



Nigam's guidelines for beginners for port placement in laparoscopic cholecystectomy

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Abstract

Background: Internal landmarks are the main and actual landmarks in port placement in laparoscopic cholecystectomy. External landmarks as generally practiced can be proved to be inaccurate sometimes.

Methods: Patient's demography and advantages of internal landmarks over external landmarks are presented.

Results: Fifty cases of laparoscopic cholecystectomy were done between Jan 2010 to Jan 2020 at Max Hospital, Gurgaon, Haryana, India. All cases were of chronic cholecystitis with cholelithiasis. All cases were performed by four port laparoscopic cholecystectomy. Ports were shifted from standard sites to the comfortable sites after analyzing internal anatomy and abnormalities.

Keywords: Nigam's guidelines, actual landmarks, laparoscopic cholecystectomy, abnormalities

Introduction

Laparoscopic Cholecystectomy is one of the most commonly performed general surgical operations. Port placement in Laparoscopic operations is akin to incision placement in open surgery. Correct port placement makes the procedure technically easier to perform, enables better dissection, reduces time taken, decreases injuries and enhances safety. If the working ports are introduced in peritoneal cavity under vision with keeping in mind the anatomy of various organs, adhesions and abnormalities the surgeon is at ease and comfortable. It also reduces chances of internal injuries and other complications. There are more than 50 techniques of laparoscopic cholecystectomy (LC) available in literature [1]. There are suggestions to reduce the number of ports or reduce the size of ports. Micro-laparoscopic cholecystectomy as alternative to single-port surgery is advised by McCormack [2]. Majumdar advised principles of safe laparoscopic cholecystectomy [3].

At present, according to most of the standard literature, port placement is as per external skin landmarks. We suggest port placement as per internal landmarks which we feel should be the preferred landmarks due to advantages over external landmark. Kevin has stressed upon contraindications, absolute and relative of laparoscopic cholecystectomy [4]. Murphy explained about the predictors of major complications in patients undergoing laparoscopic cholecystectomy [5]. Giger very well explained the risk factors for preoperative complications [6]. Pucher studied the outcome trends and safety measures in laparoscopic cholecystectomy [7].

There must be an equilibrium between the working ports and optical port. There should be appropriate distance between various ports to provide ideal situation for work and observation. It is good if the telescope is in the middle of other the ports with a manipulation angle of 60 degree.

We follow the North American Approach where surgeon stands on left side of the patient, using 4 ports.

1st Port

Umbilical (optical port) – 5mm, by closed technique (using Veress needle) or open technique (Hasson's technique) as per surgeon's preference. We use closed technique. In

patients with history of previous surgery, umbilical hernia, or where we anticipate adhesions, we prefer to use Palmer's point.

Umbilicus is a good choice for optical trocar as there is not much problem of developing a scar. Umbilicus is the thinnest part of the whole abdominal wall so the entry of a trocar is easy and with less force.

At umbilical port site rate of infection and chances of developing incisional hernia are same as anywhere else in the abdominal wall so we don't take chances of developing complications over an easy and ideal optical port placement.

2nd Port

10 or 12 mm port, just lateral to the falciform ligament taking care not to go through it, and just below the lower border of liver, making sure you are adequately lateral to the gall bladder. This is ergonomically sound as it helps in avoiding torque from the liver as well as falciform ligament if one goes through it.

3rd Port

5 mm port, Just above the fundus of the gall bladder (where it is lying in it's natural state) as Calot's triangle dissection can be done easily. By observing abdominal wall for internal view we may shift the port above, below medially or laterally according to site and adhesions of gallbladder.

4th Port

5 mm port, 4 to 5 cm lateral and below the 3rd port, in line with lateral border of the liver, as it's function is to retract the fundus diagonally, towards the right shoulder and also to avoid crowding or swording of instruments. We feel that port placement as per internal landmarks is the best way to teach students and young surgeons that "seeing is believing".

The ports can be placed at a point where shifting of the site of port is done according to internal anatomy. Liver can be found enlarged or contracted which can make dissection difficult and shifting of the sites of port can be advantageous and barring this it can be a way of prevention of complications and injuries.

Port placement as per internal landmarks also takes care of a narrow or wide epigastric angle which affects the position of gallbladder.

In our experience of 50 cases of laparoscopic cholecystectomy done by this method of port placement, the procedure becomes easier to perform even in difficult cases, is helpful for beginners, makes the procedure faster and as a result patient has to undergo a shorter period of pneumoperitoneum and general anaesthesia resulting in their usual benefits. Easy to remember and replicate for beginners. This way of placing ports after internal

assessment helps in avoiding injuries to internal organs and complications.

Then cholecystectomy proceeds as per findings.

Material and methods

We have performed 50 cases of laparoscopic cholecystectomy with internal assessment for placement of ports between, Jan 2010 to Jan 2020 in Max Hospital, Gurgaon, Haryana, India.

In our study the age of patients varied from 20 to 60 years. There were 8 (16%) males and 42 (84%) females in the study (Table1).

Table 1: Demographic of patients

Age and sex of patients	Numbers	Percentage
A. Age - 20-30	- 04	08%
- 31-40	- 29	58%
- 41-50	- 13	26%
- 51-60	- 04	08%
B. Sex – Male	- 08	16%
- Female	- 42	84%

n = 50

All cases were operated by 4 port cholecystectomy. Fig1. In 7 (14%) cases the umbilical port could not be introduced due to adhesions caused by previous surgery. Palmer’s point was used for creating pneumoperitoneum and introduction of the telescope in these 7 (14%) cases. The epigastric port was placed not at the standard position but above or below it and laterally also, in 12 patients (24%) due to enlargement or contraction of liver, bulky falciform ligament and adhesions due to previous surgery. In 5 cases (10%) epigastric port was placed quiet left to falciform ligament (Table 2). Fig 2.

Table 2: Shifting of standard site of ports after internal assessments

Ports	Numbers	Percentage
Ist Port (Umbilical Port)	43	86%
Palmer’s point used	7	14%
2nd Port (Epigastric Port) not at standard site	12	24%
3rd Port (Upper 5 mm right side Port) not at standard site	7	14%
4th Port (Lower 5 mm right side Port) not at standard site	8	16%

n = 50

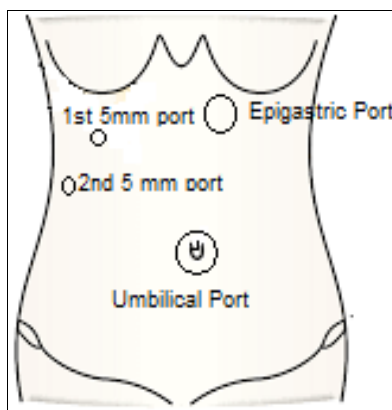


Fig 1: Standard port sites in laparoscopic cholecystectomy

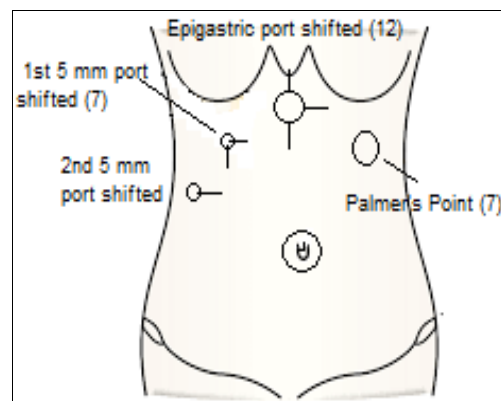


Fig 2: Shifting of various ports from stand port sites after internal landmar Assessment

In 7 cases (14%) the Ist 5 mm port was placed anterior and inferior to the standard site due to adhesions of gall bladder. In 8 cases (16%) the 2nd 5 mm port was placed more anterior to the standard site due to intestinal and abdominal wall adhesions. In 2 cases (4%) both 5 mm ports were placed quit anteriorly due to dense adhesions.

In 23 (46%) cases the epigastric port was enlarged for removal of gall bladder as it was packed with stones or the stone was big (2 cm and more).

Shifting of ports from standard positions was based on the observation of internal landmarks assessment which was quit helpful to surgeon and definitely for patient.

Results

In our study no case of common bile duct injury was noticed. The recovery from the operation was smooth and normal as it should be. The change of port sites even helped us to perform operations without difficulty.

There was one case where the drain had bile tinged fluid for 3 days which stopped on 4th day and then the drain was removed. There was no bile leakage in any other case. We could not notice any case where the cystic duct clip slipped. No case had massive bleeding or a big hematoma.

No case of injury to intestines, liver and spleen was found. In cases where we used Palmer’s point for optical port we

confirmed by ultrasound of the abdomen about splenic enlargement in every case.

Fortunately in our series no case developed peritonitis or long term ileus.

Two cases had mild infection at epigastric port site, probably due to infected gallbladder removed from this site.

No case developed keloid at any port site or incisional hernia.

Discussion

Cholecystectomy is one of the most common operations. Laparoscopic cholecystectomy is increasing now days due to shorter hospital stay, less pain, early mobility and early return to work. More than 150,000 cholecystectomy are performed each year in USA only^[8].

Usually laparoscopic cholecystectomy is performed introducing various ports as per external landmarks. We here used internal landmarks for ports which helped us in working comfortably and safely.

The internal landmarks were used in anterior abdominal wall according to the findings of internal view of the abdomen. Umbilical port was placed above, at or below the umbilicus. Palmer's point was selected due to adhesions or suspicion of a small umbilical or para-umbilical hernia. While introducing epigastric and working ports the care was taken to see that no vessel was perforated as the view from inside guided us.

In our study a total of 41 occasions were found where port sites were shifted from standard sites due to adhesions, abnormalities, diseases and anatomical anomalies. We had to change optical port alone or with working ports also.

We felt comfortable and confident while working with shifting of port sites as per internal anatomy and landmarks. On these occasions the procedure became smooth, easy and without any difficulty.

If the position of various ports in laparoscopic cholecystectomy is incorrect then it will be difficult and uncomfortable for operating surgeon. It can lead to various complications such as injuries to stomach, intestine, urinary bladder, liver, spleen, mesenteric vessels, and aorta.

Swording is actually a practical problem faced by the surgeon when various ports are not placed intelligently. If swording occurs then surgeon may have to reposition the optical port and even other ports also. In difficult cases, the swording may force additional port placement.

Inappropriate port placement may lead to surgical emphysema or even pneumomediastinum. Such placement of ports can even lead to bleeding which may be heavy and serious.

Ports should be removed slowly with circular movement to avoid bowel entrapment.

Laparoscopic cholecystectomy is a common operation which may vary in operation difficulty. For example, it can be a routine operation comfortably performed by a training grade surgeon (with appropriate supervision) but, at its most difficult, can tax even the most experienced specialist surgeon^[9, 10, 11].

Sometimes, we will meet the difficulty at operation even done by well-experienced surgeon. Various problems are considered in causing surgical difficulty such as inflammatory severity of GB, peri-GB adhesions, scarring and resulted from identifying anatomy in difficulty of LC^[12, 13, 14].

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Conflicts of interests

There are no conflicts of interest.

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