

# A Point-Specific Site for Placement of Epigastric Port in Laparoscopic Management of Gallbladder Disease: An Observational Study

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## ABSTRACT

**Background:** Laparoscopic cholecystectomy has revolutionized the world in the surgical management of benign gallbladder disease. However, for any procedure to learn properly, anatomy becomes a major concern. **Aims and Objectives:** We present a point, a convenient site, speedily accessible by our maneuver of placing epigastric port on the patient. **Materials and Methods:** This is an outcome of an observation with the prospective study of 100 patients irrespective of age, sex, body habitus and severity of gallstone disease. Our point for epigastric port satisfies all the criteria for an ideal port. **Results:** Our general observation with majority of patients with this point specific epigastric port placement was that it is easy to locate, needs less thrust on trocar for creation, stays on the linea alba, is easily maneuverable facilitates safe, easy and speedy dissection, causes less portal bleeds and is easy to angulate towards the right of falciform ligament. **Conclusion:** The point specific epigastric port conveys many benefits to the operating surgeon in terms of easy location, adds safety and speed to the procedure, causes less portal bleeds, needs less thrust and is easy to angulate to the right of the falciform ligament adding technical ease to the surgeon. It is easy to be learnt, taught and practiced by the young surgeons.

**Keywords:** Laparoscopic Cholecystectomy; Epigastric Port; Point Specific Anatomy

## 1. Introduction

Laparoscopic cholecystectomy has revolutionized the world in the surgical management of benign gallbladder disease. It is considered the gold standard procedure for cholelithiasis [1]. Looking at the benefits of minimal access procedures for gallstone disease, many surgeons got interested to learn this patient-friendly surgical modality. However, for any procedure to learn properly, anatomy becomes a major concern. The surgical anatomy of the gallbladder can be briefly described as flaskshaped, blind-ending diverticulum attached to the common bile duct by the cystic duct. In life, it is grey-blue in colour and usually lies attached to the inferior surface of the right lobe of the liver by connective tissue. In the adult the gallbladder is between 7 and 10 cm long with a capacity of up to 50 ml. The gallbladder is described as having a fundus, body and neck. The neck lies at the medial end close to the portahepatis, and almost always has a

short peritoneal covered attachment to the liver (mesentery); this mesentery usually contains the cystic artery. At its lateral end the neck widens out to form the body of the gallbladder and this widening is often referred to in clinical practice as “Hartmann’s pouch”. The neck lies anterior to the second part of the duodenum. Fundus of gallbladder is marked on the surface of anterior abdominal wall at tip of the 9th costal cartilage, where transpyloric plane crosses the right costal margin (at lateral border of right rectus sheath). Keeping in view the specific topology of the organ, it is not only safe, but also a technical requirement to know the specific sites for port placement in laparoscopic cholecystectomy [2]. Since the beginning of laparoscopic cholecystectomy, many sites for the various port placements have been described for the technical ease of the surgeon. It is all the more a matter of concern for a trained surgeon and a beginner in particular to understand the point specific topography of ports used in laparoscopic cholecystectomy. In this behalf, the most important port used as a dominant working

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port happens to be the epigastric port. Many ways for making epigastric port have been already described in the literature, yet the point specific surface anatomy of this port is unavailable to the surgeon making it difficult especially for the beginner to choose a target site for it [3,4]. It may not be out of place to mention that the correct placement of epigastric port not only makes the procedure look simpler and technically easy but can add to the comfort, safety and speed of the surgeon satisfying one of the important dimensions of minimal access surgery. While perusing the literature, we strongly felt that much has not been talked about the point specific epigastric port placement in laparoscopic cholecystectomy [5]. The word “epigastric”, refers to a region not to a point location for the port, which might be eased by naming the point in epigastrium and for convenience, we may refer to it as “thechalkoo”, point for epigastric port. Our idea to take up this study is simply to provide the surgeon especially a trainee in laparoscopy a point specific anatomy of epigastric port and a speedy maneuver for fashioning it on the patient.

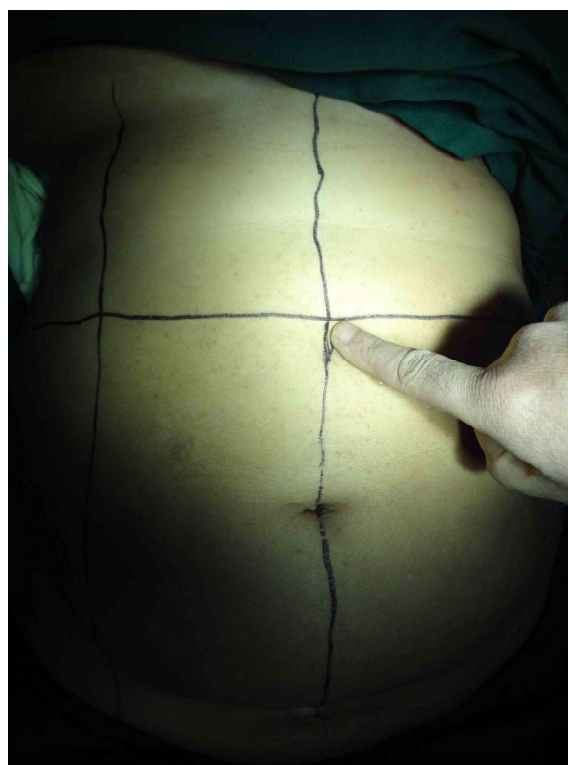
## 2. Material and Methods

We present this study from the postgraduate department of surgery, Government Medical College, Srinagar. Our department is known to carry laparoscopic cholecystectomies day in and day out since 1994. Being a postgraduate teaching institute in laparoscopy, we felt interested to take up this study from Jan 2008 to June 2012. We were clear in our idea to present a point specific anatomy of surgical ports to our young surgeons and postgraduate recruits in laparoscopy. It is difficult for the young surgeons to place different ports without a target specificity about them especially the working ports and epigastric port in particular. We present a point, a convenient site, speedily accessible by our maneuver of placing it on the patient. This is an outcome of an observation with the prospective study of 200, patients irrespective of age, sex, body habitus and severity of gallstone disease. Our point for epigastric port satisfies all the criteria for an ideal port. The point specific site for our epigastric port is the intersection of two anatomical lines; one being the sagittal line that passes through and through the xiphoid process and the umbilicus and the second line passing through the tips of ninth costal cartilages (**Figure 1**). We may refer to it as “the chalkoo point” for the convenience of description. We strongly believe that this intersection point created by these two lines in the epigastrium is the ideal site for placement of epigastric port in majority of patients undertaken for laparoscopic cholecystectomy. We have also designed a maneuver that guides the beginner to a near accurate placement of epigastric port on this point. The way to describe this maneuver is that the

surgeon stretches his left hand in a way that the tip of his index finger rests on the ninth costal cartilage in the mid-clavicular line and the pulp of the thumb in the epigastrium on the sagittal line in a way that that they stand collinear. This gives a near accurate position for an ideal epigastric port and roughly corroborates to the point described above (**Figure 2**).

## 3. Results

Our study was quite yielding as regards educating the young recruits in laparoscopy. It was a non-randomized



**Figure 1.** The ideal point for the epigastric port.



**Figure 2.** The near-accurate method of locating the point.

observational study that helped our postgraduates for a clear anatomy of ports in laparoscopic cholecystectomy. The point specific epigastric port placement was undertaken irrespective of age, sex, body habitus and status of gallbladder disease. Our general observation with majority of patients with this point specific epigastric port placement was that it is easy to locate, needs less thrust on trocar for creation, stays on the linea alba, is easily maneuverable facilitates safe, easy and speedy dissection, causes less portal bleeds and is easy to angulate towards the right of falciform ligament.

### 3.1. Age and Sex

The median age of patients included in the study was 40 years and the range was 18 - 60 years. There were 73 females and 37 males in the study group.

### 3.2. Body Mass Index (BMI)

Out of 100 patients, 81 patients fell in the ideal group, 15 were overweight and the remaining four underweight. (Underweight: less than 18.5, Ideal: from 18.5 to 25, Overweight: from 25 to 30, Obese: >30).

### 3.3. Presentation

Out of 100 patients, 79 patients had gallstones without any ultrasound evidence of acute inflammation at the time of surgery, whereas 17 had acute cholecystitis and 4 had mucocele.

### 3.4. Peri-Operative Details

The operative time (skin to skin), estimated blood loss, requirement of transfusions, intraoperative complications, use of suction/tube drainage, requirement of extending the incision and reasons thereof were recorded. Our general observation with majority of patients with this point specific epigastric port placement was that it is easy to locate, needs less thrust on trocar for creation, stays on the linea alba, is easily maneuverable facilitates safe, easy and speedy dissection, causes less portal bleeds and is easy to angulate towards the right of falciform ligament.

### 3.5. Observations

Out of 100 patients we found that in 95 there was no evidence of portal bleed and the rest 5 patients had minor haemorrhagic ooze which stopped quickly during the surgery itself. We asked the young surgical recruits to locate the point (irrespective of the body habitus of the patient) which was done successfully with 100% accuracy using the defined surgical lines but only in 85% cases by the hand maneuver. The operating surgeon found it extremely easy to angulate the trocar to the right

of falciform ligament by entering at this point; moreover the thrust needed for the same was less as compared to trocar insertion at other point.

### 3.6. Post-Operative Details

There was no postoperative complication in the study population.

### 3.7. Hospital Stay

The mean hospital stay was 2 days; the mean being 1 - 5 days. Most of the patients were discharge home on the morning of second postoperative day.

### 3.8. Return to Work

Most of the patients returned to their normal routine work within one week of surgery.

## 4. Discussion

One of the important aspects of surgery is the awareness of anatomy. A competent surgeon, efficient tools, a good theatre environ and good assistance yield a successful outcome of the surgical procedure. As regards the anatomy, performing surgeries without the knowledge of anatomy is like going to sea without knowing swimming. Laparoscopic cholecystectomy is the most commonly performed surgery worldwide. A correct port placement is mandatory for easy and safe outcome of the surgery. Many authors have tried to describe the port placement in laparoscopic cholecystectomy by describing different ways of making them on the patient. However, literature is not clear about their point specificity which becomes mandatory for the beginner in laparoscopy. We strongly felt that among various ports, epigastric port being the dominant working port needs a point specific target location for the beginner. We felt that the word, "epigastric" refers to a region of abdomen and not to a point specific site for port. We took up the study with an idea to give a name to this point where epigastric port could prove an ideal site, thereby making things simpler for the beginner in laparoscopy. One of the ways to make epigastric port is that line joining the xiphistenum to the umbilicus is to be divided into upper 1/3rd and lower 2/3rd. it is apparently difficult for a beginner to locate the area as it does not signify the point specificity and is silent about the right and left topography [6]. The other way round of making this port is three finger breadths below the xiphoid process which again varies from surgeon to surgeon and may baffle the beginner [7]. One of the references mentions that the epigastric port can be placed in the subxiphoid region which is vague and not point specific [8]. As we all understand that epigastric port is a pivotal port in laparoscopic cholecystectomy, it becomes

all the more mandatory to place it correctly for not only safe, easy and speedy dissection but also for its easy maneuverability to avoid the sword fighting and epigastric portal bleed. Given the experience that we carry working with 200 laparoscopic cholecystectomies we strongly feel that the point for epigastric port used by us is not only simple to design but also achieves all the benefits of an ideal port. It has been our observation that the trocar passing through the epigastric port using this point usually falls on the right of the falciform ligament which adds technical ease for the surgeon especially for removal of the specimen. Most of the portal bleeds are due to wrong placement of the epigastric port. All are agreed that a right displacement of epigastric port adds to the portal bleed due to injury to superior epigastric artery and the left displacement of port adds to the operative difficulty for the surgeon [9]. We have observed even a 1 cm displacement from the point we described for the epigastric port adds to the technical difficulty not only for the beginner but even to a trained surgeon. We strongly observed that the thrust required for making the epigastric port on our described point is minimal and is near bloodless as it passes through the linea alba. Moreover it has been our observation that the trocar usually enters on the right side of the falciform ligament while using this point as the site of insertion for the trocar. We have also described a rough maneuver of designing this port by the surgeon using his left hand which is easy, time saving and can easily be learnt and taught to the young recruits in laparoscopy.

## 5. Conclusion

The point specific epigastric port conveys many benefits to the operating surgeon in terms of easy location, adds safety and speed to the procedure, causes less portal bleeds, needs less thrust and usually falls to the right of the falciform ligament adding technical ease to the sur-

geon. It is easy to be learnt, taught and practiced by the young surgeons.

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