



# Minimally invasive Laparotomy Instead of Laparoscopy for a Low Resource Setting

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## Abstract

Awareness regarding the surgical advances in the field of Gynecology has increased among many patients in the world due to advancement of information technology. Even though laparoscopic surgery becoming more popular due to its unique benefits, high initial costs and the maintenance cost have limited its availability in low resource settings. Minimally invasive laparotomy will be a good alternative for that even though it has limitations.

**Keywords:** Minimal access surgery; Laparoscopy; Mini-laparotomy

**Abbreviations:** MIL: Minimally Invasive Laparotomy; PID: Pelvic Inflammatory Disease.

## Introduction

Development in surgery during last decades has reduce the surgery related morbidity and mortality while improving the patient's satisfaction and surgeon's convenience. This revolution has nourished the Gynecological surgeries as well. Many surgeries which done through an abdominal incision can be done through laparoscopies in most countries and many centers across the globe. Development of information technology and increased availability of internet facilities have helped to reach this new knowledge to patients in each and every corner of the world. Thus, patient's demand regarding the route of their surgery has increased drastically. Except vaginal Gynecological surgeries, patients tend to inquire about the possibility of getting done their surgeries through laparoscopic route. Even though it is not practical for each and every Gynecological surgery (ex-surgeries for malignancies, surgeries for large fibroid uterus) most of the surgeries for benign conditions and carefully selected malignant cases can be successfully done by laparoscopy

with expert hands in a well-equipped laparoscopy center.

But efficiency and success of laparoscopic surgeries depend on both surgeon's skill as well as having well-functioning proper instruments. But unfortunately, both these factors are not equally distributed among each and every country and each and every hospital. Because it takes long time to develop a well-trained laparoscopic surgeon. Another thing is providing a well-equipped laparoscopy center to each and every hospital is not possible, especially in a low resource setting. Because laparoscopic instruments are highly expensive compare to open surgical instruments. Their maintenance and sterilization procedures are expensive. This cost is unbearable to a developing country. As a result of that only very few centers of the country will have a fully equipped, well maintained laparoscopy units. Other main hospitals will have either basic laparoscopy instruments or no laparoscopy stack at all. So, these units will run with open abdominal surgeries and vaginal surgeries. This is the bitter truth in most parts of the developing countries. Thus, only small portion of the population in developing countries will reach to laparoscopic surgical facilities while others undergoing traditional open abdominal surgeries.

In practical point of view, it is not possible to develop laparoscopy center in every hospital in a developing country. Instead of that selected open abdominal surgeries can be done through a small incision and achieve the near possible benefits of a laparoscopic surgery. This is the reason why this concept of "minimally invasive laparotomy" (MIL) was born.

## Discussion

Ultimate memory of a surgery to the patient is the surgical scar. They don't know, they don't feel and they don't experience the difficulties faced by the surgeon during the surgery. After recovery from the surgery, they assess the surgeon's skill by the symptom relief and surgical scar. Scar related complications like keloid formation will reduce the patient's long-term satisfaction. Simply because with the change of woman's role globally, they concern more and more about their external cosmetic appearance, even in lower abdomen and around the ano-genital area. They don't want to have a big scar for their Gynaecological surgery which others can easily see during their routine daily activities. That is a one reason for the development of minimal invasive surgical techniques. Other main reasons are less post-operative pain and reduction in post-operative hospital stay.

But there are some factors limit the free availability of laparoscopy in each and every corner of the world.

- High cost of the laparoscopy instruments
- High maintenance cost of the instruments
- High cost for sterilization procedure
- Lack of skilled operators due to long learning curve

All low resource settings are suffering due to above four conditions. Even though they have laparoscopy centers, there will be a long waiting list for surgeries. That is the reason why I suggest this MIL instead of laparoscopy for a low resource setting.

### What is MIL?

This is a way of doing traditional Gynecological surgeries through a relatively small incision or doing a surgery for a benign Gynecological condition through supra-pubic transverse incision which actually need a mid-line incision. But this should be applied only for carefully selected cases. Length of the abdominal incision has significant effect on the immediate and intermediate complications and outcomes [1]. Thus, if the length of the abdominal incision can be reduced, it will improve the patient's ultimate outcome. Same time it will improve the cosmetic outcome as well which is considered more and more during modern days.

With the development of gynecological surgeries through various branches, outcome of the surgery which

perceived by the patient can be discussed in two ways [2-4].

- Minimally invasive
- Cosmetically superior

Minimally invasive surgeries will reduce the post-operative pain and post-operative hospital stay while cosmetically superior surgeries will improve the ultimate satisfaction of patient regarding the surgical scar. With the improved modern medical knowledge of the patients, they tend to demand on both aspects. Specially they think about the ultimate cosmetic appearance. Many women want to hide their abdominal surgical scar from the others while they are wearing modern dresses. Sometimes women may tend to choose mini laparotomy through a supra-pubic transverse incision over laparoscopy and Pfannenstiel incision [5]. The reason behind this may be the easy visibility of multiple port site scars in the upper abdomen compare to a scar of a small supra-pubic transverse incision which usually covers even with their under garments.

Benign conditions which need mid line laparotomy cause significant impact on patient's life due to its short term and long-term complications compare to a supra-pubic transverse incision. Few reasons may be good cosmetic appearance, reduced pain and reduced risk of incisional hernia formation in supra-pubic transverse incision due to less tension on the skin, preservation of nerves, or less stress of the aponeurotic and facial suture lines [6,7].

### Who are the best candidates for MIL?

- Any kind of benign abdomino-pelvic Gynecological conditions which need a surgery. (ex- benign ovarian cysts and para-ovarian cysts, fibroids, tubal surgeries for ectopic pregnancies and sterilization, hysterectomies for non-malignant conditions)
- Not having any past history of abdomino-pelvic surgeries which can lead to adhesion formation.
- Not having any previous history of conditions like endometriosis and pelvic inflammatory disease (PID) which can lead to abdomino-pelvic adhesions.
- Multi-parous women with lax abdominal wall.

### Contra-indications for MIL

- Diagnosed malignant diseases.
- Any condition that possibility of malignancy has not been excluded.

### Cautions

Any condition which spillage of abdominal content lead to complications such as

- chemical peritonitis due to dermoid cysts

- pseudo myxoma peritonei due to mucinous cyst adenoma
- dissemination of infected materials due to abscess

Restricted mobility in pelvic organs during clinical pelvic examination.

Surgeries for emergency conditions like

- Ruptured ectopic pregnancy
- Twisted ovarian cyst
- Ruptured ovarian cyst
- Bleeding into an ovarian cyst

### **Possible surgeries can be done by MIL**

- Ovarian or Para ovarian cystectomy
- Selected cases of myomectomy
- Selected cases of hysterectomies
- Salpingectomy for ectopic pregnancies
- Tubal sterilization

### **Pre-requisites for the surgery**

- Careful case selection after proper history and examination by the surgeon himself.
- Careful pre-operative counselling
- Proper investigations including imaging and tumor markers

Following description is about the tips of individual types of surgeries that can be done through a MIL.

### **General tips to enter into the peritoneal cavity**

- Make 2 inches size supra-pubic transverse incision at a level just above the pubic symphysis.
- Cut the subcutaneous fat until reach the rectus sheath. Fat layer should be dissected bilaterally (about 0.5 to 1 inch) beneath the skin. Meticulous hemostasis should be achieved during this to avoid hematoma formations later.
- Rectus sheath should be cut transversely and length of the rectus sheath incision should be more than the length of the skin incision.
- Parietal peritoneum should be dissected vertically to enter into the peritoneal cavity.
- Inspect the sites which need to be operated and skin incision can be extended depending on the requirement.

### **Cystectomy or oophorectomy**

- After giving the general anesthesia, check the mobility of the cyst before make the incision. Then open into the peritoneal cavity and get a clear view of the cyst and exclude any adhesions.

- If the cyst enlarged into the abdomen (abdominally palpable), ask the assistant to stabilize the ovarian cyst externally by keeping his/her hand over the patient's abdomen.
- Make a small superficial incision over the cyst wall with scalpel.
- Connect the sucker tube into a 5mm laparoscopy port with the trocar.
- Puncture the cyst wall with laparoscopy trocar through the previously incised area and take of the trocar. Allow for the suction of cyst content.
- Take two allice tissue forceps to grasp the cyst wall either side of the laparoscopy trocar.
- Gradually drag the cyst wall out from the peritoneal cavity through the small abdominal incision with the help of two allice tissue forceps with the collapsing of the ovarian cyst. Cystectomy or oophorectomy can be done thereafter.
- If the cyst is not enlarged into the abdomen, grasp the ovarian ligament to stabilize the cyst. Then do the same steps as mentioned above.

### **Salpingectomy or tubal sterilization**

- Put index and middle fingers of the surgeon along the posterior surface of the uterus. Grasp the uterine cornu and the lateral border of the uterus along the broad ligament with a long artery forcep to stabilize the uterus. Gently pull from the artery forcep to visualize the cornual end of tube. Then trace the tube and do the salpingectomy or tubal sterilization.

### **Myomectomy**

- Fix a myoma screw to the fibroid and gradually pull it out through the abdominal incision.
- Then perform the myomectomy in routine manner.
- If there is a pedunculated fibroid, separate the fibroid from the uterus while it remains inside the peritoneal cavity, after fixing the myoma screw to the fibroid. Then repair the myoma bed and then take off the fibroid from the peritoneal cavity by pulling with the myoma screw.

### **Hysterectomy**

- If the uterus is enlarged more than 12 weeks size, try to take the fundus of the uterus out from the peritoneal cavity with the help of a myoma screw.
- If the uterine size is less than 12 weeks, use a long artery forceps to stabilize the uterus just like in a salpingectomy (as describe above).
- Then perform the hysterectomy step by step down wards.
- Use Kelly's retractors to dissect the lower pedicles. Use

hand knots instead of instrumental knots.

### Before the closure

- Use Kelly's retractor to inspect the pedicles for bleeding.

Care should be taken to check all possible bleeding points before the closure as small incision may mask it. All swabs, towel and instrument count should be checked. Generally speaking this MIL is used as the gate way to insert all our traditional open abdominal surgical instruments to do the surgery with minimum tissue damage.

### Conclusion

MIL would be a good alternative method for a low resource setting where laparoscopy facilities are not freely available to achieve maximum possible patient satisfaction while reducing the surgical morbidity. Careful case selection after proper assessment of the patient is the most important thing. This need further research and discussions in future with the participation of experts.

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