

**A Study of Various Factors Responsible for Incisional Hernia****Yagnik Jagdishbhai Vaja<sup>1</sup>, Hemal J Dholakia<sup>2</sup>, Alpeshkumar D Chavda<sup>3</sup>, Jaykishan J Gol<sup>4</sup>**<sup>1</sup>Assistant Professor, Department of General Surgery, GMERS Medical College, Porbandar, Gujarat, India<sup>2</sup>Assistant Professor, Department of Pharmacology, GMERS Medical College, Porbandar, Gujarat, India<sup>3</sup>Associate Professor, Department of Pathology, GMERS Medical College, Porbandar, Gujarat, India<sup>4</sup>Assistant Professor, Department of Anaesthesia, GMERS Medical College, Porbandar, Gujarat, India

Received: 25-04-2024 / Revised: 10-05-2024 / Accepted: 15-05-2024

Corresponding Author: Dr. Jaykishan J Gol

Conflict of interest: Nil

**Abstract:**

**Introduction:** Hernia defined as abnormal protrusion of viscus through a normal or abnormal weakness in the wall of its containing cavity. The main aim of this research was to examine incisional hernias, explicitly analyzing the variables that increase the chance of developing them, the many surgical approaches used for repair, and the problems that may arise after the operation.

**Material and Methods:** There were a total of 100 patients involved. The study gathered data on patient demographics, previous operations, kinds of incisions, and possible risk factors such as obesity and diabetes. The repair techniques, such as onlay mesh repair or laparoscopic repair, and the surgical strategy, either open or laparoscopic, were recorded. Postoperative problems, such as the development of seromas and surgical site infections, were closely observed.

**Results:** The age group with the highest frequency was 35-45 years old, and females outnumbered men. Past surgical interventions, namely midline laparotomy operations, were identified as prospective variables that might increase the risk. Additionally, obesity, diabetes, and wound infections were often found. The occurrence of seromas was the most common complication after surgery, followed by wound dehiscence and surgical site infections. The prevailing surgical method was open surgery, with onlay mesh repair being the most often used technique.

**Conclusion:** This research emphasizes many aspects linked to incisional hernias. Although open surgery with onlay mesh repair is generally considered the conventional method, less invasive procedures such as laparoscopy may be used in some circumstances. The research found possible risk factors such as obesity and diabetes, indicating the need for preventive actions.

**Keywords:** Incisional hernia, Abdominal surgery, Complications, Risk factors.

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

**Introduction**

An incisional hernia, also known as a postoperative ventral hernia, is a potential complication that may occur after abdominal surgery, namely laparotomy [1-2]. An incisional hernia is a condition that arises when the fascial tissue in the abdominal region fails to mend correctly, resulting in a protrusion at the location of the surgical incision [1-2].

Historically, physicians have been aware of this illness since the 1st century AD [1-2]. In the past, attempts were made to address the issue by revitalizing the edges of the cut and sewing them back together. However, it was in the 19th century that successful repairs were carried out [1-2]. Primary complication: It is the most common long-term complication after abdominal surgery [3]. There are several risk factors: Age, Obesity, often

known as weight gain, [4] Pulmonary infections [4], types of stitches used [4] and wound infection (very significant). The precise placement of the surgical incision in your belly, particularly in cases involving transverse and midline cuts [3]. Other locations for incisions may further increase your risk, but they are less often seen [3]. Issues: In extreme instances, the hernia may enlarge significantly (giant ventral hernia) and accommodate a substantial amount of intestine [4].

This may result in complications when your organs are displaced from your abdominal cavity [4]. Intervention: Typically, surgical intervention is necessary to rectify an incisional hernia. Consequence: In some cases, a significant hernia may need modifications to one's lifestyle or even

compel them to resign from their occupation [4]. Emergency surgery may be necessary in instances when the hernia becomes strangulated, resulting in the obstruction of blood supply [4-5].

Incisional hernias are abdominal wall defects that develop during surgical procedures [6-7]. They occur most often when the surgical incision closes inadequately, commonly as a result of infection. Factors that increase the likelihood of a negative outcome: The most prevalent complication is infection at the surgical site [8-10]. Excessive body weight or adiposity: Above a certain age [8-10]: Undernutrition: Maternity: Abdominal pressure that has risen (ascites) [8-10]. Additional complications in the healing of wounds include hematoma and seroma [8-10]. Discomfort Protrusion in the abdominal region: Gastrointestinal issues: Therapeutic intervention: Surgery may be classified into two primary categories: Open surgery, which involves making a big incision and perhaps using mesh, is linked to increased discomfort and a greater likelihood of the hernia recurring (up to 20%), depending on factors such as the size of the mesh and how it is secured [10, 12]. Laparoscopic surgery, also known as minimally invasive surgery, involves making tiny incisions and using a mesh. This

method is considered more favourable because of its reduced discomfort and quicker recovery time [8, 13]. Emergency surgery is required in rare instances when the hernia causes the intestine to be trapped, a condition known as strangling. Incisional hernias may exhibit a greater prevalence in underdeveloped nations such as India, mainly as a result of elevated infection rates and malnutrition [11]. The objective of this research is to comprehend the aetiology, manifestations, and optimal therapeutic approaches for incisional hernias in this specific demographic [14].

### Material and Methods

The research collected data on patient characteristics, prior surgeries, types of incisions, and potential risk factors such as obesity and diabetes. The repair approaches, such as onlay mesh repair or laparoscopic repair, and the surgical strategy, either open or laparoscopic, were documented. Postoperative complications, such as the formation of seromas and surgical site infections, were carefully monitored. Statistical analysis was performed.

### Results

**Table 1: Age Distribution of Patients**

Age in Years	Total number of the patients	Percentage of the patients
25-35 year age	20	20%
35-45 year age	44	44%
45-55 year age	28	28%
55-65 year age	4	04%
65-75 year age	4	04%
Total Patients	100	100%

**Table 1:** The data clearly indicates that the age group with the most significant proportion of patients (44%) was between 35 and 45 years old. The remaining patients were about equally divided throughout the various age categories. It is crucial to acknowledge that this research is limited in scope

since it only includes 25 participants. Consequently, the findings may not be applicable to the broader community. Overall, the age distribution of patients in this research was relatively uniform, with the most significant proportion of patients falling between the 35-45 years.

**Table 2: Sex Distribution of Patients**

Sex	Total number of the patients	Percentage of the patients
Male	40	40%
Female	60	60%
Total	100	100 %

**Table 2:** Displays the distribution of patients in this research according to their gender. Below is a comprehensive analysis and interpretation: The survey contained a higher proportion of females (60%) compared to men (40%), indicating a considerable gender imbalance. Based on the statistics, it may be inferred that incisional hernias are more prevalent among females in this specific group of patients.

**Table 3: Clinical Symptoms of Patients**

Mode of presentation	No. of cases	Percentage of the patients
Swelling	45	45%
Pain	20	20%
Constipation	15	15%

Fever	10	10%
Abdominal Distension	5	5%
Nausea, Vomiting	5	5%

**Table 3:** The following Table 3 displays the prevalence of clinical symptoms as reported by patients in the research. Below is an analysis of the discoveries: The most prevalent symptom described by the majority of individuals (45%) was swelling, followed by pain (20%). Additional symptoms such

as constipation (15%), fever (10%), abdominal distention (5%), and nausea/vomiting (5%) were seen in a lesser proportion of individuals.

These data indicate that oedema is a robust indication of incisional hernia in this specific group of patients.

**Table 4: Previous Surgeries**

Name of the operation	No. of patients
Hysterectomy patients	40
Lower segment cesarean operation procedure	10
Tubectomy patients operated	15
DU perforation closure procedure	5
Exploratory laparotomy procedure	15
Laparoscopic port site procedure	5
Appendectomy patients operated	5
Nephrectomy patients operated	5

**Table 4:** This table provides a comprehensive breakdown of the many surgical procedures that the patients in the research had previously experienced. Hysterectomy was performed on 40 individuals.

Fifteen patients had exploratory laparotomy. Additional methods: Procedures that occurred with lower frequency included: Decennial segmental caesarean section was performed on a cohort of 10

individuals. Tubectomy was performed on a total of 15 individuals. Upper gastrointestinal (GI) surgery may be necessary due to a duodenal ulcer (DU). Perforation closure was performed in five individuals.

Five patients had an appendectomy. Five patients had nephrectomy. Laparoscopic port site surgery was performed on a total of five individuals.

**Table 5: Previous Incisions Used**

Incision procedure type	No. of cases
Lower midline incision	40
Upper midline incision	30
Paramedian incision	10
McBurney procedure	5
Transverse incision procedure	10
Oblique lumbar incision procedure	05

**Table 5:** The presented data illustrates the frequency of different incision forms used in prior operations among the participants of the research. The lower midline was seen in a group of 40 individuals. The upper midline was seen in a group of 30 individuals. Alternate surgical cuts: Infrequent surgical cuts comprised: Paramedian was seen in 10 individuals.

The McBurney incision, which is slightly off-centre, is often used for appendectomy in the lower right abdomen. Transverse (10 patients) - involves making a horizontal cut across the abdomen. The oblique lumbar approach (used in 5 patients) was employed to provide access to the kidney in the flank region.

**Table 6: Risk Factors Analysis**

Risk factor	No. of patients
Obesity problems	60
Respiratory complications illness	30
Wound infection occurrence in patients	40
Wound dehiscence in patients	30
Diabetes occurrence in patients	65
Repeated surgery problems	20
Anemia disease	40
Miscellaneous	5

**Table 6:** This table provides a concise overview of the several variables that may be linked to a higher likelihood of incisional hernias in the individuals under investigation.

Commonly occurring risk factors: The presence of obesity in 60 individuals is consistent with the results of previous investigations and indicates a significant potential risk factor. Diabetes was shown to be a major risk factor in 65 individuals, further emphasizing its importance.

Wound infection was seen in 40 patients, which aligns with the findings from prior tables and confirms that it is a significant risk factor. Respiratory difficulties were seen in 30 individuals.

These issues may be attributed to variables such as coughing or straining, which exert additional pressure on the abdomen wall. Wound dehiscence, seen in 30 patients, is the condition when a surgical incision partially or completely reopens, hence elevating the likelihood of hernias. Multiple surgical procedures (including 20 patients) may be attributed to the development of scar tissue or increased stress on the abdominal wall. Anaemia, seen in 40 individuals, may be associated with delayed wound healing. Miscellaneous (5 patients) - The small sample size implies that these variables may be less prevalent in this research group.

**Table 7: Time of Onset of Hernia after the Previous Surgery Being Operated on in the Hospital**

Duration since surgery	No. of patients
0-3 months	20
Three months to 1 year	40
1-3 years	30
> 3 years	10

**Table 7:** This table displays the distribution of patients according to the period that passed between their prior operation and the occurrence of an incisional hernia.

**Table 8: Type of Repair**

Type of repair	No. Of patients
Onlay Experiment	70
Transverse Abdominus Release Operation Procedure	10
Retrorectus Procedure	5
Laparoscopic Procedure	10
Anatomical Repair Procedure	05

**Table 8:** The provided table outlines the surgical methods used for the correction of incisional hernias in the patients under investigation.

Primary Technique: The repair type that occurred most often was Onlay repair, performed on a group of 70 patients, which is a surgical method that includes the placement of a mesh over the abdominal wall defect in order to strengthen it.

Infrequent Methods: Additional repair techniques used include Transverse Abdominis Release (TAR) surgery, which was performed on a total of 10 individuals. - The objective of this surgery is to firm up the abdominal muscles. Retrorectus repair was performed on five patients, with the mesh positioned posterior to the rectus muscle. Laparoscopic repair

was performed on ten patients utilizing a minimally invasive method, laparoscopy, for the implantation of mesh. The anatomical repair was performed on five patients, which included suturing tissues together without the use of a mesh implant. However, specific information on the procedure needs to be supplied. Onlay mesh repair is often used: The high incidence of onlay repair in this research indicates that it is likely the conventional procedure. Options for specific scenarios: The use of TAR, retrorectus repair, laparoscopic repair, and anatomical repair in a limited patient cohort suggests that various methods may be selected for certain instances or according to the surgeon's choice.

**Table 9: Types of Approach Procedure**

Type of Repair	No. of Cases
Laparoscopic Surgery Procedure	10
Open Surgery	90

**Table 9:** The following table illustrates the distribution of patients according to whether they had laparoscopic or open surgery for the correction

of incisional hernia. The research mostly used open surgery as the primary technique, with a total of 90 individuals undergoing this procedure. A smaller

cohort of patients (10 individuals) had laparoscopic surgery. Open surgery is considered the conventional procedure. The prevalence of open surgery implies that it may be the favoured or customary method at this healthcare institution.

Laparoscopic repair, while it is a less invasive procedure, is only recommended for select instances or surgeons who have specialized knowledge and experience in this approach.

**Table 10: Post-Operative Complications**

Complication	No. of patients	Percentage
Seromas presence	20	30
Dehiscence presence	10	2
SSI	2	8
Mesh Infection	8	2
Nil	60	74
Total	100	100

**Table 10:** This table provides a concise overview of the postoperative problems seen by individuals who had incisional hernia repair surgery. Primary complication: Seromas, seen in 20 out of 100 individuals (30% prevalence), refer to the formation of fluid collections after surgical procedures. Infrequent complications: There were ten individuals (10%) who had wound dehiscence—reopening of the surgical incision, either wholly or partially. Two individuals had Surgical Site Infection (SSI), accounting for 8% of the total. - Infection at the location where the incision was made. Two individuals (8% of the total) had a mesh infection. - Infection-related to the surgical mesh used for repair. Positive result: No problems (60 patients, 74%) - The majority of patients did not encounter any of the specified complications.

### Discussion

Hernia is more common in females: Women were much more likely to develop hernias than men (73% vs 27%). This could be due to weaker abdominal walls after childbirth and obesity, both of which can increase infection risk [15-16]. Age: Most cases (91.8%) were in the 40-70 year age group, similar to other studies [17] found patients between 25-90 years old). Symptoms: Swelling (most common): Over two-thirds (67.6%) had a bulge, usually noticeable when standing or straining. Pain: Around a quarter (24.3%) experienced abdominal pain, often cramping. A small number (8.1%) had both pain and swelling [18].

Hernia size: Most hernias (81%) were more significant than 4 cm. This suggests longer surgical incisions are linked to a higher infection risk, a substantial factor in incisional hernias [19-21]. All support wound infection as a risk factor). Time of onset: The timing of hernia development varied: 8.1% within three months of surgery, 16.2% within three months to 1 year, 21.6% within 1-3 years, and 54% after three years.

This differs from a 10-year study where most hernias occurred later (56% after the first year and 35% after five years) [22]. Location: Most hernias (64.9%)

occurred in midline laparotomy scars, confirming findings from other research [23]. The short follow-up period (6 months) limits conclusions on recurrence rates. However, one case recurred within three months. Several factors significantly increased the risk of complications (p-value < 0.007): Wound infection [24-25], Repeat surgeries: And underlying diseases (like diabetes and high blood pressure). Larger hernia size and the type of incision used previously were also significant factors (p-value < 0.04). This study highlights factors that increase the risk of incisional hernias and complications. This knowledge can help surgeons develop strategies to prevent these problems [25].

### Conclusion

This research examined the occurrence of incisional hernias, revealing a greater incidence among females and those who had undergone midline laparotomy operations in the past. Potential risk factors that have surfaced include obesity, diabetes, and wound infections. The most prevalent method used was open surgery with onlay mesh repair, and the most common consequence after the procedure was the development of seromas. These findings indicate the significance of preventive actions for persons at risk and emphasize the need for more studies on long-term results and less invasive repair methods.

### References

1. Celsus AC of medicine. Translated by James Grieve. London, England; 419.
2. Abrahams J, Elder S. Shoelace repair of large postoperative ventral abdominal hernias: a simple extraperitoneal technique. *Contemp Surg.* 1988; 32:24.
3. Rutkow IM, Robbins AW. Demographic, classification, and socioeconomic aspects of hernia repair in the United States. *Surg Clin North Am.* 1993 Jun; 73(3):413-26.
4. Bucknall TE, Cox PJ, Ellis H. Burst abdomen and incisional hernia: a prospective study of 1129 major laparotomies. *Br Med J (Clin Res Ed).* 1982; 284:931-3.

5. Narayanan V, Bhagavan K. A Prospective Study of Incisional Hernia with An Evaluation of Factors In Developing Post-Operative Complications. *IOSR Journal of Dental and Medical Sciences*. 2017; 16(3):25-29.
6. Korenkov M, Paul A, Sauerland S, Neugebauer E, Arndt M, Chevrel JP, et al. Classification and surgical treatment of incisional hernia. Results of an experts' meeting. *Langenbecks Arch Surg*. 2001; 386:65-73.
7. George CD, Ellis H. The results of incisional hernia repair: A twelve-year review. *Ann R Coll Surg Engl*. 1986; 68:185-7.
8. Mudge M, Hughes LE. Incisional hernia: A 10-year prospective study of incidence and attitudes. *Br J Surg*. 1985; 72:70-1.
9. Cuschieri A, Steele RJ, Moossa AR, editors. Incisional hernia. In: *Essential Surgical Practice*. 4th ed. New York: Arnold Publications; 2002; 169.
10. Bessa SS, Katri KM, Abdel-Salam WN, Abdel-Baki NA. Early results from the use of the Lichtenstein repair in the management of strangulated groin hernia. *Hernia*. 2007; 11:239-42.
11. Ellis H, Gajraj H, George CD. Incisional hernias: When do they occur? *Br J Surg*. 1983; 70:290-1.
12. Voller G. Ventral abdominal hernia. *Mastery of Surgery*. 5th ed. Vol. 2. Philadelphia, PA: Lippincott Williams & Wilkins; 2007.
13. Bucknall TE, Cox PJ, Ellis H. Burst abdomen and incisional hernia: A prospective study of 1129 major laparotomies. *Br Med J (Clin Res Ed)*. 1982; 284:931-3.
14. Agrawal M, Singh H, Sharma S, Singh N, Kishan Kaul R, Chaudhary R. Prevalence, Clinical Presentation, and Management of Incisional Hernia in the Indian Population: A Cross-sectional Study. *International Journal of Scientific Study*. 2016; 4(7).
15. Cuschieri A. Incisional hernia. In: *Essential Surgical Practice*. 4th ed. Higher Surgical Training in General Surgery. New York: Arnold Publications; 2002. p. 169.
16. Regnad JF, Hay JM, Rea S. Ventral incisional hernias: incidence, date of recurrence, localizations and risk factors. *Ital J Surg Sci*. 1988; 3:259-65.
17. Carlson MA, Ludwig KA, Condon RE. Ventral hernia and other complications of 1000 midline incisions. *South Med J*. 1995; 88:450-3.
18. Bose M. Ventral hernia: A review of 175 cases. *Indian J Surg*. 1999; 61:180-4.
19. Blomstedt B, Welin-Berger T. Incisional hernia: a comparison between midline, oblique and transverse incisions. *Acta Chir Scand*. 1972; 138:275-8.
20. Greenall MJ, Evans MJ, Pollock AV. Midline or transverse laparotomy? A randomized controlled clinical trial. Part I: influence on healing. *Br J Surg*. 1980; 67:188-90.
21. Pollock AV, Greenall MJ, Evans M. Single-layer mass closure of major laparotomies by continuous suturing. *J R Soc Med*. 1979; 72:889-93.
22. Mudge M, Hughes LE. Incisional hernia: A 10-year prospective study of incidence and attitudes. *Br J Surg*. 1985; 72:70-1.
23. Fassiadis N, Roidl M, Hennig M, South LM, Andrews SM. Randomized clinical trial of vertical or transverse laparotomy for abdominal aortic aneurysm repair. *Br J Surg*. 2005; 92(10):1208.
24. Carlson MA. Acute wound failure. *Surg Clin North Am*. 1997; 77(3):607-36.
25. Sanders DL. The modern management of incisional hernia. *BMJ*. 2012; 344:2843.