

An Interview with Stefanos Chandakas, M.D., M.B.A., Ph.D.



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Dr. Chandakas, please describe the progress of minimally invasive surgical techniques in gynecology over the last 5 years. In what areas have we seen the most progress?

Minimally invasive techniques have transformed women's surgeries in the past 5 years. Minimally invasive surgery (MIS) has rapidly moved from simple procedures done routinely in the early and mid-1990s, such as ovarian cystectomy and tubal ligations, to hysterectomies, fibroid removal, laparoscopic advanced pelvic-floor procedures, and procedures that are also done hysteroscopically, such as endometrial ablation, minimally invasive "tape" techniques, such as the transobturator approach for treating female stress urinary incontinence [TOT Tape, the Monarc™ system, American Medical Systems, Minnetonka, MN] and the Perigee™ and Apogee™ systems [also American Medical Systems]. We are rapidly moving to a combined technological and surgical evolution, which is typical of many specialties but is especially evident in gynecology. This will, hopefully, allow us, in the next 5–10 years, to be able to treat 95% of gynecologic pathology using minimally invasive techniques. By this I mean not only traditional laparoscopy and hysteroscopy but also a general approach toward less-invasive procedures, which will mean less hospital time for women, less trauma, and much better results.

A good example would be hysterectomies. In the US, about 650,000 hysterectomies are performed each year. At present, about 10% of these are done laparoscopically. However, in tertiary-care centers, this figure has reached more than 90%. The latest paper to come out of our unit at Princess Royal University Hospital in the UK, for example, reports that 91% of women treated with hysterectomy undergo laparoscopic outpatient, or day, procedures.¹ The difference between the 10% figure overall and the 90% achieved at some centers can be attributed to training in these new, complex procedures.

In the past, women needing a hysterectomy would have had a traditional laparotomy and a 3–4-day hospital stay. Now they undergo an average 45-minute laparoscopic keyhole procedure and can return home in 6 hours, nine out of ten times. We can all understand the benefits this offers women: less trauma; a shorter hospital stay; less time under anesthesia; and the ability to return to work in 1 week. This represents not only a major surgical evolution but also a macroeconomic evolution.

For most other procedures as well, such as myomectomies to treat fibroids, currently only about 5% are performed laparoscopically, but this number could easily reach nearly 50% in the next 5–10 years. Consider gallbladder removal, for example, which was originally performed laparoscopically in the early 1990s; the percentage done laparoscopically has now reached 85%. That is the figure gynecologists aim for with our procedures as well. The main challenge now is the issue of training—not so much the training of new doctors, but rather retraining of existing surgeons who need to change completely the techniques they have been using for the past 5, 10, 15, or 20 years. That kind of change is very difficult and takes a long time. It took 10–15 years for this type of transition to take place in gallbladder surgery but the average general surgeon now routinely performs laparoscopic gallbladder procedures. We can gradually reach this 85% goal in gynecology as well but it will probably take another 5–10 years.

Is the problem more the availability of training or the surgeons' willingness to take the time and have an interest in learning these new techniques?

I think it is a combination of the availability of equipment because you need specialized equipment to perform these procedures—specifically special forms of energy such as bipolar energy [PlasmaKinetic® bipolar forceps, Gyrus International, Minneapolis, MN], special monitors, and instruments such as the Lap Loop supracervical hysterectomy system [Medsys, Gembloux, Belgium], which is a monopolar machine that speeds up the operation by 20%. My feeling is that the rate at which these techniques become more commonplace results from a combination of how quickly the equipment becomes available and the difficulty of retraining doctors who may have little time and are not willing to take the risk of changing their current approach.

The way specialized units, such as our unit in the UK, have been able to achieve laparoscopic procedures approaching 90% for all gynecologic procedures is that, since 1989, when the unit was established by Professor John Erian, we have remained very flexible and open to new technologies that are safe and backed up by good research. We will eventually be able to offer all these procedures in local hospitals everywhere.

AU1

What, in your opinion, are presently evolving areas of growth in this subspecialty surgical arena?

I would identify three main areas in which gynecologic surgery will evolve. The first is the main problem for which women need gynecologic surgery—treating menorrhagia. We have gradually moved from the traditional treatment of menorrhagia, which comprised either conservative medical treatment or hysterectomy, to a large number of options for both the surgeon and the patient. In recent years we have seen numerous changes in this treatment area. Far fewer women now opt for hysterectomy, and gynecologists are now more inclined to highlight the benefits of

other therapies, such as medical therapy, endometrial ablation, or resection techniques, and, lately, laparoscopic hysterectomy—both total and subtotal.²⁻⁸

The second area that is rapidly evolving is urogynecology, which is relatively new and is combined with pelvic-floor repair procedures. In the past, these disorders were treated with major operations, such as cystocele repairs, rectocele repairs, hysterectomies, and colposuspensions. New materials developed to treat symptoms of stress incontinence, cystocele, or prolapse mainly include the different “tapes” [TOT Monarc, or the TVT[®] Urinary Incontinence System, Gynecare, Johnson & Johnson, Somerville, NJ], which can be used in a 10-minute procedure that requires about a 6-hour surgical visit.

The third area, which again relates to problems of infertility, menorrhagia, and pain, is endometriosis. This is a major problem experienced by nearly 30% of women, with or without symptoms. Apart from the traditional use of various forms of energy, such as lasers, bipolar energy, and monopolar energy, we now have new forms of energy that can be used for more delicate cases, such as treatment of bowel endometriosis or ureter endometriosis, areas that are very sensitive and very difficult for the average gynecologist to treat.

For example, we are using a new form of energy called the Helica[®] Thermal Coagulator [Helica Instruments, Riccarton, Edinburgh, Scotland] that combines low-pressure helium gas and low AC [alternating current] electrical power.⁹ The advantage of this energy is that it causes only 1–1.5-mm deep destruction of the tissue. This means that an average gynecologic surgeon can use it to treat areas of endometriosis that were traditionally not approached because of the high risk of injury. Numerous published papers have shown that, for endometriosis up to stage II, this is an amazing way to treat women and achieve a nearly 100% cure rate.⁹

These examples suggest that the MIS techniques being applied for gynecologic surgery could have broader applications in a variety of surgical areas. Has the field of gynecology pioneered these techniques? Or, has it, instead, largely borrowed and adapted the techniques from other surgical specialties? Or, in fact, is it a combination of the two?

History has shown that gynecologists performed most of the major breakthrough operations, for example, the first laparoscopic appendectomy, done in 1976. The first use of a laser was again by a gynecologist and the first laparoscopies, done in the late 1960s, were done by gynecologists. Although our specialty tends to be very open-minded about using new techniques, we are not spreading the word around within our own specialty. Gynecologists are responsible for most of the major breakthroughs in laparoscopic surgery in the last 30 years but general surgeons are making broader use of this technology at the moment. We are trying to change the mindset of the average gynecologist and encouraging our colleagues to embrace the new technology.

Are we moving in the direction of day surgery as the de rigueur standard for procedures such as supracervical hysterectomy?

We are definitely moving toward day surgery for many procedures. Apart from major surgery done to treat cancer, nine out of ten times, women can already be treated with day procedures. Returning once again to the main problem women encounter, menstrual problems, we now have three options to offer women, all of which have a cure rate of nearly 95%. The first is traditional medical therapy. When medical therapy is effective, it offers several advantages, including eliminating the need for surgery or even a minimally invasive procedure. However, it does not work in more than 20% of cases. For these women, we can offer a minimally invasive procedure such as endometrial ablation. Ablation procedures have grown rapidly in the past 15 years. The different techniques we use—such as balloon ablation, Thermachoice[®] [Gynecare, Ethicon, Johnson & Johnson, Somerville, NJ], the NovaSure[®] System [Cytyc, Palo Alto, CA], the Cavaterm[™] plus

System [Wallsten Medical Morges, Switzerland], cryotherapy, [Her Option,[®] AMS], and microwave therapy [Microwave Endometrial Ablation, Microsulis, Hants, UK]—all work by ablating the endometrium and offer a nearly 90% success rate in reducing menstrual problems. Fifteen (15) years ago, most of these women would have had a hysterectomy and we can now offer them a 10- or 15-minute procedure that can be done under local anesthesia.

AU2

Interestingly, even more major procedures for treating menstrual problems, such as hysterectomy, are now done on a day-surgery basis. In the UK, we have pioneered the supracervical laparoscopic hysterectomy.¹ This is not something new. A gynecologist started doing these operations in the early 1920s–1930s. Using an open surgical procedure, gynecologists would do a supracervical hysterectomy because it was a much safer and easier operation with minimal risk of ureter injury. The perceived problem at that time was the higher risk of cervical cancer in these women because the cervix was left behind. So the next generations of doctors, who were trained in the 1960s, 1970s, and 1980s, were brainwashed to believe that all women should have total hysterectomies due to the risk of cervical cancer. All of a sudden, all women were having total hysterectomies.

However, the subsequent data showed that the number of deaths from cervical cancer did not drop at all in the mid-1950s when women were undergoing total hysterectomies. The number of cervical cancers dropped in the late 1960s when the Pap smear test was introduced and it became possible to detect and treat cervical cancer at a much earlier stage. The change in cervical cancer rates had nothing to do with the operation. Additionally, the actual number of cervical cancers in the UK only dropped in the last 10 years, when the NHS [National Health Service] introduced a national obligatory cervical smear test every three years for the whole UK female population. The UK Department of Health, through the General Practitioners [GP] Primary Healthcare System, now ensures that every woman in the UK has the test done every 3 years.

Based on this data, about 4 years ago, our department decided that, since menorrhagia is not a problem of the cervix but rather a problem of the uterus, and, since we now know that leaving the cervix intact is safe and does not result in increased rates of cervical cancer, we were going back to supracervical hysterectomies. We can do these laparoscopically in, on average, a 30-minute procedure under a general anesthetic, and the women are discharged in 6 hours. At the same time, as we began making this change in the UK, others in the US were also taking this approach. The data to support the procedure is now coming out and is showing that this is an amazing operation.¹ Patient satisfaction is nearly 99%. Quality of life is much better, the risks for the women are nearly zero, the success rate is approaching 95%, and women can return to normal activities in a very short period of time.

What new technological advances are further improving this procedure?

I would identify three major technological improvements that have allowed us to do this operation quickly and safely. The first is the use of energy to coagulate the vessels and pedicles. In our unit we are using PlasmaKinetic[®] energy from Gyrus International [Minneapolis, MN] and sometimes the Johnson & Johnson Supershears.[®] Both of these instruments allow us to coagulate all the vessels and pedicles without the need for any suturing, making the procedure less traumatic for the woman, and safer and quicker.

Next, once we reach the cervix, using the Lap Loop system, which uses monopolar energy, we are able to amputate the uterus from the cervix in 5–10 seconds. This is another important step in the procedure and the technology is allowing us to do it more quickly, in a dryer environment, and more safely.

Thirdly, there have been huge advances in the area of morcelators, which are specialized pieces of equipment that facilitate removal of large organs from a 5-mm or 10-mm hole. During the past 5 years, this technology has rapidly evolved. We are using a disposable morcelator developed by Gynecare that allows us to morcelate the uterus in about 5–10 minutes, whereas a year or 2 ago it took 30–45 minutes.¹

Regarding the surgical treatment of endometriosis, are there any new technologies available to help improve surgical visualization or ablation/excision of endometriotic lesions?

Endometriosis is a very important issue, especially for younger women in their reproductive years. Apart from stage I endometriosis, which can be treated with a fairly basic surgical technique in a local hospital, other cases either need to be referred or are not treated properly. With the use of new technology, such as Helica energy, gynecologists will be able to treat more patients locally and safely and achieve a much better results without putting themselves or patients at risk. I expect that additional types of energy will be introduced in the coming years as well.

There are a myriad of technologies still evolving for the management of menorrhagia. Which appear to offer the most promising approaches?

In our unit we have tried many different ablation techniques and associated technologies and we have found pros and cons for every product on the market. We use mostly balloon ablation techniques, relying on either the Thermachoice or Cavaterm. We are also using the new Nova-Sure technology, which we find yields better results, particularly with local anesthesia.

Once again, we are moving in a direction in which traditional major surgery is now becoming day surgery and traditional day surgery of the 1990s is now becoming an office gynecological procedure under local anesthesia. We are able to perform ablative techniques under local anesthesia in the office. This is a substantial change.

The most important issue in selecting a technique is patient safety. With the availability of information and study data via the Internet and through resources such as the MAUDE library—which contains information from every company and doctor who has had complications with a particular type of instrument—the information to make an informed choice is easily accessible. This information, combined with the surgeon's skill level and expertise with a particular technique, and patient-specific safety concerns, contribute to the decision-making process in selecting a treatment approach.

There are several current options available to the average gynecologist for the management of urinary stress incontinence. Do you see these applications moving into the doctor's office?

This area represents another major change over the past 5 years. Until the late 1990s, the traditional operations involved colposuspension, which could also be done laparoscopically, although that is a highly skilled procedure and can still only be done at a few centers. Major operations, such as repair of the vaginal wall, which have traditionally required a hospital stay of 3 or 4 days and a 3–4-month recovery period, had only a 60%–70% success rate, with a 30% recurrence rate within 5 years.

In the last 5 years, we have seen a new generation of products become available to treat urinary-stress incontinence. For example, American Medical Systems introduced the Monarc tape, the Apogee Vaginal Vault Prolapse Repair System, and the Perigee Anterior Prolapse Repair System, and J&J/Gynecare offered the TVT Urinary Incontinence System. By “tape” I mean a tape we place between the woman's pelvis, the bladder, and the urethra.

These procedures typically have an 85% success rate in treating urinary stress incontinence. Most importantly, though, these are generally 10–15 minute procedures that can be done under local anesthesia. We are clearly moving to an office gynecology environment. We can now offer procedures that produce better results, and we can offer them using faster and safer techniques. A woman can have a tape procedure done and go home in 2–6 hours. These procedures are very easy to perform. They do, however, require structured training but the learning curve is much quicker than it is in the areas of endometriosis and advanced laparoscopic procedures (hysterectomies, sacrocolpopexies, etc.).

Is there still a role for a laparoscopic approach to treat this disorder?

Yes, if there are any major problems such as vaginal prolapse or anterior prolapse, they need to be repaired under general anesthesia and laparoscopy needs to be combined with other procedures (sacrocolpopexies, paravaginal repairs, etc.). For laparoscopic procedures such as paravaginal repairs or sacrocolpopexies, these operations would, again, have to be done in the operating room but, whereas they were once major operations, they can now be done on a day-case basis. These are very complicated procedures and will probably have to be done in specialty centers by highly trained surgeons for many years to come. Treatment for urinary-stress incontinence can be done in the office but more complicated procedures that involve pelvic-floor repair procedures should be done in a specialist hospital or surgical center.

Is there a need to continue to improve our minimally invasive surgery training methods of junior physicians as well as retraining existing surgeons as technology continues to evolve and surgical skill levels need to remain sharp?

Training is a major issue in gynecology. The main concern is not the junior doctors because they are being trained in this new environment. The main concern is the large number of existing doctors who have been trained in traditional surgical techniques. Laparoscopic surgery and traditional surgery are two totally different things. These doctors have a surgeons' minds and can certainly be trained in these new approaches but they still need to commit the time and effort to complete the training.

Training needs to evolve as a combination of performing live surgery and training on simulators. We are using simulators in our hospital, because doctors can work on the main components of the learning curve, which are hand/eye-coordination issues and learning how to use the instruments, on the simulators, and then applying what they have learned on patients, under supervision, until they have reached a certain level of proficiency, when they are allowed to operate alone.

Simulation is a major step for training. Robotics is also coming, although it is very expensive at present. Systems such as the *da Vinci*TM Surgical System [Intuitive Surgical, Sunnyvale, CA] will be used more and more in the next 5–10 years, both for training and for use in surgery as well.

The number of surgical procedures is decreasing due to the many other options we have to offer women. Thus, the challenge we face becomes a combination of fewer operations being done and more doctors needing to be trained in the newer techniques. Simulation, therefore, is an important training tool. Simulators will continue to improve as the demand continues to increase and computer technology evolves. The better the computers and the better the graphics, the better the simulators. Computer software has now been developed to monitor doctors' surgical techniques and progress and to monitor how they are evolving. The simulators will report on the strengths and weaknesses of individuals' skills, so we can guide them on how they need to improve to become better surgeons.

In your view, will robotic manipulation ever replace the "surgeon's hand"?

No, and I do not think the intent of these systems is to replace surgeons. I have been trained on the *da Vinci* system and it is intended to work with the surgeon to minimize the chance for a mistake. Robotics systems contribute to improved outcomes by combining huge amounts of data from the computer, high-end technology and the surgeon's mind. The robots cannot operate without the surgeon; it is the surgeon who makes the decisions and the surgeon who makes the moves, and it is the computer that works together with the surgeon for a better result.

The philosophy behind robotics is a combination of saving time and protecting the surgeon from making mistakes. Data have shown that in operations such as prostatectomy or mitral-valve replacement, although there is a long learning curve, the major complication rates drop dramatically—nearly 50%–60%—with robotics. That is a result of the combination of the surgeon's mind and the computer's technology and data.

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—Interview by Vicki Glaser

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