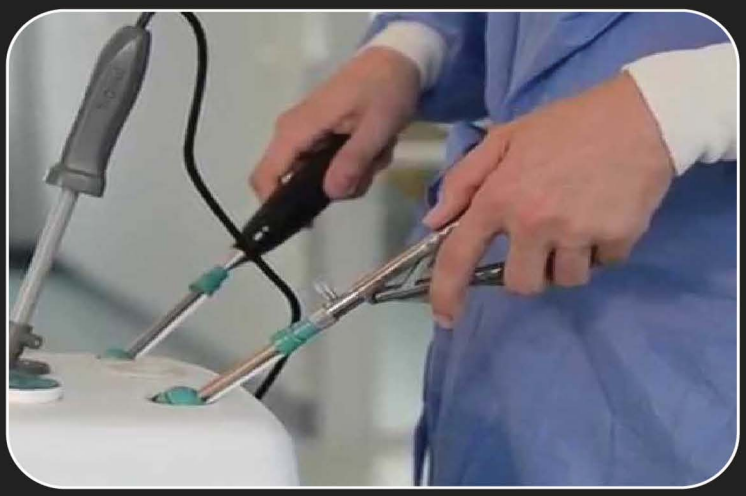

ISARCON 2017 Manual of Laparoscopic Endosuturing

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"1, 2 and V" Laparoscopic Suturing Simplified to the Core

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Nutan Jain, Vandana Jain

INTRODUCTION

Laparoscopic suturing is an endoscopic skill necessary for the successful performance of a variety of advanced and complex laparoscopic procedures. Although some surgeons attempt to dismiss endosuturing as unnecessary but most experienced endoscopic surgeons recognize that either energy sources clips or stapling devices can replace the need for suturing. As with conventional open surgery, laparoscopic suturing techniques permit restoration of normal anatomical relationships, organ reconstruction, approximation of tissue planes and establishment of hemostasis. Of the suturing and knot-tying methods adopted for laparoscopic surgery, the intracorporeal method remains the most difficult to master. Intracorporeal suturing is defined as the placement of suture and subsequent tying of a secure suture knot within the peritoneal cavity. Once limited only to short straight or ski needles, endosuturing can now be performed with a variety of curved needles and different suture materials. The ability to utilize curved needle suturing provides the surgeons with greater operative flexibility. Curve needle suturing has totally changed the dimensions of laparoscopic surgery. That is how nowadays laparoscopists are doing complex surgeries like uterine prolapse repair, burch colposuspension, tubotubal anastomosis, etc. New curved needle holders have been designed to firmly hold the needle with minimal instability at the tip. This permits SH, CT-1 needle to be driven through the tissue of various thickness and consistency. Suturing has dominated traditional open surgery for centuries. Laparoscopic suturing techniques were introduced and utilized by Kurt Semm in gynecology in mid 1970s. The first significant step in the evolution of laparoscopic instruments was combining the microsurgical handle to the laparoscopic instrument, permitting free movement and full rotation. The introduction of two handed suturing technique and the design of instruments as a matched

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pair with each performing its specific role of needle driving or assisting grasper is also important. To become skilled in laparoscopic suturing, endoscopic surgeons must learn to adept to the laparoscopic operating environment, i.e. acquire the skill of proper depth perception, hand eye coordination, direct tactile sensation, steady practice and above all, patience.

EQUIPMENT

The following equipment are necessary for intracorporeal suturing:

1. Two laparoscopic needle holders or one laparoscopic needle holder and a grasper
2. Suture materials
3. Laparoscopic scissors.

A 10 mm 0 degree telescope is used to permit direct visualization. The assistant holds the camera in a steady fashion, always keeping the target area in the center of the field of view. Proper placement of trocars is required for optimal intracorporeal suturing. As skills progress, advanced endoscopic surgeons will suture with ease from either side of the patient and either with right or left hand. Telescope with camera is placed in the umbilical region. Ancillary ports are placed lateral to the inferior epigastric vessels. Lower ports are placed 1–2 cm medial to the anterior superior iliac spine though some surgeons may prefer a suprapubic port midway between pubic hairline and umbilicus and the other in the lower quadrant on the side, from where he is operating. Laparoscopic suturing in the pelvis is made easier by placing the upper trocar high approximately at the level of umbilicus for continuous and prolonged suturing. A 10 mm trocar is needed to accommodate a CT-1 needle. A 5 mm trocar can be used for SH needle or smaller needles. The larger trocar to be placed in the upper or lower lateral position. Alternatively, 5 mm apple valveless trocar can be used for 'back loading' technique.

Needle Holders

a. Self-righting needle holder with a fixed locking jaw mechanism.
b. Standard articulating jaw needle holders that mimic open needle drivers.

Self-righting needle holders such as Cook needle holders, endopath (Johnson and Johnson) needle holder allows the needle to be grasped in an upright position, perpendicular to the needle driver with little effort. One of the limiting factors of the self-righting needle holders is that, one cannot grasp the suture with needle holder, as it can damage suture materials during the time of holding. Most advanced endoscopic

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surgeons, however, prefer the standard articulating jaw needle holder (Karl Storz, Wolf) that allow them to angle the needle preferably for a given stitch and to manipulate the suture. Needle holders are of two sizes long and standard. Long needle holders will allow the surgeons to access deep structures in the pelvis. With this introduction we would describe our own highly simplified manner of suturing. Laparoscopic suturing is commonly considered to be complex, cumbersome and difficult to acquire skill and hence, left by most endoscopic surgeons. Suturing is the way upon the ladder of successful accomplishment of more advanced laparoscopic procedures. Being associated with suturing skills courses, training and teaching of residents, fellows and other gyne experts who now want to improve suturing skills, I realized, a lot of confusion exists in the minds of trainees and they regard it as a complex drill and are unwilling to go ahead with aligning the needle and making of throws and knots. We will try to give a very simplified, core basic way of doing laparoscopic suturing. Here, we will discuss only intracorporeal suturing utilizing the technique, we prefer to call 1, 2 and V the victory of laparoscopic suturing. Even the most novices of surgeons can be transformed into suturing wizards by the acquisition of this simple way of going ahead with laparoscopic suturing. Also we would like to clarify that the technique we are going to demonstrate is compatible with ipsilateral, contralateral or mid suprapubic port placement. It is beyond the restrictions of right handed surgeons or left handed surgeons as it can be done by standing on the right side or left side of the patient. So we like to call it the "Universal Method". It does not make a difference, you stand on the right side of the patient or the left side of the patient. Best would be try suturing by this simplified two-step procedure standing on the right or left of the patient and using right or left hand with the same port placement, as you have been doing till now. We do not want to create any confusion or controversy regarding ipsilateral or contralateral. Both are good techniques depending upon surgeons' choice, comfort and particular surgical application.

Now We shall Describe Our Simplified Technique

Length of Suture

Beginners would better begin by using around 25 cm length of suture. More experience allows you to take more length of suture.

Choice of Needle

Usual is a 36 mm curved round body or taper cut needle, but with the technique described ahead, even a 50 mm needle can be introduced easily.

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Loading the Needle

Best is to use short 5 mm valveless apple trocars, but a 10 mm trocar can also be used. The 5 mm metal or valved trocar which is being used till now in the surgery is removed. The needle holder is now put in the apple trocar. It holds the tail end of the suture and brings it out of the trocar. Now the needle holder is again inserted and grasps the suture exactly about 2 cm from the hub of the needle. This is step 1. Now this assembly of needle holder, suture and 5 mm apple trocar is ready for insertion in the patient's abdomen.

Aligning the Needle

We advocate the use of two needle holders as this makes suturing faster, more accurate and better grip on needle during suturing. This assembly is introduced from the non dominant hand position. Like for surgeons standing on the left and being right handed it will be introduced from the lower left port and likewise for any further combination as per surgeons position and being right or left handed, port entry can be decided but usually it is through the lower port.

Now the needle is first introduced in the abdomen and the apple trocar is threaded over it in the abdominal cavity. The needle is made to hang in the abdomen so as the concavity of the needle is towards patient's legs or we call it half moon position. When the needle is hung in the abdomen rather than laid on any surface or tissue platform like uterus, it is much easier to align it in correct position. As the needle is held by non-dominant hand, the dominant hand brings another needle holder from ipsilateral or contralateral port and comes in the abdomen and grasps the needle at the junction of its anterior two-third and posterior one third. With slight tug on the suture, the needle comes in instant alignment. Onlookers feel, if these are self-righting needle holders but I simply say it is the "self righting surgeon". Well this is the most simplified way of aligning the needle. As most texts of laparoscopic suturing advocate one to nine steps of holding and aligning the needle, over simplification to just two steps is a significant innovation. Now this needle holder held in the dominant hand passes suture through body tissue. As the needle comes out it is instantly grasped by the other needle holder and this dominant hand needle holder presses the tissue back so that needle comes out more easily to be grasped by other needle holder without being dropped. In continuous curved needle suturing it is extremely important to grasp the needle, as soon as it comes out without letting it drop. If it drops, again we have to start from holding the suture at 2 cm

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from the hub of the needle and hanging it in the abdomen and again grasping it at junction of anterior two-third and posterior one-third. Here lies the benefit of two needle holders as they grip better giving precision and speed, less chances of dropping the needle.

Making the Knot

We advocate the formation of letter V for making the throws and knots. Most texts till now in the literature advocate the making of a letter, P, B, Q, C and complex ways of fashioning the throws, which leave the novice a little confused as to which is the vertical limb of P and where to form the loop further confusing the reader. We advocate making the knots and throws by making a letter V. For this, as soon as the needle comes out of the tissue, the suture is pulled from the tissue till the tail end remains of about 2–3 cm. The needle is held like a boat or the smiley grip in the dominant hand needle holder and the left or non dominant needle holder hooks the suture upwards to form a letter V (inverted). Once this position is achieved we start taking up one, two throws around the needle holder. Then the tail end of the suture is grabbed at the tip. The first knot is tied. The dominant hand needle holder, grasping the needle, is pulled while the other needle holder grasping the tail of suture is kept stationary making it easy to spill the throws from the tip of the needle holder. If we move both needle holders then the loops get tightened over the needle holder making their spill difficult. So, it is important to move only the dominant handed needle holder and keeping non-dominant hand stationary while tying the knot. Like this the first knot is tied, further one or two wraps are taken and the free end is held at the tip. To make a secure surgeons knot the two hands are pulled apart in reverse direction to the first knot. Though, we have extensively used the granny knot in which both the knots are made by pulling the two needle holder in same direction, we found even granny knot gives sufficient strength, having used it extensively in pelvic floor repair and that too with 'O' prolene sutures. The ease of granny knot lies in comfortably tying the knots in one direction only. The knots are secured and excess suture cut away. Now lets analyze the benefit of formation of letter V over other P, B, Q or C letter. In making a letter V with needle in boat configuration both limbs of the throws are visible very clearly and it is fashioned out at a height from the body tissue so there is no entanglement with rest of the suture or the tail end. This usually occurs when we are trying to make knots on the surface of body tissue. We advocate, that, the surgeons makes the throws and knots a little higher up in pelvis so that both limbs of the V are clearly seen and there is clarity of the

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rest of the suture and the tail end. Here lies the "1, 2 and V," the victory of laparoscopic suturing. So, making the letter V at a higher plane than the targeted tissue making the wraps, throws and knots very simple—most simplified way of doing suturing. The cut needle and thread is grabbed again closer to the needle and brought out via the lower port. We have encouraged surgeons to use this technique for application with ipsilateral or contralateral approach. Use two needle holders and try to be ambidextrous to better utilize the full potential of laparoscopic suturing. More practice makes you more proficient.

CONCLUSION

This manuscript tries to highlight the simple innovative technique of laparoscopic suturing, utilizing 2 needle holders, using two steps of holding and aligning the needle. It has been the author's experience that formation of letter "V" is an over simplification of the intricacies of knot tying. Understand it, practice it, master it and then enjoy an unlimited access to advanced laparoscopic procedures requiring suturing.

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