



DOUBLE STITCH TECHNIQUE TO CONTROL INFERIOR EPIGASTRIC BLEED AT LAPAROSCOPY.

Urology

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ABSTRACT

Introduction: Injury to abdominal wall blood vessels is a known complication and occurs in 0.2% to 2% of laparoscopic procedures. The superficial blood vessels may be identified by transillumination but the deep epigastric vessels cannot be effectively located by trans-illumination and hence are liable to injury. Methods like foley balloon tamponade and figure of '8' stitch have been described to control such bleeding with variable success rates. The present study highlights a novel technique for taking care of bleeding related to these vessel injuries during laparoscopy.

Methods: A retrospective study of our experience with transperitoneal laparoscopic nephrectomy (LN) from January 2009 to October 2015 was performed. A total of 1049 patients (338 males/711 females) with a mean age 47.5 years underwent LN. 12 injuries to the inferior epigastric artery were noted. All the injuries occurred on the left side during insertion of the right hand working port. All injuries were first attempted to be controlled with the figure of 8 stitch. Bleeding could not be controlled in 7 patients in this fashion and were subjected to the 'Double- stitch technique'. The technique involves placing a stitch both above & below the bleeding vessels keeping in mind the inferior epigastric artery anatomy.

Results: All patients underwent transperitoneal Laparoscopic Nephrectomy (Left: Right 842: 207). All the injuries to the inferior epigastric vessels occurred on the left side during the insertion of the right hand working port. In 7 patients in whom bleeding could not be controlled in this fashion were subjected to the 'Double stitch technique' and was successfully controlled.

Conclusions: The 'Double stitch technique' is safe and effective alternative means of taking care of bleeding from the inferior epigastric vessel injury.

KEYWORDS

INTRODUCTION

Port related injury to the abdominal wall blood vessels is described in 0.2% to 2% of patients undergoing laparoscopic surgery (1,2,3,4,5,)

Inferior Epigastric Artery injury is a well-known complication during laparoscopic surgery and almost all reported cases have been due to trocar injury (5,6,7,8). Both superficial and deep epigastric vessels are at risk (5). The superficial abdominal wall vessels may be easily located by transillumination but the deep epigastric vessels are difficult to localise and are therefore prone to injury while port insertion. (9, 10)

Various techniques have been described in emergency using sutures, electrocoagulation, balloon tamponade & minilaparotomy (11,12,13). We have describe a simple & reliable technique for securing injured bleeding inferior epigastric vessels or its branches at laparoscopy.

MATERIAL AND METHODS

Between January 2009 to October 2015, 1049 transperitoneal laparoscopic nephrectomies were performed. Out of this 842 were done on the left side and 207 on the right side respectively. The port insertions were done by 5 surgeons with vast experience in laparoscopy. All inadvertent events with port insertion were recorded. All bleeding events occurred on the left side with the right hand working port. The bleeding vessel was first attempted to be controlled by the standard figure of 8 stitches. In cases where the bleeding could not be controlled, the 'Double stitch technique' was used. The salvage stitch was placed by a single surgeon each time such an event occurred. The 'double stitch' involves placing a number-1 silk or vicryl suture both superior and inferior to the bleeding port site with a Carter-Thomson closure system. Each stitch should be approximately 1 inch broad and 1 inch away from the port site. (Figure 1.1 and 1.2) The stitch goes through all the abdominal layers and is tied on the skin to provide good compression on the bleeding vessel. The sutures are removed after 2 days post operatively.

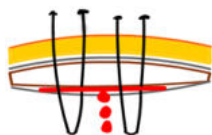


Fig.-1.1



Fig.-1.2

(Fig 1.1 and 1.2 demonstrating the technique of suture placement)

Table-1

1.	Period of study	Jan' 09-oct'15
2.	Surgery	Transperitoneal laparoscopic nephrectomy
3.	Total cases	1049
4.	Side Left Right	842 (80.26%) 207 (19.74%)
5.	Mean age	47.5 yrs
6.	Sex Male Female	338 (32.22%) 711 (67.78%)
7.	Surgeon experience in laparoscopy	2 with > 5yrs; 2 with > 8 yrs
8.	Salvage stitch	Single surgeon

RESULTS:

It was observed that all injuries occurred on the left sided surgeries (842/1049).

Table-2

1.	Site	All left sided (12/842)
2.	Port	All right hand (see port 3 in Fig)
3.	Port used	12 mm Endopath® Excel™ bladeless trocars
4.	No. of injuries	12 (1.14%)
5.	No. of injuries where figure of 8 stitch succeeded (Method 2)	5/12 (41.7%)
6.	No. of injuries where double stitch succeeded (Method 1)	7/12 (58.3%)

DISCUSSION:

Gaining safe access to body cavity is a critical first step for a successful laparoscopic surgery, and the complexity of these advanced laparoscopic procedures necessitates placement of Veress needle and large-bore ancillary port trocars through the anterior abdominal wall. This can result in accidental injury to the abdominal wall vessels and is reported in 0.2% to 2.0% of cases in literature (1,3,4). Undoubtedly, the inferior epigastric vessel is most commonly injured vessel.

The diagnosis, usually is immediately apparent, during laparoscopy, as

oozing externally around the port site(Fig 1.3) or dripping internally along the shaft of the cannula into the abdominal cavity, and there is potential for the major haemorrhage unless the bleeding is controlled quickly. The injury may initially go unrecognized due to the temporary tamponade by both the cannula and pneumoperitoneum and present as hematoma or pseudoaneurysm later(14).



Fig.-1.3 Demonstrating oozing from the port side after port removal

The inferior epigastric vessels arise from the external iliac arteries, and ascend upward through the transversalis fascia and, then between the rectus abdominis and the posterior lamellar sheath, are located in the regions used for trocar placement.(Fig 1.4)

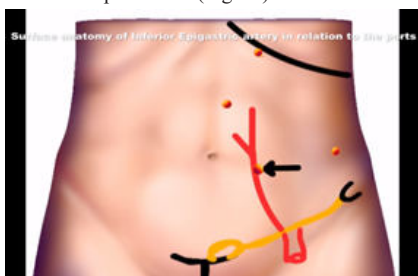


Fig-1.4(Surface anatomy of inferior epigastric vessel)

In principle, injuries to inferior epigastric vessels can be prevented by placing trocar or cannula lateral to rectus muscle or in midline, but lateral landmarks are not always obvious and accident still occurs.

Utilizing imaging modalities including computer tomography, Doppler, duplex ultrasound to visualize and locate the path of the epigastric vessels and to identify forbidden zones for incisions and trocar placement, preoperatively, may provide more structural information, than standard anatomical literature (15).

Although vessel injury occurrence is low, injury to one or more major vessels can quickly result in fatal exsanguination. Despite decades of research and development in an effort to create safer instruments, the incidence of these injuries has not decreased (16).

Numerous techniques have been described for this emergency which includes application of direct pressure with the operating port, electrocoagulation, stitching in figure of 8 fashion(Fig 1.5), or tamponade with Foley catheter balloon inserted through the trocar site and even mini-laparotomy (11,13) and exploration of the wound. This may lead to unnecessary prolongation of the laparoscopic procedure or conversion to laparotomy with loss of all the advantages of minimally invasive surgery.



Fig-1.5 Persistent bleed from port site after figure of 8 stitch

We used a simple and quick method to deal with this complication using only standard sutures and a laparoscopic needle holder. Two sutures with straight needle are inserted below, laterally, and medially

to the vessels and pulled out via a contralateral port. The sutures are tied together and pulled back into abdominal cavity and tied to secure bleeding vessels. The procedure is repeated above the bleeding vessels to achieve complete haemostasis.

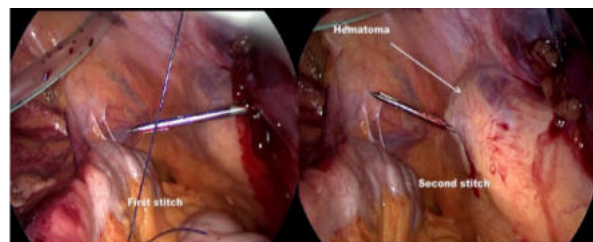


Fig-1.6

Fig-1.7

Fig 1.6 and 1.7-Demonstrates 1st and 2nd stitch taken intrabdominal view

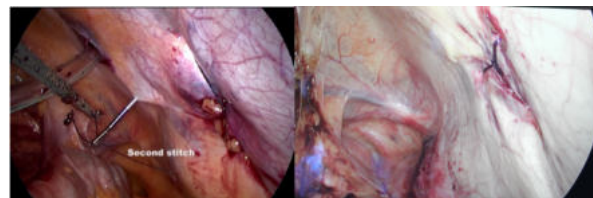


Fig-1.8

Fig-1.9

Fig 1.8 and 1.9-After completing second stitch no fresh bleeding seen

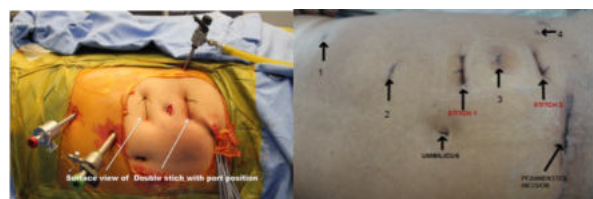


Fig-1.10

Fig-1.11

Fig 1.10 and 1.11-Surface view of double stitch with port position

In terms of cost, cosmetic and efficacy, our technique is cheap, less traumatic and practical and in case of vascular injury it can be applied quickly.(Fig 1.6,1.7,1.8,1.9,1.10,1.11)

Hence Suturing of proximal and distal portion of inferior epigastric artery is most reliable method of haemostasis but require special needle and application system that can be expensive and not universally available^(17,18,19).

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