

Prof. Javier F. Magrina: robotic surgery in gynecology

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Editor's note

Given to the approval of FDA about the Da Vinci Surgical System for gynecological surgery, it has been rapidly adopted and it has already assumed as an important position at various centers where this is available. Prof. Magrina has been applying robotic techniques for gynecologic conditions, using the robotic systems Zeus and DaVinci, since February 20, 2003. In 2018, Prof. Magrina with Dr. Alaa El-Ghobashy, Dr. Thomas Ind and Dr. Jan Persson released a textbook of Gynecologic Robotic Surgery, which was designed to provide a detailed guide to common robotic gynecologic procedures for the purpose of helping novice surgeons in their transition to robotic surgery and seasoned robotic surgeons to refine their surgical technique and expand their repertoire of robotic procedures. To benefit the young surgeons and to further the communication in the field, we tried to approach Prof. Javier F. Magrina to conduct an interview. In this interview, Prof. Javier F. Magrina has shared with us the stories and the features of the book, the Gynecology department and the training of robotic surgery in gynecology in Mayo, as well as his experience in this field.

Expert's introduction

Dr. Javier F. Magrina (*Figure 1*) received his medical education at the University of Barcelona Medical School and completed a Residency in Obstetrics and Gynecology at Mayo Clinic Rochester and a Fellowship in Gynecologic Oncology at the University of Kansas Medical Center. He was Chair of the Department of Gynecology at Mayo Clinic Arizona from 1988 until 2005. He is Professor of Obstetrics and Gynecology at Mayo Graduate School of Medicine and Director of Minimally Invasive Fellowship at Mayo Clinic Arizona.

He has received numerous honors and awards, among them the Barbara Woodward Lips Professorship at Mayo Clinic, the Medal of Dr. Jose Trueta given by the Spanish Government, the COBRA Award by The Netherlands



Figure 1 Javier F. Magrina, MD.

Obstetrical and Gynecological Association, the Santiago Dexeus Font Foundation award, Outstanding Faculty Member Award by the Mayo Clinic, Best Speaker award by the Mayo School of Continuous Professional Development, Course Director award for 21 consecutive years by the Mayo School of Continuous Professional Development, and Distinguished Surgeon Award by the Society of Gynecological Surgeons in USA. He has received honorary membership in Gynecological Societies in USA, Portugal, Spain, Peru, Panama, and Columbia. He has trained over 60 gynecologic oncologists from Spain during the past 32 years. The Spanish alumni have created JMA, Javier Magrina Alumni, a group dedicated to continue advancing surgical techniques and maintain surgical excellence. The group has already had two meetings.

He has served as President of the AAGL and President of the FMIGS board (Fellowship in Minimally Invasive Gynecological Surgery).

About the book—Textbook of Gynecologic Robotic Surgery

GPM: *What sparked your interest in writing the Textbook of Gynecologic Robotic Surgery?*

Prof. Magrina: There was no such book available and there was enough evidence about the results which made it worthwhile to proceed.

GPM: *What are the key features of this book?*

Prof. Magrina: To provide an up to date information on the results of robotics in Gynecology for benign and malignant conditions.

GPM: *In the book, you contributed a chapter “Robotic Debulking Surgery in Advanced Ovarian Cancer”. Can you please introduce this chapter? And what are the indications of robotic debulking surgery in advanced ovarian cancer?*

Prof. Magrina: The most important aspect is patient selection. In the review of our experience about 20–25% of patients with advanced ovarian cancer are candidates for a robotic approach. What is interesting is that the same percentage of patients with unresectable ovarian cancer at diagnosis can be operated by robotics after neoadjuvant chemotherapy. Candidate patients have disease localized in one or two areas with no peritoneal metastatic implants. Although 20–25% may appear low it is simply because in our practice we do not consider worthwhile to proceed with debulking unless a complete tumor resection can be accomplished.

GPM: *Dr. John Shepherd and Dr. Marielle Nobbenhuis raised a question at the very beginning in the book “is the development of robotic surgery evolution or revolution?”. What are your insights on this question?*

Prof. Magrina: Based on the rapid increase of robotic hysterectomy in a short period of time and compared with the very slow increase of laparoscopic hysterectomy, there is no doubt it was a revolution. Actually the increase of robotic hysterectomy is similar to the use of the internet after its introduction. Once robotic surgery had been demonstrated feasible and safe and with similar recurrence and survival for endometrial and cervical cancer, it was time to apply for selected patients with ovarian cancer. First it was for

staging patients with early disease but later with more extensive disease. The benefits of robotics disappeared, and were worse than laparotomy, when patients required three or more major procedures to achieve complete tumor resection, such as hysterectomy plus resection of sigmoid, small bowel and diaphragm. These patients need a laparotomy not robotics.

GPM: *Did you meet any difficulties or impressive moments during the preparation of this book? Do you have a plan for a new edition in the future?*

Prof. Magrina: All co-authors and co-editors were most helpful in providing the chapters on time. There is already a new da Vinci system since the writing of the book, and another one which is not approved for Gynecology yet, and there are other companies with new systems in development which will require an update in two years.

A close look at robotic surgery in gynecology

GPM: *The first Da Vinci robot was applied in cardiovascular surgery, while it is now not so popular in cardiovascular surgery comparing with gynecologic surgery. What makes it so popular among gynecologists, in your opinion? What kind of procedures in gynecology might benefit from robotic assistance in your view?*

Prof. Magrina: Simply because we have many more gynecological procedures suitable for robotics as compared to cardiovascular surgery. In Gynecology we have shown and published robotic advantages over laparoscopy for radical hysterectomy, endometrial cancer, obese patients, and endometriosis stage III and IV.

GPM: *Since February 20, 2003, you have been applying robotic techniques for gynecologic conditions, using the robotic systems Zeus and DaVinci. And then what your results have shown in term of operation times, outcomes hospital stay, and etc. by DaVinci systems? Could you briefly introduce your team, e.g., your colleagues, your research programs, operations?*

Prof. Magrina: We had only performed 66 gynecological procedures with Zeus when Intuitive Surgical Inc. purchased Computer Motion and removed Zeus from the market.

We did not have time to compare Zeus with laparoscopy



Figure 2 Prof. Magrina's team (from left to right: upper row: Javier F. Magrina, MD, Paul M. Magtibay, MD, Jeffrey C. Cornella, MD, Johnny Yi, MD and lower row: Khristine Butler, MD, Megan Wasson, DO).

because we were still in our learning curve.

Our Gynecology department is divided into medical and surgical. There are six surgeons, all subspecialty trained, oncology, urogynecology, and minimally invasive surgery. With the da Vinci system, starting in March 2004, we proceeded to analyze our results comparing with laparoscopy and laparotomy for benign and malignant gynecological conditions once our learning curve was over. We found advantages of robotics for radical hysterectomy over laparoscopy [shorter operating time], for endometrial cancer [three times lower conversion rate], for obese patients [the operating time did not increase with the BMI at a difference than laparoscopy], and for stage III and IV endometriosis [a shorter operating time as compared to laparoscopy] (Figure 2).

GPM: *Would you like to introduce us a recent research that you are involved in? What is your focus in the future?*

Prof. Magrina: We have just completed and published a study on the results of robotic resection of diaphragm metastases for ovarian cancer. The perioperative outcomes were not inferior to laparotomy, and the recurrence rate was similar as to the recurrence in other areas of the pelvis or abdomen, we are in the process of submitting a manuscript and a video detailing our technique. We hope this will encourage other gynecologic oncologists to use the robotic approach for these patients.

GPM: *Do you think that surgeons should be skilled at abdominal and laparoscopic approaches for a specific procedure before undertaking robotic approaches? What major challenges have you observed when you were struggling with the learning curve from conventional laparoscopy to robotic surgical system?*

Prof. Magrina: Agree. What would happen if they only know how to do a procedure robotically and there is a robotic malfunction or need for conversion? Their only approach would be a laparotomy.

There is a very easy transition from laparoscopy to robotics, because robotics makes minimally invasive surgery easier. Whereas, there is a big transition from laparotomy to laparoscopy, with a long learning curve. The transition is easier from laparotomy to robotics, and even easier from laparoscopy to robotics.

GPM: *Could you introduce the study program of minimally invasive gynecologic surgery particularly the robotic surgery at Mayo Clinic?*

Prof. Magrina: We offer a two year AAGL fellowship in minimally invasive surgery. New fellows practice intensely in the robotic simulator and in the laparoscopic lab for the first six weeks and subsequently on a regular basis. We published the results after one year of fellowship as compared to four year residents: the surgical time to accomplish objectively measured tasks was three times faster (1).

GPM: *How many cases of robotic surgery and conventional surgery you now operate per year?*

Prof. Magrina: I have a higher number of robotic operations because most are for advanced endometriosis and gynecologic cancer, which are excellent applications for the robotic system.

GPM: *What are the hot topics of robotic surgery in gynecology? Why?*

Prof. Magrina: The major discussion around robotics has been, and is, the excessive cost, specially as compared to laparoscopy. This makes it difficult to recommend it for all surgeries. Laparoscopy provides patient benefits, robotics provides patient benefits and surgeon benefits. Because it

facilitates the operations while providing surgeon comfort, many laparoscopists who could not advance to complex operations by laparoscopy can do them with robotics. The explosion of robotic hysterectomy in a short period of time is a demonstration of this fact.

GPM: *The ultimate goal of robotics is to allow surgeons to perform difficult procedures with a level of precision and improved clinical outcomes not possible by conventional methods. From your practices and results, to what extent has it fulfilled so far? What is your expectation of robotic surgery in the field of gynecological surgery?*

Prof. Magrina: The main indications of robotics are for surgeons not capable to operate by laparoscopy. For equally competent surgeons, the main indications are advanced pelvic endometriosis, gynecologic cancer, and sacrocolpopexy.

In years to come with more robotic systems available and lower cost, the number of laparoscopic operations will decrease significantly.

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