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Close Versus Modified Open Technique for Trocar Insertion in Laparoscopic Surgery

Medical Science

KEYWORDS : Open access; pneumoperitoneum; laparoscopy; modified open technique; close technique.

DR. VIKAS BATHLA	Professor, Department of Surgery, C. U. Shah Medical College and Hospital, Surendranagar. Gujarat state, INDIA.
Dr. Pukur I Thekdi	Professor in Surgery, General Surgery Department, C-9 Doctor quarters, C. U. Shah Medical College and Hospital, Surendranagar, Gujarat state, INDIA.
Dr. Hard Vasavada	3rd year resident, General Surgery Department, Hostel above casuality building, wing 'c', room no. 12 ,C . U. Shah Medical College and Hospital, Surendranagar
Dr. Shaival Majmudar	3rd year resident, General Surgery Department, Hostel above casuality building, wing 'c', room no. 02, C. U. Shah Medical College and Hospital, Surendranagar
Dr. Pratik Koradia	3rd year resident, General Surgery Department, Hostel above casuality building, wing 'c', room no. 12, C. U. Shah Medical College and Hospital, Surendranagar

ABSTRACT

Aims and objectives: The aim of our study was to compare the close and modified open technique of trocar insertion in terms of technique of insertion, patient's safety, intra operative complications and post operative complications. Study design: The present study was prospective, observational and longitudinal. Protocol of the procedure was formed along with Performa, Patient Information Sheet and Informed Consent Form. Place and duration of study: The present study was carried out in surgery department of C.U Shah medical college, Surendranagar; Gujarat state. The study was carried out from 1st October 2012 till 31st May 2014. Methodology: A total of one hundred patients undergoing emergency and elective laparoscopic surgery were included in our study. Case records of patients was recorded in the Performa containing demographic details, size and site of trocar insertion, technique of trocar insertion, intra operative, early post operative and late post operative complications were noted. Results: Out of 100 patients enrolled mean age was 29.87±14.13. Out of 100 patients in the study; 51 (51%) were Male and 49 (49%) were Female. In terms of on table complications; gastrointestinal injury is more in close method of trocar insertion. Conclusion: We would advocate the modified open technique of trocar insertion as a technique of choice in primary trocar insertion as it counts more on patient safety as compared to the close technique.

INTRODUCTION:-

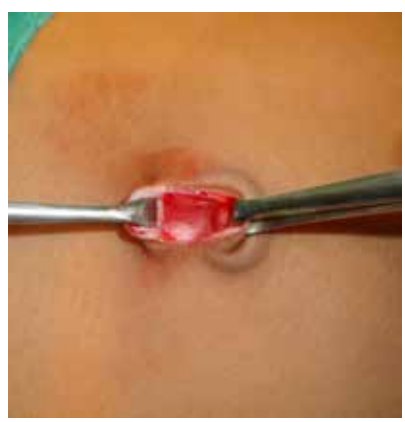
Gaining access to a body cavity prior to the laparoscopic era was not usually associated with serious or life threatening complications. The establishment of pneumoperitoneum requires the introduction of a sharp insufflating needle or trocar. Peritoneal access and creation of pneumo-peritoneum are key initial steps of laparoscopic surgery. Most commonly used method of peritoneal entry is blind insertion of veress needle through infra umbilical stab incision and then insufflating pneumoperitoneum[1,2]. Although it is safe method but outcomes of the studies have been found slightly increased complication because of its 'blind' nature. Another technique begins with small infra umbilical incision followed by gradual dissection of all layers of abdomen and then insertion of Hasson's cannula or port under direct vision[3]. Here we describe modified open technique of port placement which is simpler and safer.

Material and methods:

The study was carried out in surgery department of C.U Shah Medical College, Surendranagar; Gujarat state from 1st October 2012 till 31st May 2014. The study was prospective, observational and longitudinal. Study protocol of the procedure was formed along with Proforma, Patient Information Sheet and Informed Consent Form. All those patients who attended Surgery department of C U Shah Medical College for laparoscopic surgery (elective and emergency) were included in our study. Equal number of patients were selected on random basis for modified open and close method of trocar insertion. The complications were graded on intra operative, early and late post operative complications.

COMPARISION OF TWO TECHNIQUES

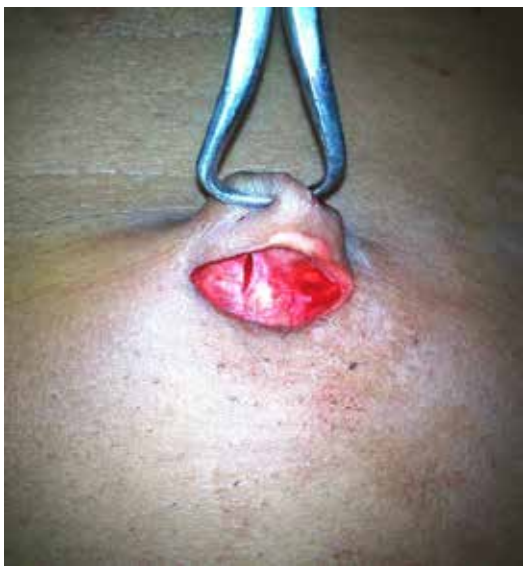
CLOSE TECHNIQUE:-



STEP: 1 With stab knife skin is incised just sub umbilically about 5 to 6 mm, then subcutaneous tissue bluntly dissected until the umbilical fascia is palpable the abdominal wall inferior to the umbilicus, then it lifted.

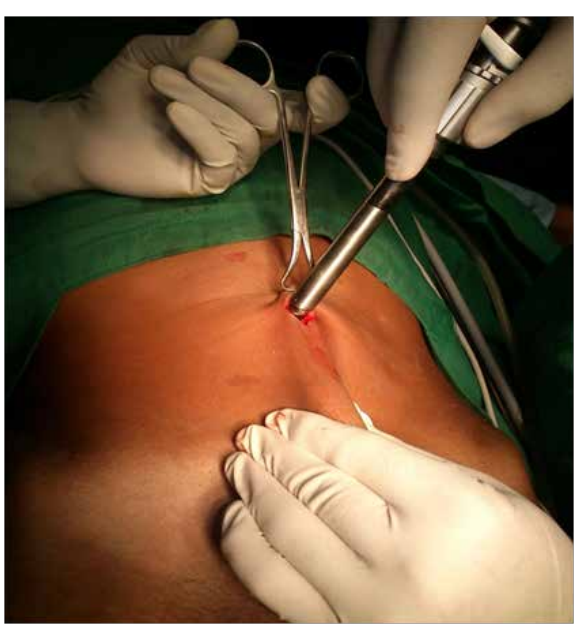
STEP: 2
Lifting abdominal wall with one hand, while the veress needle is in other hand and inserted through the fascia at the base of the umbilicus at 45° angle toward the pelvis, so it prevent injury to aorta and inferior vena cava. Two clicks of the veress needle will be appreciated as it penetrates first the umbilical fascia and then peritoneum.

MODIFIED OPEN TECHNIQUE:-



STEP 1 Umbilical cicatrix is grasped with Beckhau's towel clip which everts the umbilicus as well as lifts the abdominal wall. One centimeter transverse infra umbilical incision is kept. Using a sharp mosquito forceps subcutaneous tissue is dissected to expose the umbilical cicatrix. Now a vertical incision is made over the umbilical cicatrix to enter the peritoneal cavity.

STEP 2 The entry wound is enlarged with a small or medium sized artery forceps. 10 mm port with blunt trocar is inserted under vision.



OBSERVATION AND RESULTS:
A total of 100 cases were included in the study. The age of the patient ranges from 10-70 years and the mean age was 29.87±14.13. In terms of gender distribution 51 (51%) were Male and 49 (49%) were Female.

Out of 100 cases, following laparoscopic surgeries performed were:

a. Laparosocpic appendectomy - 56 cases (56%)
b. Laparoscopic cholecystectomy - 25 cases (25%)
c. Diagnostic laparoscopy - 19 cases (19%)

On table complications of trocar insertion in both the methods were as follows:

COMPLICATION	MODIFIED OPEN	CLOSE
Abdominal wall hemorrhage	01	04
Gastrointestinal injury	01	02
Bladder injury	00	00
Laceration to solid organ	00	00
Major vascular injury	00	00

Table 1: Showing on table complications of trocar insertion

The post operative complications of trocar insertion were as follows:

COMPLICATIONS	MODIFIED OPEN	CLOSE
SUBCUTANEOUS EMPHYSEMA	01	10
PNEUMOTHORAX	00	00
PNEUMOMEDIASTINUM	00	00
WOUND INFECTION	5	15
PORT SITE HERNIA	00	4

Table 2: Showing post operative complications of trocar insertion

Wound infection was more common in close technique. It was superficial and involved only skin and subcutaneous tissue. They resolve by antibiotics and anti inflammatory agent. It didn't require any surgical intervention.

DISCUSSION:
In the era of modern surgery, laparoscopic surgery has gained much popularity amongst the doctor as well as the patients due its advantages like minimal access approach, shorter hospital stay, early return to daily activity and minimal post operative morbidity and good cosmesis. However, in laparoscopic surgery, adequate training and surgical expertise is a must. Primary trocar insertion is a crucial step in laparoscopic surgery.

Port placement and creation of pneumoperitoneum is the essential key step in laparoscopic surgery[3,4,5]. Most commonly it is performed by introducing veress needle.[6,7] It is a safer technique but it is essentially a blind procedure. It is also associated with complications like bowel perforation, major vessels injury, subcutaneous emphysema, etc. Thus a proper technique of trocar insertion must be implemented. In our study we have compared the two basic techniques –MODIFIED OPEN and CLOSE; of primary trocar insertion.

In our study, most laparoscopic surgery were done on elective basis i.e. 65 (65%) and 35 (35%) procedure done on emergency basis, similar to study of String A, Berber E, Foroutani A, Macho JR, Pearl JM, Siperstein AE.[8] Most common provisional diagnosis was appendicitis and most common surgery performed was laparoscopic appendectomy 56 (56%), which was also documented by Harmeet Singh Rehan, Ashish Kumar Kakkar et al., (2010).[9]

There are two techniques of primary trocar insertion. Out of 100 patients, 50 patients were subjected to modified open trocar insertion technique and 50 patients were subjected to close trocar insertion technique. Though both modified open and close technique were commonly used according to surgeon preference, closed technique has known to have more complications as compared to modified open technique. This is similar to study done by Merlin TL, Hiller JE, Maddern GJ, Jamieson GG, Brown AR, Kolbe A(2003).[10]

Modified open technique comprises insertion of trocar in peritoneal cavity under vision, thus it is more advantageous in hands of inexperienced surgeon, in presence of intra abdominal adhesions and there are less chances of bowel and major vascular injuries. The appeal of entering the peritoneal cavity through a stab at the depth of umbilical cicatrix lies in its simplicity and relative safety and can be easily mastered[11,12,13,14]. Similar technique has been described before and begins with infra umbilical skin incision and grasping the umbilical stalk at the depth of wound with an Alley's forceps[5,6,15]. Comparison between close and modified open techniques is inevitable, desirable, and essentially revolve around ease of execution and attendant complications[12]. Extensive meta analysis has shown that the modified open technique, on an average is associated with lower incidence of complications and is cheaper and faster than veress needle technique.[16]

Conclusion:

In the present study, we have compared the two technique of primary insertion of trocar and they are –

- Modified open technique
- Close technique

When we weighed the above two techniques on basis of various parameters like – patient safety, intra operative complications and post operative complications; we found that the modified open technique of trocar insertion was far better than the close technique, as it was done under direct vision. The most common dangerous complications of which surgeon is worried during the primary trocar insertion, like gastrointestinal perforation, major vascular injury and bladder perforation were very less as compared to the close technique of trocar insertion.

Hence, we would advocate that the modified open technique of trocar insertion as a technique of choice in primary trocar insertion as it counts more on patient safety as compared to the close technique.

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