



Research Article

MAKING TRANSVERSE INFRAUMBILICAL INCISION WELL BELOW THE UMBILICUS WHILE DOING OPEN LAPAROSCOPY –A NEW METHOD OF MAKING INCISION FOR OPEN LAPAROSCOPY

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ABSTRACT

Objective: To describe the technique of making transverse infraumbilical incision well below the umbilicus for open laparoscopy and its advantages.

Methods: Usually curvilinear incision is made extremely close to the umbilicus for open laparoscopy. From 12th June 2015 to 12th October 2015, we also made curvilinear incision extremely close to the umbilicus for open laparoscopy while doing laparoscopic operations like laparoscopic appendectomy. But due to the umbilical skin necrosis encountered in the previous technique, from 13th October 2015 we started a new technique by making transverse infraumbilical incision well below the umbilicus for open laparoscopy while doing laparoscopic operations like laparoscopic appendectomy and laparoscopic cholecystectomy.

Results: From 12th June 2015 to 12th October 2015, while making curvilinear incision extremely close to the umbilicus for open laparoscopy while doing laparoscopic operations we frequently encountered umbilical skin necrosis and umbilical wound infection. But from 13th October 2015 to 18th December 2019 for a period of 4 years and 1 month, while following the new technique of making transverse infraumbilical incision well below the umbilicus for open laparoscopy while doing laparoscopic operations, no patient had umbilical skin necrosis or umbilical wound infection.

Conclusion : Hence the new technique of making transverse infraumbilical incision well below the umbilicus for open laparoscopy while doing laparoscopic operations is extremely useful since it avoids the complications of umbilical skin necrosis and umbilical wound infection.

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INTRODUCTION

Transverse infraumbilical incision is made well below the umbilicus in our technique to avoid puncturing the skin of the lower part of the umbilicus with cutting needle while doing suturing of the skin. This technique is extremely useful since it avoids the complications of umbilical skin necrosis and umbilical wound infection.

MATERIALS AND METHODS

This study was conducted in the department of General surgery, Indira Gandhi Medical College and Research Institute, Puducherry. From 12th June 2015 to 12th October 2015 for a period of four months, open laparoscopy was done by making curvilinear incision extremely close to the umbilicus for 8 laparoscopic operations which included 8 laparoscopic appendectomies. But from 13th October 2015 to 18th December 2019 for a period of 4 year and 1 month , open laparoscopy was done by a new technique of making transverse infraumbilical incision well below the umbilicus for open laparoscopy while doing 102 laparoscopic operations

which included 42 laparoscopic appendectomies, 28 laparoscopic cholecystectomies, 18 laparoscopic hernia repair(TAPP) and 14 diagnostic laparoscopic procedures .

RESULTS

From 12th June 2015 to 12th October 2015, while making curvilinear incision extremely close to the umbilicus for open laparoscopy while doing laparoscopic operations which included 8 laparoscopic appendectomies we encountered umbilical skin necrosis or umbilical wound infection in six out of 8 patients. But from 13th October 2015 to 18th December 2019 for a period of four years and one month, while following the new technique of making transverse infraumbilical incision well below the umbilicus for open laparoscopy while doing 102 laparoscopic operations which included 42 laparoscopy appendectomies, 28 laparoscopic cholecystectomies, 18 laparoscopic hernia repair(TAPP) and 14 diagnostic laparoscopic procedures, no patient had umbilical skin necrosis or umbilical wound infection.

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Fig 1 Marking of the site of transverse infraumbilical skin incision to be made well below the umbilicus. Umbilicus is not held with Allis forceps or towel clip.

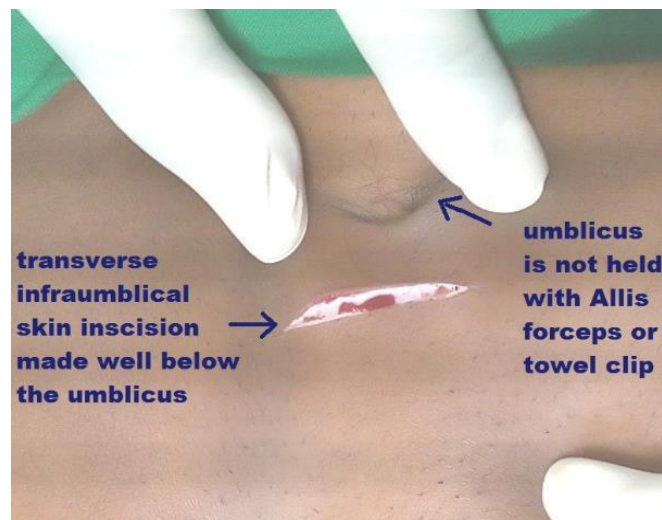


Fig 2 Transverse infraumbilical skin incision is made well below the umbilicus. Umbilicus is not held with Allis forceps or towel clip.

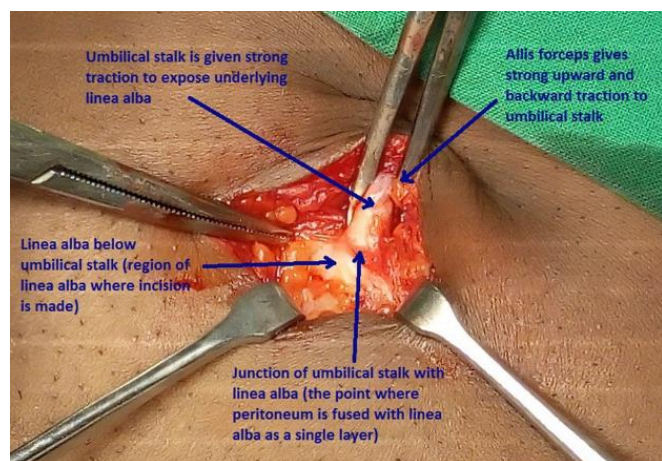


Fig 3 Umbilical stalk is given strong traction with Allis forceps to expose the underlying linea alba. The junction of umbilical stalk with the linea alba is the point where peritoneum is fused with the linea alba as a single layer.

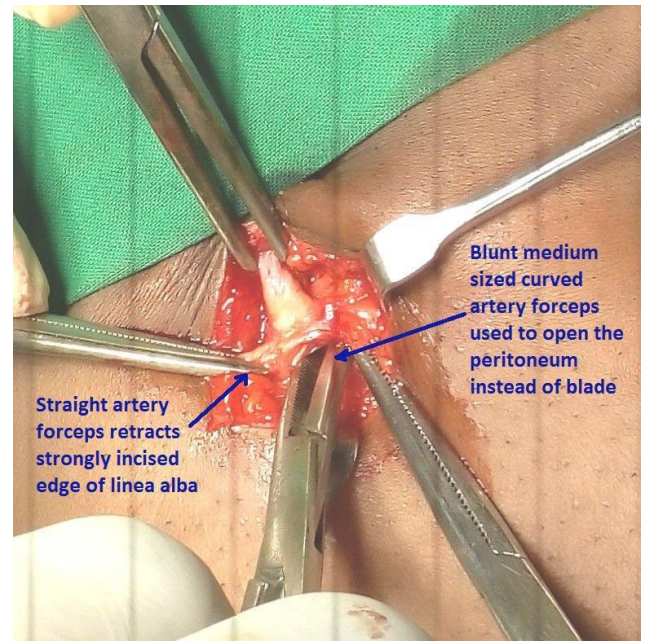


Fig 4 Straight artery forceps retracts strongly the incised edge of linea alba. The peritoneum is opened with the help of blunt tipped medium sized curved artery forceps and not with the help of the knife or blade.

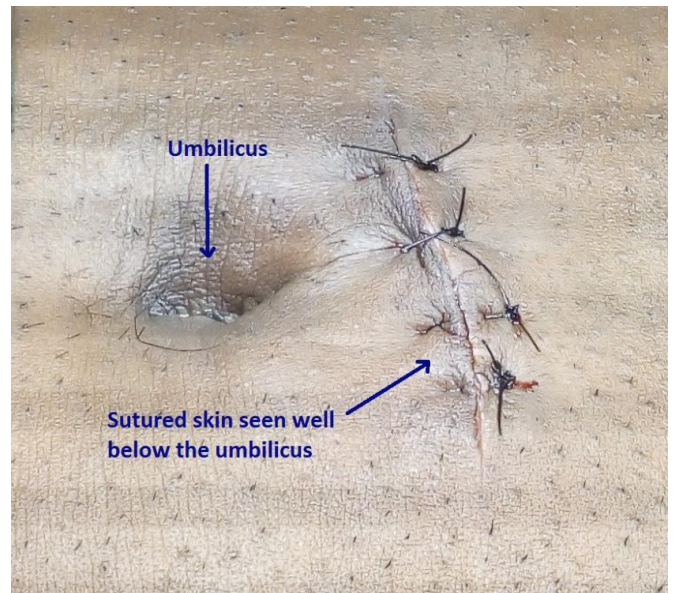


Fig 5 Sutured skin is seen well below the umbilicus.

DISCUSSION

The important aim of our technique of open laparoscopy is

1. To prevent umbilical skin necrosis and umbilical wound infection
2. Safe entry access into the peritoneal cavity.

The scientific background for the cause of umbilical skin necrosis and umbilical wound infection are

1. Since umbilicus is a scar, the skin of the umbilicus is relatively avascular.
2. Hence even minimal injury to the skin of the umbilicus can lead to umbilical skin necrosis and umbilical wound infection.
3. Hence whenever skin incision is made at the umbilicus or curvilinear incision is made extremely close to the umbilicus it causes puncturing of the skin of the lower part of the umbilicus with cutting needle

while doing suturing of the skin and umbilical skin necrosis and umbilical wound infection is frequently encountered.

The important features of our technique to prevent umbilical skin necrosis and umbilical wound infection are

1. Transverse infraumbilical incision is made well below the umbilicus (Fig. 1,2) in our technique to avoid puncturing the skin of the lower part of the umbilicus with cutting needle while doing suturing of the skin.
2. This technique is extremely useful since it avoids the complications of umbilical skin necrosis and umbilical wound infection.
3. Since the skin of the umbilicus and skin around the umbilicus is never injured in our technique, none of the 102 patients who underwent open laparoscopy by our technique had umbilical skin necrosis or umbilical wound infection.

The anatomical background of umbilical stalk and the special precautions taken for safe entry access into the peritoneal cavity is given below

1. Transverse infraumbilical incision is made well below the umbilicus (Fig . 1,2)
2. Superficial fascia is thoroughly dissected beneath the skin flaps.
3. Now a pearly white structure is seen running from linea alba to umbilical cicatrix.
4. Retraction of the upper skin flap exposes this ligament like structure running from linea alba to the dermis of umbilical cicatrix.
5. This structure in literature is described as umbilical stalk (Fig 3). This fibrous tissue is the embryological remnant of umbilical veins, arteries and urachus.
6. The junction of the umbilical stalk with the linea alba is the thinnest part of the abdomen and at this point peritoneum is fused with linea alba as a single layer (Fig 3).
7. So, a simple stab incision over this fibrous structure provides direct access to peritoneum.

Technique of our open laparoscopy

1. Transverse infraumbilical incision is made well below the umbilicus and the skin of the umbilicus is not held with Allis forceps or towel clip (Fig 1,2).
2. Umbilical stalk is given strong upward and backward traction with Allis forceps to expose the underlying linea alba where incision is made (Fig 3).
3. The incised edges of the linea alba are held with straight artery forceps and retracted to expose the underlying peritoneum (Fig 4).
4. The peritoneum is opened with the help of blunt tipped medium sized curved artery forceps and not with the help of the knife or blade (Fig 4).

Discussion of how our technique differ from many other techniques of open laparoscopy is

1. In the study of open laparoscopy conducted by Hasson, a small incision is made transversely or longitudinally at the umbilicus(1).
2. Twenty-one patients had minor wound infections, four had minor haematomas, one developed an umbilical

hernia that required surgery in the open technique of laparoscopic surgery reported by Hasson (2).

3. In the study of open laparoscopy conducted by Antevil JL *et al* the use of a lateral incision to the umbilicus and a left-sided incision was preferentially employed by Antevil JL *et al* (3).
4. In the study of open laparoscopy conducted Bonjer HJ *et al*, skin incision is made close to the umbilicus (4) .
5. In the study of open laparoscopy conducted by Lal P, Vindal A, Sharma R, Chander J, Ramteke VK(5) in January 2012,the supraumbilical route was used in 348 patients and lateral entry in 90 patients. Port-site hernias were seen in 25 cases (0.4%) and wound infections in 56 cases (0.9%)(5).
6. In another study of open laparoscopy conducted by Lal P *et al* in September 2002, supraumbilical incision is made(6).
7. In another study of open laparoscopy conducted by Lal P, Singh L, Agarwal PN, Kant R, a semicircular incision was made in the inferior umbilical fold. Fortynine patients (6.49%) had minor umbilical sepsis, 22 patients (2.91%) had periumbilical hematoma(7).
8. In the study of open laparoscopy conducted by Pring CM, a curvilinear supra-umbilical skin incision was made(8). During laparoscopy retroperitoneal haematoma was forming. Hence midline laparotomy was done. Exposure of the anterior abdominal aorta demonstrated some bruising of the anterior aortic wall but no laceration or puncture of the aorta. It appeared that the peritoneum had ‘sheared’ away from the aorta and there was bleeding from some minute vessels on the anterior wall of the aorta. The bleeding was easily controlled with a simple monofilament vascular suture(8).
9. The ‘U’-shaped sweeping motion that was employed to place the trocar either caused it to ‘bounce’ off the aorta, or shear the overlying peritoneum away from the anterior aortic wall (8).
10. In another study of open laparoscopy conducted by Alfredo M. *et al*, a mini-open technique that uses a 5-mm transumbilical incision was done(9).
11. In another study of open laparoscopy conducted by Sangrasi AK, Shaikh AR, Muneer A, supra umbilical incision was made(10).
12. In another study of open laparoscopy conducted by Bathla V *et al* transverse incision is made in the inferior umbilical fold close to the umbilicus (11).
13. In another study conducted by Gemici K *et al*, a subumbilical skin incision is made close to the umbilicus (12). 7 patients (0.92%) developed wound infection at the port site. Five of them were treated with antibiotics; the other two were treated with drainage and antibiotics.

Discusion of how Our Incision Technique Differ from other Incision Techniques for Open Laparoscopy are

1. Transverse infraumbilical incision is made well below the umbilicus in our technique(Fig2 ,5) to avoid puncturing the skin of the lower part of the umbilicus with cutting needle while doing suturing of the skin.
2. But in many other techniques of open laparoscopy skin incision is made transversely or longitudinally at

the umbilicus(1) or transumbilical incision is made (9) or semi-circular incision is made in the inferior umbilical fold (7) or a supra-umbilical skin incision is made(5,6,8,10) or a skin incision is made at the left of the umbilicus(3) or a lateral incision to the umbilicus is made (3, 5) or subumbilical skin incision is made close to the umbilicus(11,12).

Hence our incision technique differ from many other incision techniques of open laparoscopy in these aspects.

CONCLUSION

Hence the new technique of making transverse infraumbilical incision well below the umbilicus for open laparoscopy while doing laparoscopic operations is extremely useful since it avoids the complications of umbilical skin necrosis and umbilical wound infection.

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