Technical Pearls in Laparoscopic Myomectomy

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Introduction

The benefits of laparoscopic approach in gynaecological surgery are well recognised. Compared with conventional open surgery, it is associated with small incisions and better cosmetic results, less blood loss, less tissue trauma, less post-operative pain, shorter hospital stay, faster recovery with an earlier return to work and full activity, and fewer post-operative adhesion formation. The major concern about laparoscopic myomectomy (LM) is suboptimal tissue apposition during repair of myometrial defects leading to uterine rupture in subsequent pregnancies. However, if the myometrial repair is performed with the same degree of care as it would be at open myomectomy, there appears to be no reason why the rate of uterine rupture should be higher after LM. An Italian multicentre study on complications of LM provided prospectively acquired data on the complications associated with 2050 LMs. The favourable clinical results and extremely low conversions rate of 0.34% suggested that LM is a safe and reliable procedure, even in the presence of multiple or enlarged myomas. We are now entering the age of robotic surgery. At the moment, though robotic myomectomy leads to less blood loss and shorter hospital stay when compared with the conventional approach, it is more costly. Moreover, most myomectomies can be accomplished laparoscopically without the need for robotic technology.

Owing to the inherent characteristics of laparoscopic surgery including decreased tactile sense, limited direction of access towards targets and degrees of freedom of movement, difficulties may be encountered during the performance of LM. The technical aspects of LM are discussed in this article.

Case Selection

Correct case selection is vital to the success of LM. LM is suitable for a single fibroid smaller than 10cm in diameter and, for multiple fibroids, the sum of diameters should not exceed 15cm. In the case of big fibroids, preoperative fibroid shrinkage with Gonadotrophin releasing hormone analogues (GnRHA) may be used so that the selection criteria can be met. Use of GnRHA prior to myomectomy reduces intra-operative blood loss, too. However, it may lead to blurring of the surgical planes and hence difficulty in enucleation of the fibroids.

Pre-operative Mapping

Because of reduced tactile sense, small intramural fibroids may not be located during laparoscopy. Preoperative mapping with ultrasonogram, and even magnetic resonance imaging (MRI), is very important so that small fibroids are not missed during the operation. MRI is also particularly useful in differentiating fibroids from adenomyomas. Laparoscopic resection of adenomyomas can be a nightmare for the gynaecologic laparoscopist since there is no capsule or a clear margin for dissection and therefore the resection may be difficult and incomplete.

Basic Techniques of Laparoscopic Myomectomy (Figure 1)

Caution should be exercised in positioning the patient. The hip flexion and abduction should be such that the trunk-to-thigh angle is approximately 170 degrees and never more than 180 degrees to prevent nerve injury. Steep Trendelenburg position is adopted to allow the bowels to fall away from the pelvic organs. Uterine manipulator may be used to optimise exposure and stabilise the uterus.

Intra-umbilical port is used to introduce the laparoscope. Many surgeons use the diamond-shaped port placement where the accessory ports are sited in the bilateral lower quadrants and suprareopic region. The chief surgeon then works through the ipsilateral lower quadrant port and supra-pubic ports. The author employs the so-called ultra-lateral port site placement by creating side ports in the left and right lower quadrants just medial to the anterior superior iliac spines, and left paramedian region under direct laparoscopic guidance. The right-handed surgeon works through the left side ports while the assistant holds the laparoscope and works through the right side port. Their positions may be exchanged if the surgeon is left-handed. Ultra-lateral port siting is less tiring for the surgeon since it allows the surgeon’s upper arms and forearms to be adducted and the wrist and hand motion to be natural. It also allows the laparoscopic instruments to approach the target in a horizontal plane as in open surgery, eliminating the fulcrum effect. Besides, it avoids injuries to the inferior and superficial epigastric vessels.

The maximum volume of pitressin (20units diluted in 100ml normal saline) in millilitres that can be used is approximately equal to the patient’s body weight in kilograms. After injecting the vaso-constrictor, the author uses the ultrasonic scissors to resect the uterine fibroids. The direction of line of uterine incision is designed so as to facilitate the subsequent myometrial repair. One should always leave sufficient serosa and myometrium,
even overlapping layers, to avoid excessive tension on the sutures.

After enucleation of the fibroids, layered repair of the uterine defects is carried out using vicryl o sutures. Where the endometrial cavity is entered, vicryl 3o suture is used for closure. Events leading to uterine scar dehiscence in subsequent pregnancies are thought to include suboptimal suturing of the uterine incision and/or impaired wound healing from extensive use of coagulation or any tissue-destroying modality. There are no data suggesting that any one suturing technique is superior in minimising this risk—whether continuous or interrupted sutures are placed, whether the knots are tied intracorporeally or extracorporeally, or whether the suturing is done by hand or a suturing device. Sutures with shorter half-lives or ones that may lose strength in the presence of infection (e.g. chromic) should most likely not be used. All in all, careful closure of the uterine incision with minimal coagulation is most critical.

The specimens are retrieved through one of the accessory ports after morcellation. Alternatively, the specimens may be put into an endobag which is then delivered through a posterior colpotomy. In addition, all fibroid fragments should be meticulously removed after morcellation to prevent the rare complication of parasitic peritoneal leiomyomatosis.

Patients with Contraindications to the Use of Vasocostricators

In patients with contra-indications to vaso-constrictors, interruption of the uterine blood supply is used to reduce intra-operative blood loss. The uterine artery can be traced by first identifying the ureter and then tracing along it distally. The uterine artery is then seen lying above the ureter. The uterine artery may also be identified by retrograde dissection of the obliterated hypogastric artery—the obliterated hypogastric artery is traced on the anterior abdominal wall and dissection is carried out cephalad to identify first the superior vesical artery and then the uterine artery. The uterine arteries are then obliterated with bipolar electrocautery or ligated. However, this method is only suitable for those who desire no further pregnancies since the effect of bilateral uterine artery obliteration on the subsequent pregnancies is not known.

Big Uterus

For a big uterus, supra-umbilical, instead of intra-umbilical, port should be used for the introduction of the laparoscope—usually the port is sited 2cm above the uterine fundus so that there is sufficient space for optimal visualisation. Enucleation and morcellation of big fibroids can be very demanding and tedious. Sinha et al described a method to deal with a large fibroid by morcellating the fibroid while it is still attached to the uterus and enucleating only to about one-fourth of its circumference. As electromechanical traction by the claw forceps causes progressive separation of the myoma from the uterus, morcellation completes the enucleation while removing the myoma from the abdominal cavity. Caution should be exercised during morcellation not to damage the normal myometrium.

Cervical Fibroids

Dissection of the bladder is usually necessary before myomectomy for fibroids at the cervical region. In order to avoid bladder injury, it is important to keep the dissection close to the uterus and point the tip of the scissors towards the uterine side. The 30 degree laparoscope is very useful in visualising fibroids in such an awkward position as the cervical fibroids. The ability to perform suturing with both hands is vital for proper repair of the uterine defect at the cervical region.

Broad Ligament Fibroids

Broad ligament fibroids are situated in the pelvis where the ureters lie. The ureters may be at jeopardy if they are not clearly visualised. Ureteric dissection should therefore always be carried out before attempts to remove the uterine fibroids. The ureter in the pelvic side wall can be dissected by one of the following three approaches. The pelvic approach consists of visualising the ureter directly in its natural position on the pelvic side wall through the peritoneum of the broad ligament. The peritoneum is incised lateral to the ureter which is then dissected inferiorly to close to the uterus. In the cephalad approach, the peritoneum just medial to the infundibulopelvic ligament is opened to expose the ureter at the pelvic brim. On the left side, sometimes, the congenital adherions of the sigmoid colon have to be divided. Once the ureter has been identified, it is then progressively dissected off the medial leaf of the broad ligament until the uterine vessels are reached. In the caudad approach, the obliterated hypogastric artery, which is easily identified on the anterior abdominal parietal peritoneum, is dissected superiorly. The superior vesical artery is encountered before the origin of the uterine artery is located from the internal iliac artery. The ureter is then easily identified underneath the uterine artery in the medial border of the pararectal space. After
the ureter has been identified, the subsequent resection of the fibroids is usually easy and, many a times, suturing is not needed because the fibroids are pedunculated.

Management of Adenomyomas Detected Intra-operatively

Despite tremendous efforts to differentiate uterine fibroids from adenomyomas, one should always be prepared to perform an incidental laparoscopic adenomyomectomy. Takeuchi et al performed adenomyomectomy by first making a transverse incision through the adenomyotic tissue down to the endometrium. The adenomyotic tissue was then excised by slicing in layers with a monopolar needle on 70W incision mode. They counteracted the substantial loss in the muscle layer after adenomyomectomy by overlapping the normal muscle layer on the serosal membrane side and below the incision line as serosal flaps.

Laparoscopic hysterectomy is another option for the incidental finding of adenomyosis during the attempt to extirpate uterine fibroids. Preoperative counselling for possible hysterectomy is of paramount importance and so is the ability to carry out laparoscopic hysterectomy.

Conclusions

LM is a feasible and safe alternative to the conventional open myomectomy in many instances. It should start with careful case selection and meticulous preoperative mapping. Optimal tissue apposition with good laparoscopic suturing skill is the key to a successful LM. One should also learn the techniques to deal with difficult situations such as patients with contraindications to vasoconstrictors, big uteri, cervical and broad ligament fibroids. Furthermore, one should be prepared to perform laparoscopic adenomyomectomy and even laparoscopic hysterectomy in all cases of intended LM.

References