

# Clinical Outcomes of Open Ventral Hernia Repair in a Public Sector Hospital

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## Abstract

**Objective:** This prospective study was designed to see the outcomes in two different types of surgical repairs (suture or mesh) of primary ventral hernia.

**Methods:** A total of 70 adult patients under went for elective primary ventral hernia suture or mesh repair at surgical unit-I of Peoples Medical College Hospital Nawabshah and Surgical Unit-I from March-2010 to Feb-2016 were included in this study on the basis of inclusion – exclusion criteria. Patient's demographic characteristics, operative details, post-operative outcomes (complications and recurrence) were studied.

**Results:** A total number of 70 consecutive patients having primary ventral hernia under went for an elective open repair either with suture (32/45.7%) or synthetic mesh (38/54.3%) were evaluated in this study. Among these patients 52 (74.2%) and 18 (25.8%) were female and male respectively, with mean age of 51.5 ± 12. A total of 3(7.89%) patients had recurrence with Mesh Repair and 06(18.75%) with suture repair at 3 years follow-up, p-value = 0.176.

**Conclusion:** The mesh repair in ventral hernia has low wound complications and less recurrence of the hernia when compared with suture technique.

**Key words:** Umbilical Hernia, Paraumbilical Hernia, Epigastric Hernia, Herniorrhaphy, Hernioplasty.

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## Introduction

The fascial defects in anterior abdominal wall presenting with abnormal protrusion are termed as Ventral Hernia, which may be primary like epigastric, umbilical, para-umbilical, spigelian, lumbar etc or Secondary/acquired following trauma or surgery (incisional).<sup>1</sup> The reconstruction of ventral hernia remains one of the most challenging dilemmas facing surgeons across the globe. The increasing incidents of ventral hernia among actively working young people of society puts a large burden of resource and cost on the health care system, as more than 386000 ventral hernia repair are noted annually even in much advanced country like America, among these 75% are primary ventral (Non-incisional) Hernias.<sup>2,3,4</sup> Studies report that up to 3.2 billion dollars are spent there each year to repair ventral hernias. Despite the volumes of the literature on hernial repair, the meaningful rewarding interpretation cannot be explained due to the bundles of futile studies depicting combinations of surgical approaches

complex techniques, and then choice of position and fixation of prosthesis. While peri-operative management is another debated issue.<sup>2</sup>

In addition, there is also no consensus on surgical site occurrence (SSO), known as complications and hernia recurrence as the most important end points in the repair of ventral hernia<sup>5</sup>. And in this regard, many studies report that the surgical site occurrence like seroma, Hematoma, surgical site infections (SSI), skin dehiscence, Skin necrosis, cellulitis and suture granuloma or abscess are abysmal risk factors associated with increased preponderance of recurrence of ventral hernia with or without mesh repair.<sup>6,7</sup>

Further, co morbidities like chronic use of corticosteroids, smoking, coronary artery disease, chronic artery disease, chronic obstructive pulmonary disease, diabetes, malnutrition, immuno suppression, low serum albumin, obesity and old age may convey at least four folds infection risk post-operatively as have been analyzed by National Surgical Quality Improvement Program (NSQIP).<sup>8-11</sup>

Indeed, the repair of Ventral Hernia with mesh acknowledges better outcomes in comparison to suture; hence surgical wisdom are choosing it as an optimal standard of care.<sup>6,12</sup> But the relationship between hernia types Primary (Congenital) or Acquired (incisional) and profound SSO/Complications resulting morbidity and additional sequelae are not yet precisely delineated in available literature.<sup>13</sup> This is so because the available studies are few randomized control trials limited with small numbers, short follow-up and vague end points without having assertion of principle of approaches in assessment and repair of various ventral hernia.<sup>14</sup> The closure of fascial defect in ventral hernia with suture or mesh by open surgery remains the most common approach, accounting approximately 75% of cases.<sup>15</sup> OVHR is still rewarding and common practice in resource limited institutions in general and at our part of world in particular.<sup>6</sup> So in this perspective, this study was designed to access the outcomes (Recurrences) in two different surgical (suture or mesh) repairs of primary ventral hernia.

## Methods

A total of 70 adult patients under went for Elective Primary Ventral Hernia Suture or Mesh repair at surgical unit-I of Peoples Medical College Hospital Nawabshah and Surgical Unit-I of from March-2010 to Feb-2016 were included in this study on the basis of inclu-

sion – exclusion criteria. The patients of both gender from 18 to 65 years of age with primary ventral hernia except lumbar with given informed consent and fit for general Anesthesia for open repair surgery were enrolled. While the patients having presence of more than one hernia, signs of infection, incisional or recurrent hernia, ascites, systemic disease like liver, renal failure, un controlled diabetes and patients under went in emergency surgery for incarcerated or strangulated hernia were excluded. All patient received appropriate pre-operative antibiotics along with anti-thrombotic prophylaxis as per need. The patient were approached through either midline or transverse incision under general anesthesia and after complete lysis of adhesions and resection of redundant soft tissue and skin, the size of hernial defect was measured and recorded. Patient having hernial defect up to 5 cm were under gone repair with suture, as the two edges of the fascia were approximated without tension with a continuous polypropylene suture No. 1, with stich width (Tissue bites) and intervals of 1 cm apart. While patients having hernial defect more than 5 cm were undergone with either inlay or sublay (Retromuscular Rives stoppa) mesh repair in which dorsal side of the fascia adjacent to the hernia was freed from under laying tissue for about 4 – 5 cm. A polypropylene mesh was tailored in the defect to have about 4 cm of mesh overlapped on the edge of fascia and the placed mesh was reinforced with continuous suture of prolene No. 1 to the abdominal wall at least 3 – 4 cm away from the edge of defect. While the peritoneal defect was closed or omentum was sutured in between to avoid the contact of mesh with intraperitoneal gut and prevent any adhesion & incident of fistula.<sup>16,17</sup>

The cavity of wound was irrigated with third generation cephalosporin antibiotic laden normal saline and closed suction drain(s) was (were) placed as per need. The anterior rectus sheath was re-approximated with mono filament sutures. Subcutaneous tissues were also irrigated with normal saline and were closed in layers. Sterile dressing was placed over the wound followed by abdominal binder and were shifted to ward. Post operatively every patient received third generation cephalosporin antibiotics and some of them remained on deep vein thrombosis prophylaxis during hospital stay. Liquid to regular routine diet were allowed accordingly as tolerated. Drains were removed when were without outputs. Patients were discharged after having adequate oral intake and pain controlled with oral analgesics and was asked for follow-up visits with clear instructions. Peri-operative data collection inclu-

ded size of hernial defect, location (Upper or middle), type of surgical procedures (Prolene suture or mesh repair), operative duration determined by the time from skin incision to skin closure and length of hospitalization. Early-Post operative risk factors of SSO like symptomatic seroma, hematoma, SSIs, skin necrosis or wound dehiscence were recorded and SSI was defined as per definition of centers of disease control and prevention (CDC).<sup>17</sup>

While the followup outcomes of hernia recurrence rate were evaluated in both types of repair separately. The designed post-operative follow-up evaluation included physical examination at 4 week, 3 months, 6 months and then annually for one visit. Having excellent patient follow-up we believe the strengths of our study. Patient’s awareness of recurrence were evaluated and noted. Patient with documented evidence of hernia (bulge) recurrence were not taken to have further evaluation in follow-up. The ultrasound examination or even CT Scan abdomen were taken in cases where physical examination to identify the recurrence were suspicious.

All data was entered in SPSS version 20. Mean and S.D was used for quantitative data like age years. Frequency (%) was used for qualitative data, gender, type of ventral hernia, wound infection and recurrence. Chi-square test was applied to compare wound complications and recurrence in both study groups.

## Results

A total number of 70 adult consecutive patients having primary ventral hernia under went for an elective open repair either with suture (32/45.7%) or synthetic (38/54.3%) were evaluated in this study. Among these

patients 52 (74.2%) and 18 (25.8%) were female and male respectively, with mean age of 51.5 ± 12 and BMI more than 30 kg/m<sup>2</sup> is seen in 20 patients (F/18, M/2). While 10 were smokers (F/2, M/8), many patients had associated co-morbidities like 18 (F/16, M/2) had diabetes mellitus with a mean Hb A/C value of 8.1% and 5 (F/1, M/4) were suffering from COPD. The mean range of American society of anesthesiologist score was 2 – 8. All these patients are briefed in table No: 1 for their demographic and pre-operative characteristics.

**Table 1:**

Particulars	DATA	
	No. of Patients	%
Female (F)	52	74.2%
Male (M)	18	25.8%
Age (mean)	51.5 ± 12	
Female: male ratio	2.8:1	
Obesity (BMI) 30 kg/m <sup>2</sup>	20	28.5%
Smokers	10	14.3%
Diabetes Mellitus	18	25.7%
COPD	5	7.14%

COPD (chronic obstructive pulmonary disease)

Among these patients, the majority presented with umbilical hernia (32), then (23) as paraumbilical, 13 had epigastric and 02 (female) had spigelian hernia. The median length of hospital stay was 8 days (range 6 to 29 days).

All these focused hernia findings are briefed in table no 2.

**Table 2:**

Particulars	Mesh Repair			Suture Repair			
	UH	PUH	EH	UH	PUH	EH	Spig
Normal wound	05	06	03	18	11	09	02
Infected wound	02	02	00	8	09	01	00
Sero-sanguineus Discharge	01	01	00	04	02	01	00
Wound dehiscence	00	1	00	02	01	00	00

Recurrence	1 <sup>st</sup> year	01	01	00	02	01	00	00
	2 <sup>nd</sup> year	00	01	00	02	02	00	00
	3 <sup>rd</sup> year		00	01	01	01	00	00
		03			06			

p-value for recurrence , p-value = 0.176.

Among 70 patients, 32 & 38 underwent Simple Suture and sublay synthetic Mesh Repair respectively. In both repairs 9 (12.8%) patient outcome with recurrence. From these 09 patients, 03 were male and 06 were females. While, from 38 patients having Mesh Repair 03 (8%) had recurrence; and, from 32 patients having Simple Suture Repair 06 (18.7%) had recurrence.

## Discussion

As the surgical literature is lacking in data that compare the recurrence rates between open traditional suture repair versus synthetic mesh repair in primary ventral hernia over a long term followup.<sup>18</sup> Therefore the gold standard approach for ventral hernia repair remains to be an area of controversy.<sup>19</sup> Despite of best practices, hernia recurrence remains a significant challenge and the use of synthetic meshes has decreased the incidence of ventral hernia recurrence.<sup>20</sup> In this study, majority of the patients were considered to be at increased risk of wound complications and recurrence because of their pre-existing co-morbid conditions, and hence, through this study, it was vigilantly focused on various co-morbid conditions for their association with increased rate of recurrence. The conditions that seem to be associated in this regard were obesity, and COPD (Asthma). And this study corresponds in similarity to the studies of Kapata DM et al.<sup>21</sup> In our study the rates and types of postoperative complications are very similar to marry as quoted in literature.<sup>22,23</sup>

This study, observed that surgical site infection (SSI) is the most common risk factor for a reason of recurrent hernia, this is in the line with other studies that have also shown it to be predictive of future recurrence. In research it was demonstrated that any degree of post operative infection (SSI) can lead to potential complication with consequent mesh removal. Despite the significant SSI, there were two patients who require mesh removal and this corresponding similarity is

also with study of Farrow B, et al.<sup>22</sup> Thus decreasing the rates of SSI with ventral hernia repair will alleviate the surprising high rates of recurrence.<sup>23</sup>

While, some propose that the use of laparoscopy reduces SSI rates compared with open repair.<sup>23,24</sup> An-otherwise study suggests that increased use of mesh repair in every primary ventral hernia will prevent the successive incisional hernia.<sup>25-27</sup>

This study finds that most of the recurrence after both open suture or mesh repairs occur in two year of surgery and this is very similar to study of Ngyen MT et al.<sup>29</sup> While many other studies have compared recurrence rates in various procedures of open ventral hernia repair but there subjects and follow-up period were too small to persuade the connotation of recurrence.<sup>29</sup> Ngyen MT, et al and Porrero JI, et al found in their studies that suture repair is appropriate for small primary ventral hernia with acceptable recurrence rates of less than 10%, while our study finds higher rates of recurrence (18.7%)<sup>29,30</sup> and this makes to think that the size of defect should not be more than 3 cm in simple suture repair. Generally in open ventral hernia repair, there are higher rates of post-operative SSI, which varies from technique to technique and mesh positions.<sup>31,32</sup> Hence, Mesh (synthetic or Biologic) selection, as does its position (sublay, inlay or onlay) and technique of mesh fixation varies widely from surgeon to surgeon.<sup>33</sup> However, in this study, patients having ventral hernia defect more than 5 cm were subjected to sublay/retromuscular mesh placement, and this study found the recurrence rate of 8% which corresponding to other studies as shown below.

## Conclusion

The mesh repair in ventral hernia has low wound complications and less recurrence of the hernia when compared with suture technique.

**Table 3:** Comparison of results of different studies.

Author	Year	Study Type	N	Follow-up (Months)	*SSO	**SSI	Recurrence
Rives	1992	***R	258			7.7%	6.2%
McLanahan	1997	R	106	24			3.5%
Petersen	R	R	175	20	7.4%	6.3%	9.0%
Israelsson	2006	R	228	12-24			7.3%
Iqbal	2007	R	254	70	4.0%	7.0%	5.0%
Poghoysan	2012	R	262	58	6.0%	0.8%	3.0%
Mehrabi	2010	R	176	96	1.7%	2.8%	1.1%
Novitsky	2015	****P	306		11.8%	15.7%	--
Cobb	2015	R	255	17	37.7%	19.6%	16.9%
Kashif	2017	P	70	36	31.42%	18.6%	8%

Follow-up

\*Surgical Site Occurrence

\*\*Surgical Site Infection

\*\*\*Retrospective

\*\*\*\*Prospective

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