

Surgical Techniques Used in the Treatment of Endometriosis

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I will discuss the pros and cons of the various surgical techniques available for removal of endometriosis. It is important to remember that the goal in surgical treatment of endometriosis is the removal of all of the endometriosis. Realization of this goal is dependent upon the skill of the surgeon and is true no matter which surgical approach or instrument is used by the physician.

Basic Techniques

Basically, there are two acceptable ways a surgeon can remove or destroy the endometriosis – excision or vaporization. Excision means to cut around and remove. Vaporization is the process by which solid and liquid is turned into a gaseous form inside the treated cells. The surgical laser delivers a very concentrated packet of light energy which instantaneously boils the water in the cell (remember cells are mostly water with some proteins and other goodies). The water turns into steam and in the process expands the volume over a thousand fold resulting in water vapor and cellular proteins literally going up in smoke (actually, it's more like fog from the water vapor – there is no burning).

Coagulation is a burning or melting of the tissue. This historically has been a common approach to the treatment of endometriosis. Unfortunately, coagulation is ineffective in removing all of the endometriosis (whether by monopolar electrosurgery, bipolar electrosurgery, some types of lasers, or endocoagulator) and thus is not an appropriate approach for treating endometriosis.

The current surgical tools available to remove endometriosis include (1) scissors, (2) electrosurgery, (3) harmonic scalpel, (4) laser and (5) the endocoagulator. These tools can be used to excise (1,2,3,4), coagulate (2,3,some types of 4,5) or vaporize (Carbon 13 CO₂ laser and high pure cut electrosurgery). Keeping in mind the surgical goal of the treatment of endometriosis (complete removal of the endometriosis while maintaining as much normal tissue as possible), let's examine the advantages and disadvantages of the basic methods of removing endometriosis.

Excision

Excision offers several advantages and is the mainstay of successful surgical treatment of endometriosis. It can quickly remove large amounts of tissue and provides tissue for the pathologist to check under the microscope. It does not damage or alter the appearance of the underlying tissue. This is an important point for the following reason: Whenever tissue is removed, the remaining underlying tissue must be assessed to determine if all of the endometriosis was removed or if deeper disease is still present. Sounds pretty good so far, but what is the disadvantage of excision? The primary disadvantage of excision is that it is fairly non-selective. Endometriosis not only grows on the surface of the peritoneum (inside lining of the body) where it can be easily plucked off; it can also

invade the underlying tissue. This invasive endometriosis can send out fingers of endometriosis growing on and around vital organs (e.g. the bowel, blood vessels, ureter, bladder, etc.). If the endometriosis being removed is away from vital structures, then excision is a good approach. If the endometriosis is growing on vital structures, I feel excision is not always the best choice, as it may require the removal of normal vital structures. In my opinion, if endometriosis is aggressively removed using only excision, there will be a higher incidence of bowel resection, ureteral resection, etc. because "the endometriosis was so advanced", when in reality other techniques could have removed the endometriosis without having to resort to removing normal tissue.

Vaporization

Vaporization with the [Carbon 13 CO2 laser](#) offers several advantages. Vaporization is the most precise surgical tool available for the removal of endometriosis. Because the packet of light energy is so intense and focused, there is virtually no thermal damage to the tissue that is left behind. This allows the surgeon to remove the endometriosis layer by layer. The surgeon also has the advantage that the appearance of the remaining tissue is unchanged allowing an accurate assessment as to whether endometriosis is still remaining or if normal tissue has been reached. This is especially useful when working on the vital structures such as the bowel, ureters, blood vessels and others.

A good example is endometriosis involving the small bowel. It is virtually impossible to excise endometriosis from the small bowel. It's kind of like trying to remove chunks of old dried glue (endometriosis) from tissue paper (the bowel) with a pair of scissors, without damaging the tissue paper. A surgeon who only uses excision would likely be in the position of either having to leave endometriosis on the bowel or having to perform a segmental small bowel resection because "the endometriosis was so extensive".

The Carbon 13 CO2 laser is ideal for removing endometriosis from vital structures such as the bowel. With the laser, the surgeon can remove the endometriosis layer by layer leaving the underlying normal healthy tissue undamaged (the small bowel in this example). Another analogy of vaporization and excision is removal of an old finish from a piece of antique furniture. The old finish (paint or varnish) would represent the endometriosis and the piece of antique furniture, the normal body organ. Vaporization would be like using sandpaper (removing the endometriosis layer by layer) while excision would be like used a knife or scissors to remove the finish. Using the latter technique, one could see how pieces of the furniture might have to be cut out to remove the old finish or at times the carpenter may even tell the owner that the antique is so damaged that it can not be salvaged (hysterectomy).

Coagulation

Coagulation offers few advantages and in my opinion is one of the leading causes of under treatment and "recurrence" of endometriosis. First, coagulation is usually performed using an electrical current that is passed through the body. Coagulation is in essence an electrical burn that destroys the appearance of the tissue. As a result, it is impossible to tell what is normal and what is abnormal. Since the surgeon can't tell if all of the endometriosis has been destroyed, deep endometriosis can be left behind. In the

worst case, normal peritoneum heals over this area with endometriosis deep underneath. The next time the patient undergoes laparoscopy (because the pain is not gone or is back) she is told the laparoscope is normal and... well you know the rest. Second, I don't care how good the surgeon is; it is virtually impossible to tell how deep the tissue is coagulated (destroyed). The longer the tissue is coagulated, the deeper the damage but the degree of damage is not apparent for days or even a week. What this means in real life is that if the endometriosis is growing near a vital structure (say the bowel) the surgeon will usually err on the side of under treating. If the surgeon were to over treat, the thermal damage from the coagulation would damage the normal underlying vital structure, i.e. the bowel in this example. A week after surgery the bowel wall could die off resulting in a hole in the bowel with the bowel contents spilling into the abdomen and at the very least the patient becoming very sick. If you were to speak with the nationally recognized surgeons who treat endometriosis I do not think you would find any that use coagulation as their primary mode of removing endometriosis.

Endocoagulator

The endocoagulator, to the best of my knowledge, is not used at this time. The best way I can describe the endocoagulator is to envision cutting a 1/4" diameter piece out of the bottom of a clothes iron and glue it on the end of a stick. The endocoagulator is a 1/4" diameter probe (usually about a foot and a half long) that is heated on the end much like an iron. It is used laparoscopically to coagulate the endometriosis. This approach has the same pitfalls as coagulation with electricity as discussed above. The endocoagulator was initially introduced as a device to provide laparoscopic coagulation without the risks associated with electricity.

Harmonic Scalpel

The harmonic scalpel has been promoted as a method for treatment of endometriosis. It is a metal tipped probe that vibrates at a very high frequency creating sound waves that can cut or coagulate. This tool has been presented primarily as an alternative to electrosurgery (many surgeons are worried about the electricity arcing to the bowel and causing damage). The harmonic scalpel is another tool that can be used to treat endometriosis. While I have used this device, I do not feel that it offers a significant improvement to the combined use of electrosurgery and the laser.

I hope my description of the various surgical techniques has helped you gain a better understanding of the surgical treatment of endometriosis. I believe that the use of instruments that vaporize or excise are good techniques, while the use of instruments that coagulate or cauterize are bad surgical techniques. Excision is a primary surgical technique in removing endometriosis laparoscopically and in many cases is the only method needed to remove all of the endometriosis safely. Laser vaporization is an adjunctive treatment which provides the precision necessary in some of cases to completely remove the endometriosis while leaving the normal tissue and vital structures intact. I call this the [EVE procedure](#) (Excision and Vaporization of Endometriosis). While it is important to understand the various surgical techniques, the real issue is the surgeon's skill in identifying and removing endometriosis. Just because Doc Jones uses technique X does not make him or her a good endometriosis surgeon.

A good share of my practice is devoted to patients who have failed treatment with other physicians, so I admit to a certain bias regarding the overall treatment of women with endometriosis. It seems to me that too many women are not receiving adequate surgical treatment. All too often, endometriosis is under diagnosed and not completely removed at the time of surgery. At times I see endometriosis missed on the videotapes I review – it was that apparent.

On occasion, I operate on people who have recently undergone surgery elsewhere but whose symptoms persist. My surgical pathology report usually reveals endometriosis. Either the endometriosis is growing back in a matter of weeks or months, or it was not removed at the time of the previous surgery. Patients and physicians alike want to see endometriosis properly diagnosed and treated. As a group, women suffering from endometriosis can make a difference in the level of care that is provided by the medical community.

If all patients require that their physician videotape the entire surgery, I believe the level of care will rise, no matter which surgical technique is used. Video documentation of the entire surgery will provide accountability of the facts. If a surgeon states that he/she does not have the equipment to videotape the procedure you may want to think twice about proceeding with surgery. The good surgeons will be proud of the work they are performing and will be glad for all to see the "masterpiece" that they have created. Others will not be so inclined. Together you, as patients, can make a difference in the quality of care provided!