

## ORIGINAL ARTICLE

# Internal Tension Sutures in term of Wound Healing in Patients Undergoing Laparotomy

SHAHID KHAN AFRIDI<sup>1</sup>, MUHAMMAD YOUSAF<sup>2</sup>, GUL SHARIF<sup>3</sup>, ASIF MEHMOOD<sup>4</sup>, MOHAMMAD SHOAIB KHAN<sup>5</sup>, DASTGEER WAHEED<sup>6</sup>

<sup>1</sup>Senior Registrar General Surgery, Muhammad Teaching Hospital, Peshawar

<sup>2</sup>Senior Registrar General Surgery Northwest Teaching Hospital Hayatabad, Peshawar

<sup>3</sup>Assistant Professor General Surgery, Lady Reading hospital, Peshawar

<sup>4</sup>Assistant Professor, General Surgery, Khalifa Gul Nawaz Teaching Hospital, Bannu

<sup>5</sup>Assistant Professor, General Surgery, Khalifa Gul Nawaz Medical Teaching Institute, Bannu.

<sup>6</sup>Associate Professor, General Surgery, Gomal Medical College D.I.Khan

Corresponding Author: Dr. Gul Sharif, Email: [gulafridi1@yahoo.com](mailto:gulafridi1@yahoo.com), Cell No: +92 300 5959004

## ABSTRACT

**Objective:** The aim of this study is to determine the effectiveness of internal tension sutures in term of wound healing in patients undergoing laparotomy.

**Study Design:** Prospective cross sectional study

**Place and Duration:** Department of Surgery, Lady Reading Hospital, Peshawar for duration of six months from 15<sup>th</sup> November 2020 to 15<sup>th</sup> May 2021.

**Methods:** One hundred and fifty patients of both genders were presented this study. Patients were aged between 20-60 years of age. Patients' detailed demographics including age, sex and body mass were recorded after taking informed written consent. Internal tension sutures technique were used for laparotomy among patients who had intestinal obstruction, fire arm injury or stab wound to abdomen, intra-abdominal malignancies, pancreatitis. Mean post-operative pain was measured by using VAS. Outcomes in terms of healing and complications were observed at the end of study. Complete date was analyzed by SPSS 27.version.

**Results:** There were 115 (76.7%) patients were males and 35 (23.3%) were females. Mean age of the patients were 39.09±12.24 years with mean BMI 28.17±8.42 kg/m<sup>2</sup>. Among 150 cases, majority of the patients 120 (80%) were treated as elective and 30 (20%) were treated in emergency. Symptoms among patients were peritonitis, intestinal obstruction, trauma, mesenteric ischemia, intra-abdominal malignancy, pancreatitis and obstructive jaundice found. Effectiveness was found among 140 (93.3%) cases and only 10 (6.7%) adverse outcomes were found i.e. wound infection and incisional hernia. Patients' satisfaction was 94.7% among all cases.

**Conclusion:** We concluded in this study that use of internal tension sutures technique for laparotomy is an effective and safest technique in terms of less complications and wound infections with excellent outcomes. We observed that majority of the patients were satisfied by this technique.

**Keywords:** Wound dehiscence, Internal tension sutures, Laparotomy, Incisional hernia

## INTRODUCTION

As the name implies, abdominal wound dehiscence (AWD) is the process of separating distinct layers of an abdominal wound before it heals completely. Acute laparotomy wound failure and ruptured abdomen are other words used [1]. In most cases, it happens when a wound is not strong enough to withstand the forces imposed on it [2, 3].

Due to the quick onset of frequently permanent clinical sequelae, abdominal wound dehiscence is among the most feared life-threatening consequences. In sub-Saharan Africa, especially Ethiopia, it is a major cause of postoperative morbidity and mortality [4–6]. Many impoverished nations have a very high related death rate due to infective consequences and a lack of suitable facilities, in contrast to more developed countries [1–7].

Complications following abdominal wall closure persist despite considerable developments in surgical procedures, equipment, and supplies. It should be effective, strong, and function as a barrier against infection. Infection, hernia formation, suture sinus formation, and incisional pain should be at a minimum.

Numerous technical concerns and patient-related factors may help to prevent these issues from occurring during surgery. It was decided to conduct the review using a MEDLINE search. Articles from 1952 to 2015 on

abdominal fascial closure were used in this study. As with any other wounds, abdominal incisions heal the same way as other wounds. This is followed by a 3 week proliferative phase. [8,9] For up to a year, the maturation process takes place. There are barely 20 percent of original abdominal fascia strength left at the end of the proliferative phase. The fascia is only 50% and 80% of its former strength at 6 and 20 weeks post-surgery, respectively. As a result of the surgery, the abdominal fascia will never fully restore its previous force. [10,11] The choice of incision and closure technique is well-documented. Dehiscence, wound complications, and hernia formation are connected with a number of patient risk factors. A review of wound complications and incisional hernia formation will be conducted, as well as ways to reduce their occurrence.

The aim of this study is to determine the effectiveness of internal tension sutures in term of wound healing in patients undergoing laparotomy.

## MATERIAL AND METHODS

This prospective cross sectional study was conducted at Department of Surgery, Lady Reading Hospital, Peshawar for duration of six months from 15<sup>th</sup> November 2020 to 15<sup>th</sup> May 2021.

The study consisted of 150 patients. Patients' detailed demographics were recorded after taking informed written consent. Patients had history of laparotomy, cirrhosis and those did not give any written consent were excluded from this study.

Patients were aged between 20-60 years of age. Internal tension sutures technique were used for laparotomy among patients who had intestinal obstruction, fire arm injury or stab wound to abdomen, intra-abdominal malignancies, pancreatitis. Mean post-operative pain was measured by using VAS. Outcomes in terms of healing and complications were observed at the end of study. Complete date was analyzed by SPSS 27.version. Categorical variables were assessed by percentages and frequencies.

## RESULTS

There were 115 (76.7%) patients were males and 35 (23.3%) were females. Mean age of the patients were  $39.09 \pm 12.24$  years with mean BMI  $28.17 \pm 8.42$  kg/m<sup>2</sup>. Among 150 cases, majority of the patients 120 (80%) were treated as elective and 30 (20%) were treated in emergency.(table 1)

Table 1: Baseline details demographics on enrolled cases

Variables	Frequency	%age
Mean age (years)	$39.09 \pm 12.24$	
Mean BMI (kg/m <sup>2</sup> )	$28.17 \pm 8.42$	
<b>Gender</b>		
Male	115	76.7
Female	35	23.3
<b>Treatment</b>		
Elective	120	80
Emergency	30	20

Symptoms among patients were peritonitis found in 48 (32%) cases, 25 (16.7%) intestinal obstruction, trauma among 16 (10.7%), mesenteric ischemia in 6 (4%), intra-abdominal malignancy in 35 (23.3%), pancreatitis 12 (8%) and 8 (5.3%) obstructive jaundice found.(table 2)

Table 2: Association of symptoms among all cases

Variables	Frequency	%age
<b>Symptoms</b>		
Peritonitis	48	32
Intestinal obstruction	25	16.7
Intra-abdominal malignancy	35	23.3
Trauma	16	10.7
Pancreatitis	12	8
obstructive jaundice	8	5.3
mesenteric ischemia	6	4
Total	150	100

Post operatively pain according to mean VAS score was  $8.01 \pm 7.44$ .Effectiveness was found among 140 (93.3%) cases and only 10 (6.7%) adverse outcomes were found i.e wound infection and incisional hernia. (table 3)

Table 3: Post-operative outcomes among enrolled cases

Variables	Frequency	%age
Mean VAS score	$8.01 \pm 7.44$	
<b>Effectiveness</b>		
Yes	140	93.3
No	10	6.7
<b>Complications</b>		
wound infection	6	4
incisional hernia	4	2.7

Patients' satisfaction was 94.7% among all cases. (Table 4)

Table 4: Post-operatively satisfaction among all cases

Variables	Frequency	%age
<b>Satisfaction</b>		
Yes	142	94.7
No	8	5.3

## DISCUSSION

A midline incision is the most common access route to the abdomen cavity[12] and is therefore focussed on this incision in the subsequent explanation of the abdominal closure. The overall procedure can be used for various incisions of the abdominal wall, but it is important to note that the actual layers of the abdominal wall differ depending on the location of the incision. In this prospective study 150 patients of both genders were presented with mean age  $39.09 \pm 12.24$  years. Majority of the patients 76.7% were males and the rest were females 23.3%. Our findings were comparable to the previous studies.[13,14]Among 150 cases, majority of the patients 120 (80%) were treated as elective and 30 (20%) were treated in emergency.[15]

In our study symptoms among patients were peritonitis found in 48 (32%) cases, 25 (16.7%) intestinal obstruction, trauma among 16 (10.7%), mesenteric ischemia in 6 (4%), intra-abdominal malignancy in 35 (23.3%), pancreatitis 12 (8%) and 8 (5.3%) obstructive jaundice found.[15] Post operatively pain according to mean VAS score was  $8.01 \pm 7.44$ .In a prior study, external tension sutures were particularly painful with mean VAS  $7.3 \pm 2.31$  in the first 24 hours.[16] In current study effectiveness was found among 140 (93.3%) cases and only 10 (6.7%) adverse outcomes were found i.e wound infection and incisional hernia.The lower surgical site infection rate may be explained in a significantly smaller patient group with the competent immune system in this study. These results were comparable to the previous different researches in which authors presented low rate of surgical site infection among cases who underwent for laparotomy by using internal tension sutures.[15,17-19]

In our study we found that 94.7 patients were satisfied from this technique.[20]As a result, the use of internal or external sutures for fascial dehiscence and evisceration has been a long-standing matter of dispute in the surgical community. A recent small randomized series contradicts the traditional belief that retention sutures prevent evisceration, but do not prevent fascial dehiscence. [21] The use of retention sutures is left to the discretion of the operating surgeon, but it is likely to be beneficial only for patients with a high risk of developing wound problems. It's important to educate patients about wound care and any concerns that may arise. Following abdominal surgery, many surgeons will impose activity limits in order to prevent the failure of the fascial closure. It's not uncommon for them to vary in length based on the surgeon and the surgery. In spite of the lack of strong evidence to support these recommendations, certain activities of daily living (such as getting up from a chair, coughing or valsalva) may generate intraabdominal pressures that are equal or greater than those generated by lifting[22]; however, counseling patients to refrain from heavy lifting and activities that cause incisional pain for a few weeks following surgery may be appropriate.

The type of incision has been considered a risk factor for dehiscence. Transverse or oblique incisions have a lower rate of fascial problems than midline or paramedian incisions. [23] This selection is often dictated by the sort of incision that will be made and how it will be placed and oriented. A unique abdominal closure approach using interrupted buried/internal tension sutures with Vicryl 1/0 has great results, a low rate of infection, wound dehiscence, and incisional hernia, making it suited for all patients.

## CONCLUSION

We concluded in this study that use of internal tension sutures technique for laparotomy is an effective and safest technique in terms of less complications and wound infections with excellent outcomes. We observed that majority of the patients were satisfied by this technique.

## REFERENCE

1. J. A. R. Smith, "Complications, prevention and management," in *Clinical Surgery in General*, p. 350, Churchill-Livingstone, London, UK, 1999.
2. G. H. van Ramshorst, J. Nieuwenhuizen, W. C. J. Hop et al., "Abdominal wound dehiscence in adults: development and validation of a risk model," *World Journal of Surgery*, vol. 34, pp. 20–27, 2010.
3. M. A. Carlson, "Acute wound failure," *Surgical Clinics of North America*, vol. 77, no. 3, pp. 607–636, 1997.
4. W. I. Wolff, "Disruption of abdominal wounds," *Annals of Surgery*, vol. 131, no. 4, pp. 534–555, 1950.
5. M. J. Zinner and S. J. Schwartz, in *Maingot's Abdominal Operations*, pp. 416–422, McGraw-Hill Education, New York, NY, USA, 10th edition, 2012.
6. R. Anielski, S. Cichon, M. Słowiaczek, and P. Orlicki, "Wound dehiscence as a problem of the surgery department," *Wiad Lek*, vol. 50, pp. 234–240, 1997.
7. J. Spiliotis, K. Tsiveriotis, A. D. Datsis et al., "Wound dehiscence: is still a problem in the 21th century: a retrospective study," *World Journal of Emergency Surgery*, vol. 4, no. 1, p. 12, 2009.
8. Khan M. Naqvi A.H. Irshad K. et al. Frequency and risk factor of abdominal wound dehiscence. *J Coll Physicians Surg Pak*. 2004; 14: 355
9. Sandy-Hodgetts K, Carville K, Leslie GD, Determining risk factors for surgical wound dehiscence: a literature review. *International wound journal*. 2015 Jun
10. Borad NP, Merchant AM, The effect of smoking on surgical outcomes in ventral hernia repair: a propensity score matched analysis of the National Surgical Quality Improvement Program data. *Hernia : the journal of hernias and abdominal wall surgery*. 2017 Dec
11. Peponis T, Bohnen JD, Muse S, Fuentes E, van der Wilden GM, Mejjaddam A, Alam H, Kaafarani HMA, Fagenholz PJ, King DR, Yeh DD, Velmahos GC, de Moya MA, Interrupted versus continuous fascial closure in patients undergoing emergent laparotomy: A randomized controlled trial. *The journal of trauma and acute care surgery*. 2018 Sep;
12. Khorgami Z, Shoar S, Laghaie B, Aminian A, Hosseini Araghi N, Soroush A, Prophylactic retention sutures in midline laparotomy in high-risk patients for wound dehiscence: a randomized controlled trial. *The Journal of surgical research*. 2013 Apr
13. Gurjar V, Halvadia BM, Bharaney RP, Ajwani V, Shah SM, Rai M et al. Study of Two Techniques for Midline Laparotomy Fascial Wound Closure. *Indian J Surg* 2014;76(2):91–4
14. Khorgami Z, Shoar S, Laghaie B, Aminian A, Hosseini Araghi N, Soroush A. Prophylactic retention sutures in midline laparotomy in high-risk patients for wound dehiscence: a randomized controlled trial. *JSurg Res*. 2013;180(2):238-43
15. Muhammad Imran Khan, Jawad Khalil, Maryam Alam Khan. Internal tension sutures, a novel method of midline laparotomy closure in high risk patients. *Pak J Surg* 2017; 33(3):165-169
16. Abdulretha M. Effect of retention sutures for prevention of abdominal wound dehiscence after laparotomy in high risk patients (a prospective study). *IOSR Journal Of Pharmacy* 2014;4(2):38-43.
17. Gurjar V, Halvadia BM, Bharaney RP, Ajwani V, Shah SM, Rai M et al. Study of Two Techniques for Midline Laparotomy Fascial Wound Closure. *Indian J Surg* 2014;76(2):91–4
18. I. P. Qureshi, V. Modi, S. Qureshi, P. Gupta, and M. Gupta, "Study of early post-operative complications of major surgery in patients in tertiary care teaching hospital in Central India-a prospective observational study," *Asian Pacific Journal of Health Sciences*, vol. 5, no. 2, 2018.
19. K. Kapoor and M. Hassan, "A clinical study of abdominal wound dehiscence with emphasis on surgical management in Bangalore Medical College and Research Institute, Karnataka, India," *International Surgery Journal*, vol. 4, no. 1, pp. 2349–3305, 2017.
20. Harvin JA, Wray CJ, Steward J, Lawless RA, McNutt MK, Love JD, Moore LJ, Wade CE, Cotton BA, Holcomb JB, Control the damage: morbidity and mortality after emergent trauma laparotomy. *American journal of surgery*. 2016 Jul
21. Khorgami Z, Shoar S, Laghaie B, Aminian A, Hosseini Araghi N, Soroush A, Prophylactic retention sutures in midline laparotomy in high-risk patients for wound dehiscence: a randomized controlled trial. *The Journal of surgical research*. 2013 Apr
22. Guttormson R, Tschirhart J, Boysen D, Martinson K, Are postoperative activity restrictions evidence-based? *American journal of surgery*. 2008 Mar
23. Brown SR, Goodfellow PB, Transverse versus midline incisions for abdominal surgery. *The Cochrane database of systematic reviews*. 2005 Oct 19