

EVE Procedure for the Treatment of Endometriosis

Excision and Vaporization of Endometriosis

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The EVE procedure is a comprehensive process that effectively removes endometriosis from the body. The EVE procedure utilizes wide excision of the endometriosis as the primary technique with vaporization of endometriosis in critical areas where very precise removal of tissue from vital structures is required and where excision alone would damage an unnecessary amount of normal tissue.

While there is currently no known cure for endometriosis, the EVE procedure does offer an approach that effectively treats endometriosis and its associated pain with a very low recurrence rate. Successful surgical removal of endometriosis involves several key steps, including preparation for laparoscopy, accurate diagnosis of endometriosis and finally, complete surgical removal of the endometriosis.

PREPARATION FOR LAPAROSCOPY

If the endometriosis is not identified, it does not matter how proficient the surgeon is at recognizing and removing the endometriosis. Preoperative preparation will increase the chances of identifying and successfully treating the endometriosis. A detailed history and physical examination are important in identifying the cause or causes of the patient's symptoms including conditions other than endometriosis. A transvaginal ultrasound just prior to surgery provides several functions – (1) it is necessary to identify endometriosis deep in the ovary (endometrioma) which cannot always be seen at laparoscopy, (2) can identify other causes of the patient's symptoms, such as pelvic varicosities and (3) if performed by the physician, can help pinpoint the location of the pain.

Office Pain Mapping is a detailed history of all of the different locations and types of pain a patient is experiencing. This includes a maximum, minimum and average level of intensity on the numeric pain scale (0 to 10). Anything that exacerbates or helps reduce the pains is documented as well. This information is used in surgery to correlate physical findings with the patient's symptoms.

Review of previous operative reports can be crucial in predicting deeply buried endometriosis. Sometimes, finding endometriosis is like digging for buried treasure and previous operative reports can be used as a map to help find it. Finally, a preoperative bowel preparation aids in diagnosis and complete removal of the endometriosis, especially when the endometriosis invades into the bowel wall. If the bowel is full of stool it gets in the way of seeing the entire pelvic area and can interfere with diagnosis. If the endometriosis is growing on the bowel then it will have to be removed. Usually, the disease is removed from the surface of the bowel, but occasionally it penetrates through the

wall of the bowel. When the endometriosis penetrates through a small area of the bowel wall it must be removed. In the process, a hole is made in the bowel that must be closed. If the patient has completed a bowel prep (cleansing) then the hole can be closed laparoscopically. When endometriosis completely invades a large area of bowel, the segment of bowel must be removed and the ends of the bowel are reconnected. Again, the bowel should be clean to do this procedure safely. In these cases if a patient has not completed a bowel prep pre-operatively, the surgery would need to be stopped and the patient would have to come back for a second surgery. At that time a pre-operative bowel prep and a bowel resection could be performed to finish removing the endometriosis.

LAPAROSCOPIC DIAGNOSIS

The first step in diagnosing endometriosis at laparoscopy is a systematic evaluation of the abdominal and pelvic cavity. There are a lot of folds and nooks and crannies inside of the body. The inside of the body is not like an empty room (easy to see if there is anything on the floor or walls) but more like a penny amongst a bunch of wadded up, unfolded cloths. Each layer has to be gone through one at a time so as not to miss anything. In the case of endometriosis, very small, difficult-to-see lesions can cause excruciating pain. The laparoscope magnifies when the end of the laparoscope is very close to the tissue, but this also decreases the area that is seen, similar to the effect of looking through a telescope or set of binoculars. The peritoneum (the lining inside the body) covers the pelvis, bladder, bowel, abdominal cavity, appendix and diaphragm (bottom of the lung). It also needs to be inspected systematically for endometriosis so that no area is missed.

A surgeon needs to be very thorough and meticulous with a systematic approach in looking for endometriosis. The surgeon also needs to understand the many different appearances of endometriosis and work with an excellent pathologist that does not overlook mild endometriosis. Some endometriosis is hard to see, but if the proper time is taken and magnification is used, it can be found. Wide excision is also important in removing "microscopic disease". In addition, scar tissue in an endometriosis patient is considered and treated as endometriosis until proven otherwise.

The visual appearance of endometriosis is highly varied. The lesions can be dark, pigmented lesions similar to a blood blister, or clear vesicular lesions, appearing like miniature water balloons. It can also look like specks of salt or even leathery scar tissue. The Pathologist is an unseen and largely unappreciated member of the endometriosis team. If the Pathologist is not meticulous in his or her examination of the tissue, then endometriosis is missed, the feedback to the surgeon is false, and over time, the surgeon will leave endometriosis lesions behind because the Pathologist has incorrectly told the surgeon that this appearance is not endometriosis, when in fact it is.

I work with, what I believe to be, one of the best endometriosis Pathologists in the country. He has a lot of respect for endometriosis and is very meticulous in looking for the disease. He takes extra steps in preparing the tissue that helps to maximize the chance of finding all the endometriosis that is present.

SURGICAL REMOVAL OF ENDOMETRIOSIS

Unfortunately, there seems to be much mis-information about the surgical treatment of endometriosis. Removal of the disease (endometriosis) from the body is the core concept in successful treatment. Techniques that remove endometriosis from the body are acceptable; techniques that do not remove the endometriosis from the body are not acceptable. The two techniques that remove endometriosis from the body include excision (cutting the tissue out) and vaporization (the endometriosis is vaporized; it is not burned). Coagulation or cauterization of the tissue with monopolar, bipolar instruments or underpowered lasers is unacceptable and not part of the EVE procedure. These latter techniques result in a high rate of recurrence and/or incomplete removal of the endometriosis.

The primary method required for treatment of endometriosis is wide excision, which removes all of the endometriosis including the microscopic endometriosis. Microscopic cells can spread up to an inch away from the visible endometriosis, just as microscopic cancer cells can spread from the main lesions and require wide excision for successful treatment.

Excision can be accomplished with scissors, the Carbon 13 CO₂ laser, harmonic scalpel, and high current pure cut electrosurgery. When used in a line the laser acts like a pair of invisible light scissors and can be used to perform excision. The Carbon 13 CO₂ laser has the advantage over the other methods in that it requires one less incision for the patient and frees up one of the surgeon's hands to operate more effectively.

The Carbon 13 CO₂ laser is a surgical tool that can also vaporize tissue (when the laser beam is moved back and forth over the tissue rather than in a single line). The energy from the Carbon 13 CO₂ laser is so focused that the water in the treated cell is instantaneously turned into vapor, carrying the heat away from the surrounding cells and suspending the solid particles of the cells in the vapor. The vapor appears as smoke, but is more like a fog (it is *not* smoke as the result of burning). This fog is a result of the solid particulates from the cell being suspended in the water vapor following vaporization. Because the energy of the Carbon 13 CO₂ laser is so focused, there is virtually no conduction of heat that could damage the remaining cells surrounding the vaporized cell.

I have heard and read references that laser *vaporization* burns tissue and thus should not be used. These claims are not based upon published scientific information. Physics and the principles of heat and energy delivery tell us that this is simply not true. While it is true that a Carbon 12 CO₂ laser can *coagulate* tissue, which does burn it (this is laser coagulation – not acceptable) but laser vaporization (laparoscopically, the Carbon 13 CO₂ laser works the best) does not coagulate or burn tissue. An understanding of physics and heat transfer tells us that laser *vaporization* does not burn tissue.

Excision and vaporization each have advantages and disadvantages. Excision takes out large amounts of tissue, but is less precise. Vaporization is precise and can remove cells layer by layer from the body, but is slower and works on a smaller area. Vaporization is

especially useful when removing endometriosis from vital structures such as blood vessels, the bowel, ureter and bladder and the fallopian tubes.

I believe that the EVE procedure is better than any other procedure, including excision alone, for complete removal of the endometriosis while minimizing the need for removing normal tissue. I believe that with the precision of the EVE procedure, I am able to save normal organs such as the ureter, bowel, ovary and fallopian tube – when the use of excision alone would potentially necessitate removal of all or part of these organs.

The EVE procedure offers the gentlest techniques that are most effective in removing endometriosis from the body with minimal damage to the normal surrounding tissue.