International Journal of Research in Medical Sciences
Sharma VM et al. Int J Res Med Sci. 2014 Feb;2(1):127-131
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012

DOI: 10.5455/2320-6012.ijrms20140226

Research Article

Study of factors associated with incisional hernia in female

Vidhyasagar M. Sharma*, Sushil D. Akruwala

Department of Surgery, GCS Medical College, Hospital & Research Centre Ahmedabad, Gujarat, India

Received: 8 October 2013
Accepted: 16 October 2013

***Correspondence:**
Dr. Vidhyasagar M. Sharma,
E-mail: sharma_vidhyasagar@yahoo.com

ABSTRACT

Background: Incisional hernia is still relatively common in our practice. The aim of the study was to identify risk factors associated with incisional hernia in females in our region.
Methods: All the women who presented with incisional hernia between 2010 and 2012 were retrospectively studied using records and preparing a standard form to obtain information on pre-hernia (index) operations and possible predisposing factors. They all had open surgical repair and were followed up for 12-36 months.
Results: Fifty two women were treated during study period. The index surgeries leading to the hernias were emergency caesarian section 26/52 (50%), emergency exploratory laparotomy 6/52 (11.6%), and elective surgeries 20/52 (38.5%). Major associated risk factors were the use of wrong suture materials for fascia repair, midline incisions, wound sepsis, and overweight.
Conclusions: For elective surgeries, reduction of weight should be encouraged when appropriate, and transverse incisions are preferred. Absorbable sutures should be avoided in fascia closure. Antibiotics should be used for complicated cases.

Keywords: Incisional hernia, Meshplasty, Recurrence

INTRODUCTION

Incisional (postoperative ventral) hernia is an iatrogenic abdominal wall defect that occurs at the site of previous incision following breakdown in the continuity of the fascia closure.[1] It has been described as a bulge visible and palpable when the patient is standing and often requiring support and repair. It is a very common complication of abdominal surgeries and is associated with considerable morbidity and mortality.[2,3] As many as 11% of laparotomies are complicated by the development of incisional hernias.[4,5] The figure rises to 26% in those who develop wound infection. Despite increased understanding of abdominal wound closure, it is worrisome that the frequency has not diminished appreciably in the past 75 years.[6]

An incisional hernia occurs due to biochemical failure of the acute fascial wound early in the healing process when wound tensile strength is very low or absent (days 0-30). It is during this time, when wound strength depends entirely on suture integrity, that recovering patients start returning to increased levels of activity and thereby place increasing loads across their acute wounds. However, the hernia may not be obvious for days or even years.[13,14] Various factors have been identified to be responsible for the failure, including obesity and wound infection; other contributory factors include initial closure of fascia with catgut, drainage tube through the index incision, senility, early wound dehiscence, immunosuppressant therapy, anaemia, diabetes mellitus, malnutrition, jaundice, and azotaemia.[7] Occurrence of incisional hernia has also been attributed to the disturbance of collagen metabolism at the microscopic level.[8] Hence, tension free repairs are

recommended. This entails the use of mesh, either open or laparoscopic.[7,9] This study was carried out to identify the factors associated with incisional hernia in females of our region as well as factors affecting recurrence.

METHODS

All women who presented with ventral incisional hernia at our hospital, between January 2010 and December 2012 were included in the study.

Retrospective analysis of all the records and history of the patient were carried out to obtain the indication for the pre-hernia operations and the possible predisposing factors. Those patients where sufficient information couldnot be gathered were excluded.

Surgeons' skill and level of experience for the pre-hernia surgery could not be assessed because most were patients referred from other hospitals. All hernias were in the midline of the abdomen, but they were characterised as being supraumbilical, periumbilical or infraumbilical. Wound infection as a risk factor was arrived at if the patient gave a history of a pus discharge from the wound after the pre-hernia surgery. This was corroborated by the length of hospital stay and the scar of the pre-hernia operation. Prolonged ileus was defined as delay of return of the bowel movements 72 hours after surgery.

All patients with body mass index of > 25 kg/m^2 whose weight was the same or greater before the pre-hernia surgery were considered overweight or obese.

All the patients were operated on by the team headed by the first author. Scars with no sutures in the wound were assumed to have been repaired with absorbable sutures (chromic catgut/vicryl). The operation notes of the few patients who were operated on in this hospital were also reviewed.

The patients were given general or regional anaesthesia as per case. Meshplasty was performed in all the cases either by onlay or sublay method. Rectus sheath was closed using nonasborbale material (polypropelene) in all the cases. All the patients were placed on cephalosporin for prophylaxis. Recovery from anaesthesia was observed. All the patients were followed up for a minimum of 12 months after repair. Post-operative complications and recurrences were documented.

Post-operative complications were classified as superficial or deep wound infection, seroma, or haematoma. Superficial wound infection was defined as the presence of signs or symptoms of inflammation at the wound, which was treated with antibiotics. Deep wound infection was defined as the presence of a sub-fascial collection of purulent fluid that may or may not have been associated with systemic or local evidence of inflammation. Seroma was defined as the presence of a symptomatic prefascial collection of sterile fluid requiring drainage. Haematoma was defined as prefascial collection of organized clot requiring operative drainage. Recurrence was defined as the occurrence of the incisional hernia after the repair.

The data were analysed using SPSS package 11.0 version. Categorical data was compared with recurrence using Chi square (Pearson Chi square and Fischer's exact test) where appropriate. Two-tailed student's t-test was used to compare the continuous data with recurrence. Statistical significance was assigned for value of $p<0.05$.

RESULTS

Fifty two women with incisional hernia were studied. Ages ranged from 25 to 70 years. Age distribution is shown in Table 1. Most of the patients (51.9%) were in the reproductive age group. More than three-quarters of the incisional hernias (42, 80.7%) occurred within the first year of pre-hernia surgery. Most patients (34, 65.4%) under wentonlay meshplasty repair and the remainder had sublay meshplasty. Only two patients (3.8%) had recurrence of the lesion within the study period. Sixteen patients (30.8%) had other complications, including superficial wound infection (6, 11.5%), deep wound infection (2, 3.8%), haematoma (2, 3.8%) and seroma (6, 11.5%).

Table 1: Age distribution and the outcome of surgery in the 52 women with incisional hernia.

Variable		Frequency	Percentage
Age	<29	9	17.3
	30-39	18	34.6
	40-49	16	30.76
	50-59	6	11.5
	>60	3	5.7
Onset of hernia (months)	0-6	16	30.76
	7-12	26	50.0
	13-18	6	11.5
	19-24	2	3.8
	>25	2	3.8
Method of repair (meshplasty)	Onlay	34	65.4
	Sublay	18	34.6
Outcome of surgery	Recurrent	2	3.8
	Not recurrent	50	96.2
Complication	None	36	69.2
	Wound infection	8	15.4
	Haematoma	2	3.8
	Seroma	6	11.5
Total		52	100

The pre-hernia (index) operations of the patients are as shown in table 2. By using the chi square test, we found that the index operation was significantly associated ($p<0.0001$) with the nature of the surgery: emergency or elective. Twenty-six patients (50%) had emergency caesarean section. Obstructed labour (18, 69.2%) was the most common indication for emergency caesarean sections, followed by foetal distress (4, 15.4%) and eclampsia (4, 15.4%). The fifteen emergency exploratory laparotomies were done for six typhoid perforations, four appendiceal abscesses, two for blunt abdominal trauma and three uterine perforations from septic abortion. The elective surgeries included total abdominal hysterectomy with bilateral salpingoophorectomy, herniorrhaphies, and right hemicolectomy.

Table 2: Prehernia (index) operations among incisional hernia patients.

Procedure	Type	Number	Percentage	Indication
Emergency	Caesarean section	26	50	Obstructed labour 18 Fetal distress 4 Eclampsia 4
	Exploratory laparotomy	15	28.8	Enteric perforation 6 Appendiceal abscess 4 Uterine perforation 3 Laparotomy for blunt trauma 2
Elective	Abdominal hysterectomy	3	5.7	Uterine fibroid 2 Endometrial cancer 1
	TAH-BSO	1	1.9	Ovarian malignancy 1
	Herniorrhaphy	5	11.4	Epigastric hernia 2 Umbilical hernia 3
	Exploratory laparotomy	1	1.9	Ileal stricture 1
	Laparotomy with right hemicolectomy	1	1.9	Caecal mass 1

$p \leq 0.0001$ - The incidence of incisional hernia are more common in patients who had emergency surgeries than elective surgeries. TAH-BSO* = Total abdominal hysterectomy and bilateral salpingoophorectomy

Most hernias were infraumbilical (39, 75%). Only ten hernias were periumbilical (19.2%) and three (5.7%) were supraumbilical.

Table 3: Anatomical location of hernia defect Site.

Anatomical location of hernia defect site	Frequency	Percentage
Supraumbilical	3	5.7
Periumbilical	10	19.2
Infraumbilical	39	75

The major predisposing factors included midline incision (52, 100.0%), wound sepsis (35, 67.3%), absorbable suture (22, 42.3%), overweight (12, 23%), and prolonged post-operative ileus (10, 19.2%) (Table 4). Other factors included multiparity, cough, haematoma, diabetes mellitus, cigarette smoking, and cancer.

Table 4: Factors associated with incisional hernia in 52 patients.

Factor	No of patients	Percentage
Absorbable sutures	22	42.3
Midline incisions	52	100.0
Wound sepsis	35	67.3
Overweight (body mass index > 25 kg/m2)	12	23
Multiparity (previous multiple caesarean section)	2	3.8
Post operative ileus	10	19.2
Cough	2	3.8
Haematoma	2	3.8
Diabetes mellitus	3	5.7
Cigarette smoking	4	7.6
Cancer	2	3.8

Patients were followed up for 12 to 36 months. The two patients, who had recurrence, were overweight and had wound infection. Recurrence was significantly affected by the pre-hernia surgery (p=0.012). Recurrence was seen in the repair of incisional hernia resulting from umbilical hernia and emergency caesarean section. The method used did not affect the recurrence rate.

DISCUSSION

We studied fifty two women, most of whom were of reproductive age. Pre-hernia surgeries were pregnancy-related in 26/52 (50%) cases. This age group is always subjected to prolonged or repeated stretching and weakness of the abdominal muscular tendinous structure. It is therefore not surprising that incisional hernia was more prevalent in this group.

Twenty-six patients (50%) had emergency caesarean section before the incisional hernia. This is in agreement with previous observations;[10] the pregnant abdomen, attendant obesity, and emergency nature of surgery can all predispose to incisional hernia.

The major possible predisposing factors identified in this study (Tables 2, 3 and 4) are not much different from those reported elsewhere.[10,11] It seems that little is being done to reduce these preventable risk factors. Forty one patients (78.8%) had emergency operations, where nothing could have been done about the weight of overweight patients. Hence, obesity as a causative factor was prominent in 12 (23%) of our patients. Surgeons' lack of experience and inappropriate surgical technique could also be factors leading to incisional herniation. This could not be ascertained in many of our patients who had presented from various hospitals, without access to their previous operation records.

Wound sepsis has continued to be an important risk factor.[11] It was contributory in 67.3% of our patients. Perhaps the usual reduced immune state of pregnancy combined with the emergency nature of the surgeries could account for this frequent involvement of sepsis.

All our patients had vertical abdominal incisions for the index operations. The least resistance to stress by intra-abdominal forces is offered by vertical incision, which transversely divides the oriented fascia fibers of the anterior abdominal wall.[1] This could explain the 100% constancy of this risk factor in our patients. This may account for Pfannestiel incisions recording very low incidence of incisional hernia.[12]

Incisional hernia is expected in patients who have absorbable suture for fascia repair.[1] Midline abdominal fascia is poorly vascularised and hence is slow to heal, consolidate and regain its tensile strength.[1] It therefore requires suture materials whose tensile strength will still hold until the fascia heals. As noted by previous workers,[10] herniation through the lower midline scar was more frequent in our series (75%). This is anatomical, due to the thinner anterior sheath with virtually no posterior sheath support of the linea alba. It has also been attributed to the orientation of the incision, which is parallel to the line of forces acting on it.

Surgical treatment of incisional hernia includes open and laparoscopic techniques. Laparoscopic meshplasty is a promising technique with all the advantages of minimally-invasive surgery[14,15] but requires placement of composite mesh and complications related to exposure of mesh to the bowel are frequent. Open suture repair (polypropylene), which may incorporate relaxing incision and hernioplasty using onlay and sublay techniques[13], is cost effective and there is no exposure of peritoneal contents to the mesh.

The recurrence rate among the 52 patients was 2/52 (3.8%), after a period of follow-up ranging from 12 to 36 months. Two of the cases are thought to have been due to wound sepsis and overweight.

Therefore, we suggest that whenever possible, reduction of weight should be encouraged before laparotomies and incisional hernia repair in overweight patients. Transverse incisions, unless contraindicated, should be used more frequently. Judicious use of perioperative antibiotics in all emergency laparotomies, particularly caesarean section, with meticulous attention to asepsis at all times should be encouraged. Absorbable sutures should not have a place in repair of fascia of midline incisions. There is a need to continue insisting on appropriate nonabsorbable suture materials in closure of abdominal wounds during laparotomy. The well-established surgical principles remain valid: wound closure should be free of excessive tension, the sutures should be placed in healthy tissue, and strong suture material should be used to support the wound through the critical period of healing.[4]

CONCLUSION

Despite the relatively small number of patients, we confidently conclude that the major clinical attributes with possible risk factors for incisional hernia are using the wrong type of sutures, midline incisions, wound sepsis, and overweight. The role of the individual attributes is not clear. A further study of a large population to compare patients with similar attributes but no incisional hernia would shed light on this.

However, we recommend that whenever possible, reduction of overweight be encouraged before laparotomies and that transverse or oblique incision be used instead of vertical incision when practicable. Prophylactic antibiotics should be used in all emergency laparotomies, especially caesarean sections for obstructed labour. Absorbable sutures should not have a place in repair of fascia of midline incision. If these suggestions are adhered to, the incidence and morbidity of incisional hernia will definitely diminish.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the institutional ethics committee

REFERENCES

1. Sahtora TA, Roslyn JS. Incisional Hernia. Surg Clin North Am 1993;73:557-70.
2. Anthony T Bergen PC, Kim LT. Factors affecting recurrence following herniorrhaphy. World J Surg 2000;24:95-101.
3. Niggebrugge AHP, Trimobos JB, Hemans J et al. Influence on abdominal wound closure technique on complications after surgery: A randomized study. Lancet 1999;353:1563-7.
4. Gerald ML. Ventral hernia repair by the laparoscopic approach. Surg Clin North Am 2000;80:1329-39.
5. Anthony T, Bergen PC, Kim LT et al. Factors affecting recurrence following incisional herniorrhaphy. World J Surg 2000;24:95-101.
6. Flum DR, Horvath K, Koepsell T. Have outcomes of Incisional hernia repair improved with time? A population based analysis. Ann Surg 2003;237:129-35.
7. Millikan KW. Incisional hernia repair. Surg Clin N Am 2003;83:1223.
8. Si Z, Bhardway R, Rosch R et al. impaired balance of type I and type 3 procollagen mRNA in cultured fibroblasts of patients with Incisional hernia. Surgery 2002;131:324-31.
9. Cassar K, Munro A. Surgical treatment of Incisional hernia. Br. J Surg 2002;89:534-45.
10. Isrealsson L.A., Jonsson T., Knutsson A. A suture technique and wound healing in midline laparatomy incisions. European J Surgery 1996;80:162-9.
11. Shaikh NA, Shaikh NM. Comparative study of repair of incisional hernia. Journal of the Pakistan Medical Association 1994;44:389.
12. Falase AO, Akinkugbe OO. Diabetes mellitus. In: Falase AO and Akinkugbe OO, eds. A Compendium of Clinical medicine. 2nd ed. Ibadan, Nigeria: Spectrum Books Ltd; 999:376-98.
13. Korenkov M, Paul A, Sauerland S et al. Classification and Surgical treatment of Incisional hernia: results of an expert's meeting. Langenbecks Archives of Surgery. 2001;386(1):65-73.
14. Bageau S, Blanc P, Breton C et al. Laparoscopic repair of Incisional: a retrospective study of 9 patients. Surgical Endoscopy 2002;16:345-8.
15. Goodney PP, Birkmeyer CM, Birkmeyer JD. Short term outcomes of laparoscopic and open ventral hernia repair: A meta- analysis. Arch Surg 2002;37:1161-5.

DOI: 10.5455/2320-6012.ijrms20140226
Cite this article as: Sharma VM, Akruwala SD. Study of factors associated with incisional hernia in female. Int J Res Med Sci 2014;2:127-31.