

## Original Research

# Preoperative predictors of ventral hernia recurrence

<sup>1</sup>Dr. Rashi Dubey, <sup>2</sup>Dr. Krishnanand<sup>1</sup>Resident, Department of General Surgery, LN Medical College and JK Hospital, Bhopal, MP, India<sup>2</sup>Professor and Head, Department General Surgery, LN Medical College and JK Hospital, Bhopal, MP, India**Corresponding Author**

Dr. Rashi Dubey

Resident, Department of General Surgery, LN Medical College and JK Hospital, Bhopal, MP, India

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**ABSTRACT**

**Introduction:** Hernia recurrence is an extremely important postoperative outcome and assesses surgical efficacy. The ability to predict recurrence accurately would have considerable clinical utility, allowing surgeons to make better-informed decisions with their patients as to when, and when not, to operate.

**Materials and Method:** The present study was designed to analyze various risk factors, and predict recurrence preoperatively. The present study was carried among 60 patients admitted in General Surgery Department, in LNMC and JK hospital, who underwent ventral hernia repair over a period of 2 years. The present study evaluates the incidence and factors associated with recurrence after Laparoscopic ventral hernia repair (LVHR). Patient related factors i.e., age, sex, BMI, history of smoking; presence of comorbidities i.e., diabetes mellitus, COPD, hypertension and other cardiac comorbidities, benign prostatic hyperplasia (BPH) were analysed. Cases were assessed as incisional /primary ventral hernia and recurrent /primary ventral hernia. Statistical analysis was carried using SPSS-21 and p value <0.05 was considered as statistically significant value.

**Results:** The present study reported a recurrence rate of 13.3%. BMI, smoking, diabetes, COPD, were found to be patient variables significantly associated with recurrence. Only hernia related variables associated significantly with increased recurrence were incisional versus primary and recurrent versus primary ventral hernias.

**Conclusion:** Only hernia related variables associated significantly with increased recurrence were incisional versus primary and recurrent versus primary ventral hernias. This analysis suggests that male sex and age above 65 years is protective. Knowing these factors could help surgeons during pre-operative assessment and take necessary precautions during ventral hernia repair.

**Keywords:** Ventral hernia; Hernia repair; Prediction; Recurrence

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**INTRODUCTION**

Ventral hernia is defined as an abnormal protrusion of abdominal contents through a defect in the anterior abdominal wall.<sup>1</sup>Repair of large hernias requires extensive abdominal wall reconstruction via mobilisation of tissue flaps that allow access to surgical planes for component separation, accompanied by prosthetic mesh implantation. Reconstruction aims to cover the fascial defect, reapproximate the rectus muscles, and restore abdominal wall integrity.<sup>2</sup>Indeed, recurrence rates after repair are reported as 15–40 per cent.<sup>3,4</sup> indicating that surgery can be ineffective, subjecting patients to the risks of major abdominal surgery for no long-term benefit. Hernia recurrence is an extremely important postoperative outcome and assesses surgical efficacy. The ability to predict recurrence accurately would have considerable clinical utility, allowing surgeons to make better-informed decisions with their patients as to when, and

when not, to operate. Thus, the present study was designed to analyze various risk factors, and predict recurrence preoperatively.

**MATERIALS AND METHOD**

The present single center prospective, clinical observational study was carried among 60 patients admitted in General Surgery Department, in LNMC and JK hospital, who underwent ventral hernia repair over a period of 2 years. The inclusion criteria comprised of all patients >14 years of age who underwent elective ventral hernia repair at LNMC and JK hospital. Exclusion criteria comprised of patients who were under 14 years of age, pregnant women, patients who did not give consent and patients diagnosed with inguinal hernia and parastomal hernia. The study was initiated after obtaining approval from the institutional ethic committee and written informed consent from the patients who were enrolled in the present study. This

study evaluates the incidence and factors associated with recurrence after Laparoscopic ventral hernia repair (LVHR). Patients were evaluated by history taking, examination and performing relevant investigations. All required data was collected in using a pre-tested semi-structured interview schedule. Patient related factors i.e., age, sex, BMI, history of smoking; presence of comorbidities i.e., diabetes mellitus, COPD, hypertension and other cardiac comorbidities, benign prostatic hyperplasia (BPH) were analysed. Cases were assessed as incisional /primary ventral hernia and recurrent /primary ventral hernia. Statistical analysis was carried using SPSS-21 and p value <0.05 was considered as statistically significant value.

## RESULTS

In the present study, among the enrolled patients 43 were aged >50yrs and 17 were <=49; 22 were male patients and 38 females with 36 patients had BMI>=30 (table 1). Smoking, diabetes, COPD, were found to be patient variables significantly associated with recurrence (table 2). Only hernia related variables associated significantly with increased recurrence were incisional versus primary and recurrent versus primary ventral hernias (table 3). Out of 60 patients, 8 patients. In that 3 were males and 5 were females (table 4).

**Table 1: Patient details (pre-operative)**

Parameters	N=60		P value	
Age	>50yrs	43	0.025	statistically significant
	<=49	17		
Sex	Male	22	0.026	statistically significant
	Female	38		
BMI	>=30	36	0.01	statistically significant

**Table 2: Correlation of presence of comorbidities with recurrence rate**

COMORBIDITY	N=60 (%)	P value	
smoker	21%	0.04	statistically significant
Diabetes mellitus	14%	0.039	statistically significant
COPD	6%	0.014	statistically significant
Hypertension	42%	0.6	statistically not significant
Cardiac comorbidities	12%	0.025	statistically significant
Benign prostatic hyperplasia (BPH)	8%	0.01	statistically significant

**Table 3: Correlation of hernia predictors with recurrence rate**

Hernia predictors	P value	
Incisional /primary ventral hernia	0.044	statistically significant
Recurrent /primary ventral hernia	0.01	statistically significant

**Table 4: recurrence rate**

Gender	Total No.	Recurrence
Male	22	3
Female	38	5
Total	60	8 (13.3%)

## DISCUSSION

Identification of predictors of recurrence is pivotal, because decision to perform reconstruction depends on it. The present study reported a recurrence rate of 13.3%. BMI, smoking, diabetes, COPD, were found to be patient variables significantly associated with recurrence. This analysis also suggests that male sex and age above 65 years is protective. Frommer ML et al<sup>5</sup> reported that 9 of 101 patients (8.9%) experienced hernia recurrence and smoking was associated with an increased risk of hernia recurrence (p < 0.001) with a predictive odds ratio (OR) of 18.27 (p = 0.041). Kokotovic D et al<sup>6</sup> reported that with 5-year follow-up, there was a 6.5% lower hernia recurrence rate requiring reoperation attributable to laparoscopic

hernia repair compared with open, nonmesh hernia repair. For the age thresholds of 60 and 65 years, Kokotovic and colleagues,<sup>6</sup> in a publication from Danish Ventral Hernia Database (DVHD), uses reoperation rate as a surrogate for recurrence. Their cohort suggests that in elderly patients reoperation is significantly less likely as elderly patients less fit for a second elective repair. Carter SA et al<sup>7</sup> did univariate and multivariate analysis of individuals who had seroma or eventration recurrence or pseudorecurrence to find predictors. Out of 201 LVHR patients, 40 (19.9%) developed seroma, 63 (31.3%) had radiographically verified eventration, and 25 (12.4%) suffered hernia recurrence. Segomas were linked to prostate disease, surgical site infections, and past

ventral hernia procedures on multivariate analysis. Mesh eventration was linked to hernia size and surgery. Primary hernias and surgery caused tissue eventration. Incisional hernias and mesh type caused recurrence. After LVHR, recurrence and pseudorecurrence are serious. Case outcomes following LVHR depend on large hernia size, infections, and surgical technique. In the present study, only hernia related variables associated significantly with increased recurrence were incisional versus primary and recurrent versus primary ventral hernias. In a similar analysis, Parker SG et al<sup>8</sup> identified 274 patient details for inclusion. Hernia recurrence was defined in 66 papers (24.1%) using 41 unstandardized definitions which is higher than our study. Three patient variables (female sex, age 65 or less, and BMI greater than 25, 30, 35, or 40 kg/m<sup>2</sup>), five patient comorbidities (smoking, diabetes, COPD, ASA grade III–IV, steroid use), two hernia-related variables (incisional/primary, recurrent/primary) and six intraoperative variables.

Similarly, Piccoli M et al<sup>9</sup> carried a retrospective, multicenter study of patients who underwent LVHR for primary (PH) and incisional (IH) hernias with an intraperitoneal monofilament polypropylene mesh, risk factors for recurrence and post-operative outcomes were analyzed. There were 1018 patients, 665 of whom had IH (65.3%) and 353 PH (34.7%). Compared to PH patients, IH patients were older ( $p < 0.001$ ), less obese ( $p = 0.031$ ), and had higher ASA class ( $p < 0.001$ ). IH had longer hospital stays and operative time ( $p < 0.001$ ), but had similar intraoperative and early post-operative problems and reinterventions. IH patients had a higher risk of recurrence (6.7% vs 0.9%,  $p < 0.001$ ), and using absorbable tacks increased the risk by 2.94 (95% CI 1.18–7.31). LVHR with a lightweight polypropylene mesh is suitable for IH and PH with low intra- and post-operative problems. Another alike study by Lambrecht JR et al<sup>10</sup> examined defect closure and mesh fixing. 37 PH patients and 70 IH patients were enrolled in a prospective cohort trial for laparoscopic ventral hernia repair (LVHR) and randomized to  $\pm$  transfascial sutures. 35% of PHs and 10% of IHs recurred following suture repair. Recurrence and complication rates were 0 vs. 4.3% ( $p = 0.55$ ) and 16 vs. 27% ( $p = 0.24$ ) in favor of the PH cohort in the prospective research. Closure of the hernia defect did not affect seroma, 2-month pain, protrusion, or recurrence. Another study by Jolissaint JS et al<sup>11</sup> reported that 1 in 4 patients undergoing an open ventral hernia repair will have a recurrence after 5 years, and this risk is doubled among patients who experience any perioperative surgical site occurrence. After controlling for patient comorbidities, including body mass index, hernia size, and mesh position, the most significant risk factor for recurrence after ventral hernia repair was a non-primary hernia and surgical site occurrence.

## CONCLUSION

Only hernia related variables associated significantly with increased recurrence were incisional versus primary and recurrent versus primary ventral hernias. Knowing these factors could help surgeons during pre-operative assessment and take necessary precautions during ventral hernia repair.

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