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Mercedes Sign' as a New Anatomical Guide for a Safe Three Steps TAPP Procedure

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ABSTRACT

Laparoscopic inguinal hernia repair has been described many years ago. However, this method has not received enough attention until recent years. The most important reasons are posterior inguinal anatomy, requirement for additional equipment and the increased cost with this surgery. The inguinal anatomy viewed from the posterior approach is always different. Therefore, this technique has not received much acceptance. It is challenging for surgeons to perform a surgery they don't already know, without touching, feeling, and using additional equipment. This might mean getting out of the comfort zone for some surgeons. It is scary to apply a new technique if the expected complication rate is high. Perhaps these are the considerations that slowed the potential for wider adoption of laparoscopic inguinal hernia repair.

In this article, we aimed to explain more easily and clearly the anatomical structures encountered during laparoscopic transabdominal preperitoneal (TAPP) surgery and to summarize the important points with the integration of 'Mercedes sign'.

KEYWORDS

TAPP; Laparoscopic; Inguinal; Anatomy; Mercedes sign

INTRODUCTION

Laparoscopic surgical approach is successfully applied as a standard treatment in gallbladder surgery all around the world, and excellent results are obtained. However, adoption of laparoscopy in inguinal hernia repair has not been at the expected rate. Although laparoscopic technique in a new anatomical plan is difficult and time-consuming, there are many studies showings that laparoscopic approach is associated with less post-operative pain and faster recovery benefits [1-3].

Laparoscopy also has better results than open surgery in terms of cosmetic outcome. Both inguinal areas investigation at the same time is another advantage. The intraabdominal organs can also be evaluated, and any occult pathology can be diagnosed in TAPP. If the mesh is placed and stabilized properly, the recurrence rates are lower. After the surgery, the patient can be easily mobilized, be able to do her/his personal care, and return-to-work time is shorter. Pain is very limited, and in most cases can be easily treated with mild pain relievers.

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Patients can be discharged the following day and are able to lift weight after one or two weeks depending on their individual recovery speed. Laparoscopic technique can be considered as an ideal method for active people, athletes and people who need to work physically [1,3,4].

The posterior approach anatomy is perhaps the most critical step for the success of TAPP surgery. Many methods such as landmarks and triangles, have been suggested to understand the complex posterior inguinal anatomy. These can be easier to make orientation during the surgery much easier, as well as less risky [3,5-8]. On the other hand, these complex methods can also be confusing during surgery.

In this article, our aim is to create a better anatomical point to make of peritoneal incision, preparation of the peritoneal flap, and explanation of anatomical structures and basic landmarks with 'Mercedes Sing' which is a mark known in the world.

TECHNICAL DETAILS

The patient lies on his back, with reverse Trendelenburg position (inclination of about 15°) and side tilt towards the surgeon. The surgeon and the assistant using the camera stand on the opposite side of the hernia. Using an incision made just above the umbilicus, a carbon dioxide pneumo-peritoneum is created inside the abdomen using a Veress needle. A 10 mm trocar is inserted through this incision. 30° or 45° optic system is used. Under laparoscopic view, 5 mm trocars are placed on the right and left sides at the intersection with the line drawn from the midclavicular line on the transvers line passing 2 cm below the umbilicus.

Step 1: Peritoneal Incision and Preperitoneal Dissection

The purpose of this step is to ensure the best positioning of the mesh and to ensure that the peritoneum is closed comfortably after the surgery to prevent contact of the mesh with the abdominal organs. In the literature, the peritoneal incision is described as 5 cm above the hernia defect or at least 4 cm above the deep inguinal ring border [2,3,8].

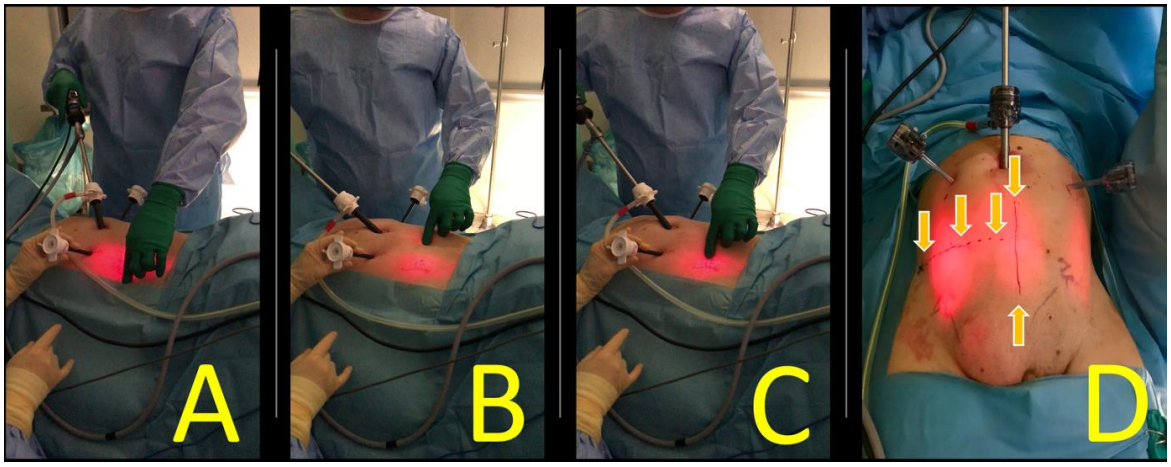

Figure 1A- 1D: Determination of the peritoneal incision, transverse incision drawn perpendicular to the anterior upper iliac bone level and the midline of the abdomen.

The safe incision should be with a vertical incision made from anterior upper iliac spine and the midline of the abdomen (Figure 1). This incision becomes advantageous when closing the peritoneum. A large mesh (12 cm × 15 cm or 15 cm × 15 cm) can be easily placed, and no tension or non-closure of the peritoneum observe. The peritoneal flap can prepare with the help of scissors or hook cautery without moving away from the peritoneum (Figure 2). This method prevents unwanted bleeding from the

peritoneal surface and prevents complications. This step may take a long time in surgeons who are at the beginning of the learning curve, or in patients who have undergone previous surgery. Perhaps this is the longest step of the surgery. Therefore, patience, gentle manipulation of the tissue and keep an eye on the critical landmarks and structures are important.

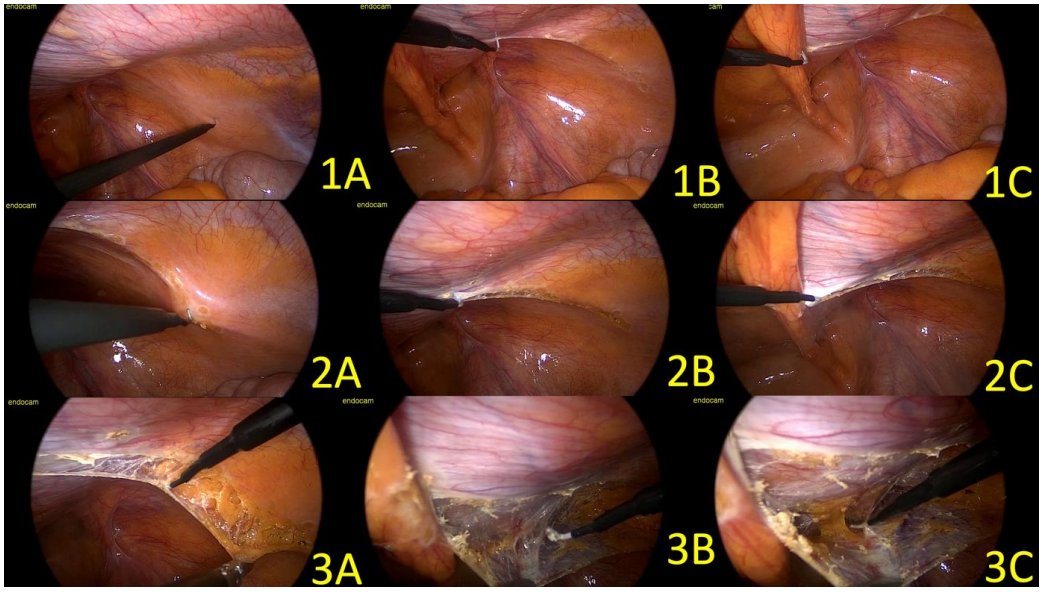

Figure 2A-2C: The peritoneal flap is prepared with the help of scissors or hook cautery.

Step 2: Determination of Anatomical Basic Points using the Mercedes Sign

In this step, 'Mercedes Sign' which is a mark known in the world to describe the anatomical structures is practical and quickly adapt to the anatomical area. The middle of the 'Mercedes Sign' is placed at the junction of the iliopubic tract and the deep inguinal canal. The upper leg of 'Mercedes Sing' marks the inferior epigastric vein, the left lower leg vas deferens and the right leg spermatic veins (Figure 3).

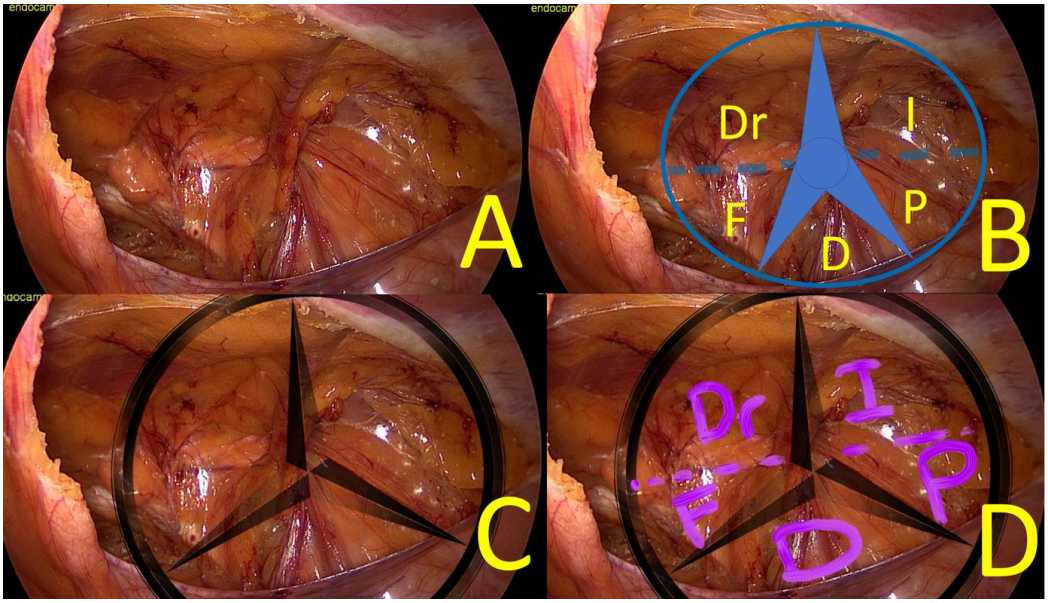

Figure 3A-3D: Description of anatomical structures with 'Mercedes sign'.

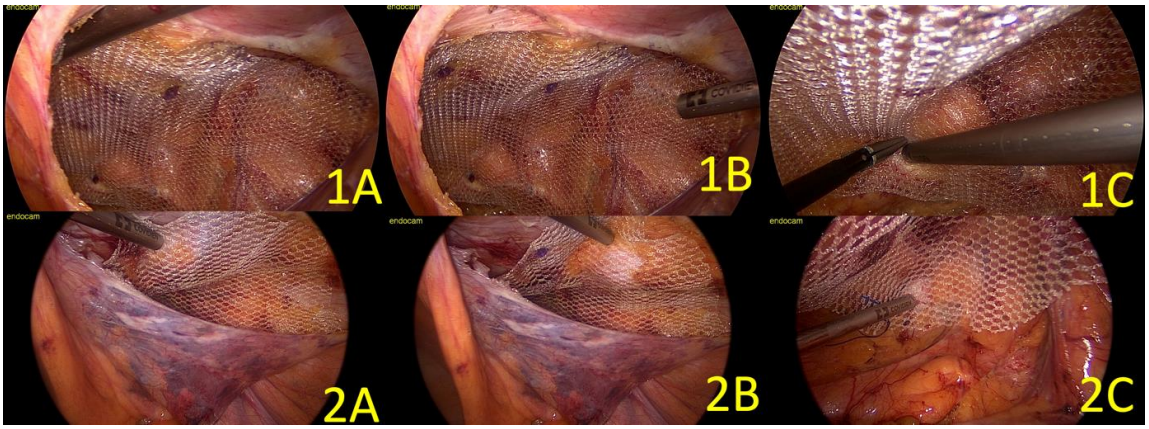

Figure 4A-4C: Mesh fixation with absorbable tack fixation device.

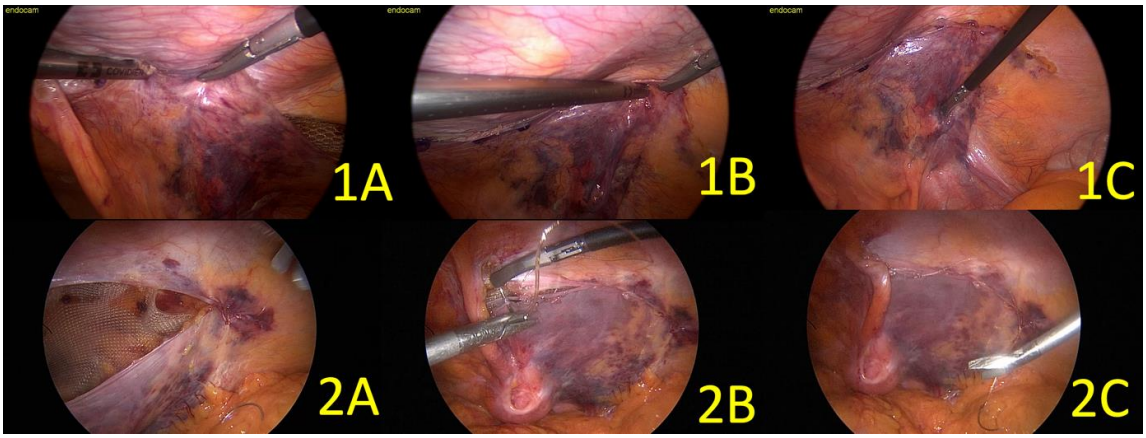

Figure 5: Peritoneal flap closure with an absorbable tack (1 A, B, C) or suture (2 A, B, C)

After placing the Mercedes sign, on the upper right triangular area includes the indirect inguinal hernia area (I), the lower right side includes the triangle of pain (P), the upper left area includes the site for direct inguinal hernia area (Dr), the lower left area includes the femoral hernia area (F), and the triangle between the two legs represents the triangle of death (Doom, D) (Figure 3).

These 5 triangles can describe very easily. In this step, marking the 'Mercedes Sign' is very simple, and applicable for every patient. This method can be used in patients with excess fat in this area.

Step 3: Mesh Land Off and Peritoneal Fixing

After removing the hernia sac from the inguinal canal, mesh is place in this area to cover not only the hernia site, but also all the potential hernia areas (direct, indirect, femoral). It is known that nerve injuries or pressure on the nerve during fixation will cause postoperative pain. Fixation to the veins cause serious bleeding complications [1,9-12]. Self-adhesive mesh and fixation with glue can also be chose for to avoid these complications. Determining the basic points by placing the Mercedes sign is very important in preventing these. An appropriate mesh size also reduces the recurrence rate of the hernia. Studies have showed that the mesh placed at least 3 cm - 4 cm from the hernia area is sufficient and approximately 12 cm × 15 cm or 15 cm × 15 cm mesh can cover all defect areas [1,9-12]. An absorbable tack fixation device can use. Total of 3 or 4 fixation points, one on the right and left of the inferior epigastric artery, one on the Cooper ligament, and sometimes on the upper left corner of the mesh should be enough for fixation (Figure 4). While choosing these fixing points, it is important to attend to stay away from the areas of the nerve and vein on the 'Mercedes Sign'.

Peritoneal flap can clause with an absorbable tack or suture (Figure 5).

CONCLUSION

As a result, the use of the 'Mercedes Sign' is easy, understandable, and useful in determining anatomical points during TAPP, which helps to avoid complications. Also, these three steps are very important for this surgery with the principle of " Primum Non Nocera" and paying attention to these steps will protect the surgeon from many complications that can have serious results.

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