquito nylon net mesh in cases of incisional hernia surgery. Here in our study our aim was to evaluate the effectiveness of use of mosquito net mesh in hernioplasty in comparison to hernia repair without application of mesh in rural institutional set up, to evaluate cost effectiveness of surgical procedure and consequences arising during six months of

follow up periods, to evaluate complications in the cases of mosquito net mesh surgery after the procedure in comparison to controls (immediate and late).

## MATERIALS AND METHODS

Total 160 patients admitted in R. D. Gardi medical college with incisional hernia during march 2008 to march 2014. Those patients of incisional hernias having complications like strangulation or obstruction and the large size incisional hernia were excluded from the study. Those with critical diseases and high risk cases were also excluded from the study. Total 17 patients were excluded. Of the remaining 143 patients the 75 patients who gave consent for surgery were included in the study as case group. Those patients who did not give their consent (68 patients) for the repair of hernia with mosquito net mesh were included in the control group in which hernia repair was to be done by conventional non-mesh methods like Anatomic closure or Double-breasting technique. Data collected

prospectively during dates according to the age group, sex and previous surgeries and

associated factors of incisional hernia (Tables- 2 & 3).

**Table-2**  
**Age & Sex distribution of patients.**

| Age<br>(Years) | Cases (n-75) |      |        |       | Controls (n-68) |       |        |       |
|----------------|--------------|------|--------|-------|-----------------|-------|--------|-------|
|                | Male         |      | Female |       | Male            |       | Female |       |
|                | Number       | %    | Number | %     | Number          | %     | Number | %     |
| <20            | 5            | 6.66 | 0      | 0     | 3               | 4.41  | 2      | 2.94  |
| 20-40          | 18           | 24   | 22     | 29.33 | 16              | 23.52 | 19     | 27.94 |
| 40-60          | 12           | 16   | 18     | 24    | 11              | 16.17 | 17     | 25    |

**Table-3**  
**Causes of Incisional hernia( previous procedures).**

| Procedures             | Cases (n-75) |       | Controls (n-68) |       |
|------------------------|--------------|-------|-----------------|-------|
|                        | Patients     | %     | Patients        | %     |
| Exploratory laparotomy | 28           | 37.33 | 25              | 36.76 |
| Caeserian Section      | 30           | 40    | 31              | 45.58 |
| Appendectomy           | 02           | 2.66  | 3               | 4.41  |
| Hysterectomy           | 08           | 10.66 | 6               | 8.82  |
| Other                  | 07           | 9.33  | 3               | 4.41  |

After the surgery all the patients were examined from immediate postoperative period and various early complications like seroma, stitch abscess ,gross infection was *diagnosed clinically by signs & symptoms as well as by aspiration of collection, if any, observing the colour and smell of discharge, supported by laboratory tests & bacteriological examinations. After discharge the patients were followed up to 6 months initially weekly for one month then thereafter fortnightly for two months then monthly till the completion of period selected arbitrarily to regain the strength of wound and fascial tissues. The final data's were compared with control groups (those who were undergone through hernia repair without mesh) at the end of the study. Surgical technique (For application of Mosquito net mesh) –The skin scar of the*

previous surgery was excised and subcutaneous tissue was separated to find the sac of the hernia. The sac separated from the surrounding tissues opened and reduced into the abdominal cavity. Then the peritoneum and the posterior rectus sheath was repaired followed by approximation of the rectus muscles. Then anterior rectus sheath was repaired with non absorbable inverting continuous sutures after putting the nylon mosquito mesh and securing with non absorbable sutures [Primary closure with mesh reinforcement] and putting a simple tube drain to drain the collection in subsequent days. The subcutaneous layer was closed with absorbable suture followed by skin closure Mesh– Nylon is a thermoplastic material made up of repeating units linked by amide bonds and is known as polyamide. It

was first commercially successful synthetic polymer used first in bristled toothbrushes [1938] followed by mosquito nets. It is a very stable polymer with melting point of 265 degree centigrade. The mosquito net made of nylon was purchased from local and meshes of various sizes were cut and autoclaved. In this way the material was available with cost of 2 rupees [0.0404 US\$] for size 10cm x15cm and 5 rupees [0.101US\$] for bigger ones. [Total cost including the material and sterilisation]

## RESULTS

The patients included in the study were ranging from 18 years to 60 years with mean age of 42. The number of male patients was 65 and females were 78. Majority of cases

was done with spinal anaesthesia [112 cases] and other cases being operated under general anaesthesia [31cases]. There was no problem in the handling of the mesh during the procedure. The patients were followed up to 6 months and the various complications treated and recorded [Table-4]. In case group it was found that collection in the drainage system for longer duration in 9 patients [12%]. Seroma found in 7 patients [9.33%] the wound was grossly infected in 4 [5.33%] patients, while stitch abscess found in 6 [8%] patients. There was no recurrence noted in the case group. In the control group the gross infection was found in 8 (11.76%) cases followed by prolong infection in 6 (8.82%) cases, seroma and stitch abscess in 5 (7.35%) cases. The recurrence was found in 2 (2.94%) cases.

**Table -4**  
**Postoperative complications.**

| Complications     | Cases (n-75) |      | Controls (n-68) |       |
|-------------------|--------------|------|-----------------|-------|
|                   | patients     | %    | patients        | %     |
| Seroma            | 7            | 9.33 | 5               | 7.35  |
| Prolong discharge | 9            | 12   | 6               | 8.82  |
| Gross infection   | 4            | 5.33 | 8               | 11.76 |
| Stitch abscess    | 6            | 8    | 5               | 7.35  |
| Recurrence        | 0            | 00   | 2               | 2.94  |

## DISCUSSION

It is well established that repair of incisional hernia with mesh is better as compared to primary suture repair. Luijendik (8) in his study of suture versus mesh repair of incisional hernia found more rate of recurrence (43%) in suture repair as compared to mesh repair (23%). Langer and Christianson (1983) in their study of repair of incisional hernia with mesh found it superior to suture repair as recurrence is less common in their method (9). Liakakos et al (1994) carried out prospective comparison of primary closure against mesh showed that recurrence rate was less with mesh at mean of 7.6 years of follow up (10). Our follow up period was up to six months and

it was not so long period that we can compare the recurrence rates of incisional hernia in the patients operated with the use of mosquito mesh to the recurrence rates mentioned in previous studies performed over commercially available mesh. In our study with the use of mosquito mesh net the rate of seroma was 9.33% and infection rate was 4%. It was comparable to rates found in other studies using commercial mesh. Khaira (2001) in his study of repair of incisional hernia with polypropylene mesh found seroma in 17% of cases and infection in 3% cases (11). Molloy (1991) found 4% seroma rates in his study (12). Usher (1962) 5.8% seroma rates (13).

## CONCLUSION

In our results it was found that in the case group the seroma was found in more cases as compared to controls also the prolong discharge was more common in case group which probably may occur as a reaction to mesh used. The other complications like gross infection were more in control group. The most important finding in the postoperative period was during follow up in which 2 of the patients of the control group came with recurrence within our follow up period of 6 months. After the comparison of two groups it was clearly established that sterilised nylon mesh extracted from mosquito net can be used safely in incisional hernia surgeries as complications like seroma, infections, stitch

abscess are not major complications and in our study they were found in small percentage in case group. The important factor that favours the use of mosquito net mesh was the absence of recurrence in the case group as compared to the non mesh control group. Another most important point in favour of mosquito net mesh was its cost effectiveness. So after the comparison of the results of incisional hernia repair with mosquito net mesh with the results of primary suture repair and the results of various studies of incisional hernia repair with commercially available mesh, it is concluded that the well sterilised mosquito net mesh is safer and can be used as an alternative to commercial mesh in the poor rural population of developing countries because of its low cost.

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