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Postgraduate Manual of OBSTETRICS & GYNECOLOGY for Practical Examination



Sumita Mehta
Sandhya Jain
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Foreword
Amita Suneja

3rd Edition

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Contents

1. **History Taking and Examination of Long/Short Cases 1**
   Shalini Rajaram, Om Kumari, Namita Grover, Neerja Goel

2. **Immunization in Pregnancy 17**
   Pakhee Aggarwal, Sandhya Jain

3. **First- and Second-trimester Aneuploidy Screening 23**
   Astha Srivastava, Sandhya Jain

4. **Fetal Monitoring 29**
   Sruthi Bhaskaran, Himsweta Srivastava, Shalini Rajaram

5. **Maternal Pelvis and Fetal Skull 44**
   Himsweta Srivastava

6. **Normal Labor 50**
   Rashmi Malik, Annu Kumari

7. **Abnormal Presentations 67**
   Smiti Jain, Amita Suneja, Anita Matai

8. **Instrumental Delivery 86**
   Sumita Mehta, Sonam Singh

9. **Obstetric Procedures 96**
   Abha Sharma, Sruthi Bhaskaran

10. **Obstetric Drills 108**
    Upasana Verma, Sumita Mehta

11. **Maternal Resuscitation 120**
    Rashmi Salhotra

12. **Neonatal Resuscitation 126**
    Rajeev Kumar Thapar

13. **Instruments 149**
    Shalini Rajaram, Sandhya Jain, Om Kumari, Vashudha Gupta

14. **Endoscopy: Laparoscopy and Hysteroscopy 172**
    Sumita Mehta, Shalini Rajaram, Latika Chawla

15. **Robotic Surgery in Gynecology 187**
    Latika Chawla, Shalini Rajaram

16. Incisions **194**
Sonia Chawla, Bindiya Gupta

17. Sutures, Needles, and Meshes **203**
Rachna Agarwal, Penzy Goyal

18. Disease-specific Investigations in Obstetrics and Gynecology **218**
Sumita Mehta, Rupali Bhatia

19. Obstetric Specimens **233**
Pikee Saxena, Archana Mishra, Saloni Chadha

20. Gynecology Specimens **249**
Ruchi Srivastava, Shailza Vardhan, Neerja Goel

21. Imaging: Hysterosalpingogram, X-ray, and CT Scan **280**
Himsweta Srivastava, Richa Aggarwal, Vineeta Rathi

22. Ultrasonography in Obstetrics **298**
Vishal Gupta, Ruchi Narayan

23. Drugs in Obstetrics and Gynecology **310**
Sandhya Jain, Nazia Parveen, Astha Srivastava, Sumeet Singla

24. Prescription Writing **334**
Neerja Goel, Anshuja Singla, Ankita Jain

25. Contraception **348**
Rashmi Malik, Annu Kumari

26. Medical Termination of Pregnancy Act with Amendments **371**
Richa Sharma

27. Consent in Family Planning: Medicolegal Aspects **377**
Rashmi Gupta

28. Definitions **394**
Archana Mehta, Shivangini Sahay, Neerja Goel, Anshuja Singla

29. Anesthetic Techniques **406**
Manpreet Singh, Namita Grover

30. Fluids and Electrolytes **415**
Manpreet Singh, Namita Grover

31. Assisted Reproductive Technologies and Surrogacy **428**
Vikas Yadav, Neerja Goel

32. Principles of Counseling in Obstetrics and Gynecology **438**
Surinder Singh Gulati

33. Normal Values of Investigations Related to Obstetrics and Gynecology 455
Samta Gupta

34. Classification in Obstetrics and Gynecology 459
Priyanka Mathe, Neha Kumar

35. New FIGO Classification of Gynecological Cancers 471
Shelly Agarwal, Mayuri Ahuja

Index 483

15

CHAPTER

Robotic Surgery in Gynecology

Latika Chawla, Shalini Rajaram

INTRODUCTION

In the ever-evolving landscape of medical science and technology, robotic surgery has emerged as a ground-breaking advancement, transforming the way surgical procedures are conducted. Robotic surgery is a form of minimally invasive surgery that uses robots to perform surgical procedures. The integration of robotics into the surgical domain represents a paradigm shift, offering unprecedented precision, flexibility, and control to surgeons. This cutting-edge technology not only enhances the capabilities of medical professionals but also holds the promise of improved patient outcomes and a new era in healthcare.

HISTORY OF ROBOTIC SURGERY

The history of robotic surgery dates back to the mid-20th century, with significant developments occurring in the last few decades.

- Idea of using robots in surgery was first conceptualized in the 1950s.
- In 1960, the first robot-assisted surgical procedure was performed using "Arthrobot", a device designed for orthopedic procedures.
- In 1985, PUMA 560, a robotic surgical arm, was used for taking neurosurgical biopsy.
- Automated Endoscopic System for Optimal Positioning (AESOP) introduced in the early 1990s was a robotic arm designed to hold and position an endoscope during surgery, providing surgeons with better visualization. AESOP was modified and later relaunched as the ZEUS.
- da Vinci Surgical System, developed by Intuitive Surgical, was approved by the Food and Drug Administration (FDA) in 2000. It marked a significant breakthrough in robotic surgery. The da Vinci System has remained dominant for over a decade. It is a three- to four-armed system, with a central arm holding a binocular lens that allows for 3D vision. Surgical instruments are articulated at the wrist to provide 7 degrees of freedom.

What are the types of robotic surgical systems?

- *Active systems* essentially work autonomously (while remaining under the control of the operative surgeon) and undertake preprogrammed tasks (e.g., PROBOT, ROBODOC).
- *Semiactive systems* allow for a surgeon-driven element to complement the preprogrammed element of these robot systems.
- *Master–slave systems* are entirely dependent on a surgeon's activity. The surgeon's hand movements are transmitted to laparoscopic surgical instruments, which faithfully reproduce surgeon's hand activity but intracorporeally (e.g., da Vinci, ZEUS).

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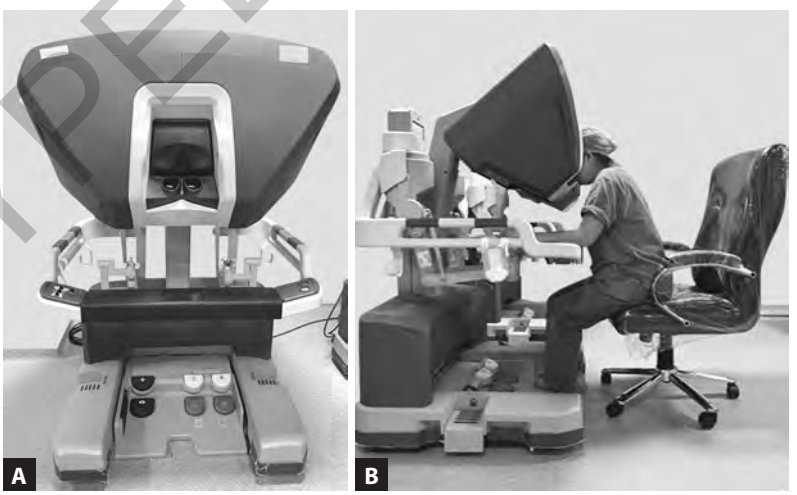
The da Vinci Xi Surgical System is the latest iteration of the da Vinci robotic surgery platform. It builds upon the success of its predecessors, incorporating advancements in technology to enhance surgical capabilities. This chapter will describe practical aspects of robotic surgery in gynecology using the da Vinci Xi Surgical System.

What are the components of the da Vinci Xi Surgical System?

- *Surgeon console:* The surgeon controls the robotic arms while sitting comfortably at a console located at a distant site in the operating room. The console provides a 3D high-definition view of the surgical site and allows the surgeon to manipulate the camera and instruments with hand and foot controls. The surgeon can also modify the cautery settings sitting at the console **(Figs. 1A and B)**.
- *Patient cart:* This is positioned near the patient during surgery and holds the four robotic arms through which instruments and endoscope are inserted into the patient's body. The cart has a "*Boom*" which is an adjustable rotating support structure that moves the arms into position; a "*Column*" that moves the boom up or down to adjust the height of the system; a "*Helm*" that enables the cart drive functions, boom positioning, and provides a touchpad for system messages and guided menu options; and a "*Base*" that includes a motorized cart drive for positioning and transportation of the cart. The arms are thin and long and offer a greater range of motion. Each arm has a *"Port Clutch"* that controls gross arm movements and raises the boom and an *"Instrument Clutch"* that repositions arm around remote center and advances/retracts the scope and instrument **(Figs. 2A and B)**.
- *Vision cart:* It consists of a 24-inch HD monitor with touchscreen and streamlined controls, an integrated ERBE VIO® *dV* electrosurgical unit, an endoscope controller where the endoscope is connected, and a video processor with a USB port **(Fig. 3)**.
- *Endo-wrist instruments:* These have a unique design that allows for 7 degrees of motion and 90 degrees of articulation, mirroring the natural movements of



Figs. 1A and B: (A) Surgeon console; (B) Surgeon sitting comfortably at console while operating.
(For color version, see Plate 7)

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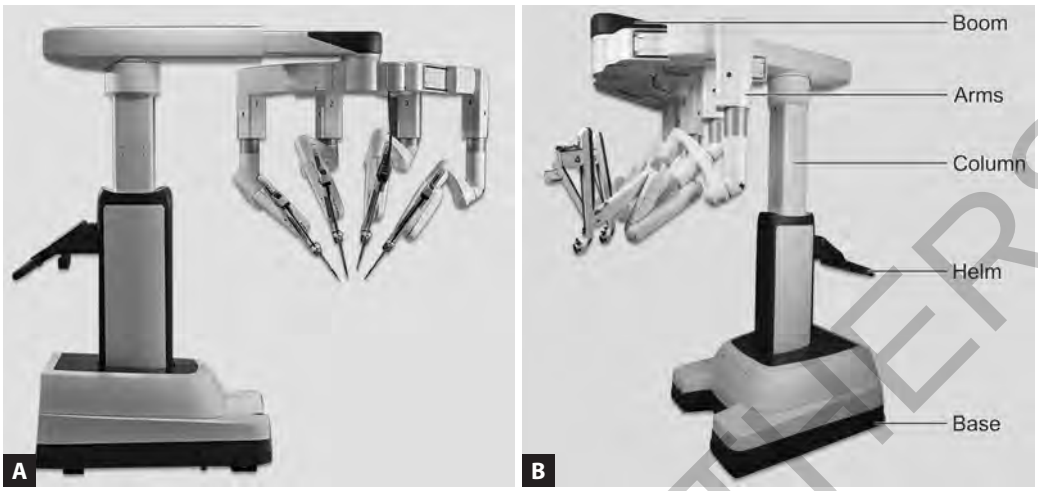

Figs. 2A and B: (A) Patient cart; (B) Components of patient cart. *(For color version, see Plate 8)*

human arm and wrist. Movements are under fingertip control of the surgeon sitting at the console with scaling down of motion and reduction in the tremors. The following endo-wrist instruments are available:

- Bipolar cautery instruments [fenestrated forceps **(Fig. 4A)**, Maryland forceps, curved dissector, long grasper, microforceps, vessel sealer]
- Monopolar cautery instruments [scissors **(Fig. 4B)**, hook, spatula, hot shears]
- Harmonic ace curved shears
- Needle driver **(Fig. 4C)**.



Fig. 3: Components of vision cart.
(For color version, see Plate 8)

Discuss the steps in robotic surgery.

Anesthesia: Preoperative fitness remains the same as required for laparoscopic surgery. Robotic surgical procedures are done under general anesthesia. Airway pressure should be maintained to ≤25–30 cm of H_2O.

Patient positioning: Steep Trendelenburg position is used for gynecological surgery. Arms are tucked in at the patient's sides. Pressure points should be padded to prevent injuries to peripheral nerves and bony prominences. Cross-body taping may be used to prevent the patient from sliding on the OT table during surgery.

Marking and creation of ports: The center port (C) is marked in the midline, minimum of 15 to maximum of 20 cm from the pubic symphysis. Pneumoperitoneum is created. The center port is created using a 8- or 12-mm robotic trocar and cannula **(Fig. 5A)**, through which an 8- or 12-mm endoscope is

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inserted. Lateral ports should be marked after insufflation and are always created under vision. Lateral ports (L1 and L2), 8 mm in size, should be created 6–8 cm lateral to the center port on either side at the same horizontal level. If an extra robotic arm is to be used, the fourth port (L3) can be created 6–8 cm away from either L1 or L2 at the same horizontal level. The assistant port (L4) is either a 12- or an 8-mm robotic port. This is also created 6–8 cm away from either L1 or L2 at the same level. The authors prefer to have the assistant port at a slightly lower level **(Fig. 5B)**.

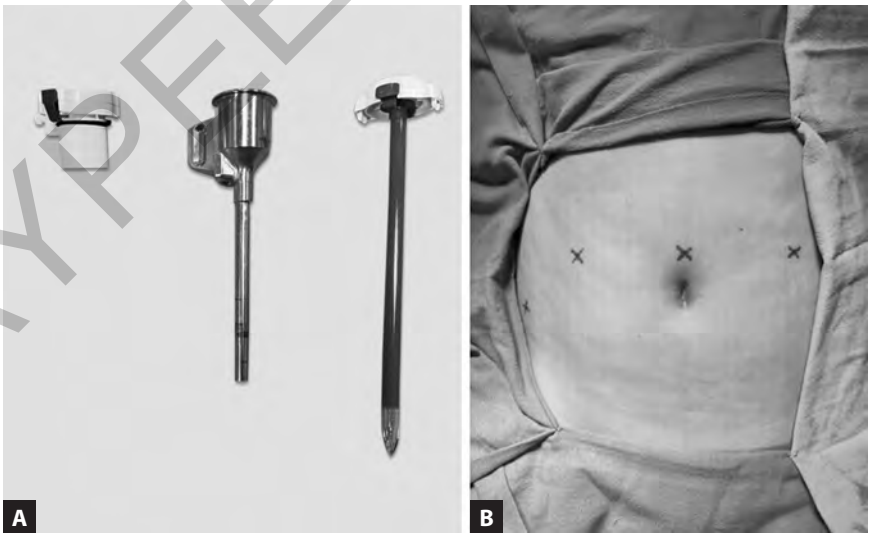
Most traditional robotic gynecologic surgeries can be performed using three robotic arms (C, L1, L2) and the assistant port L4.

Inflating pneumoperitoneum: Creation of pneumoperitoneum by insufflation of carbon dioxide (CO_2) is needed to open space in the abdomen for visualization and surgical manipulation. CO_2 insufflation can be performed using a Veress needle. The gas source is connected to the needle or port; intra-abdominal pressure (IAP) is monitored as gas is insufflate, aiming for a pressure ≤15 mm Hg (ideal around 12–13 mm Hg to minimize physiologic effects).

Docking and targeting: After proper positioning and insertion of ports, the patient cart is brought to the side of the patient. Using a laser line, the cart is aligned to the abdomen and the ports **(Fig. 6A)**. Docking is the process of attaching the robotic arms to the trocar



Figs. 4A to C: (A) Fenestrated bipolar forceps; (B) Monopolar scissors; (C) Needle driver. *(For color version, see Plate 8)*



Figs. 5A and B: (A) Robotic trocar and cannula 8 mm; (B) Port placement in robotic gynecological surgery. *(For color version, see Plate 9)*

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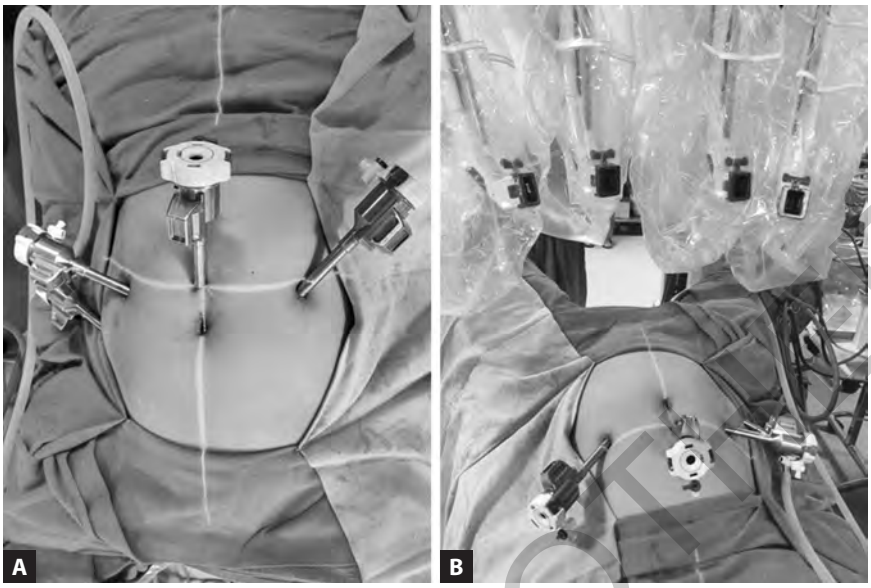

Figs. 6A and B: (A) External targeting using laser line; (B) Robotic arms draped and ready for docking. *(For color version, see Plate 9)*

already in place in the patient's abdominal wall **(Fig. 6B)**. The assistant's trocar is not docked. The endoscope is inserted most commonly through the center port (although in Xi, any arm can be used for the camera). An internal targeting system enhances the height of the boom and aligns the robotic arm along the operating field, preventing them from colliding with each other and allows for a smooth procedure. Endo-wrist instruments on either side are then introduced under vision. The cautery leads are connected to the instruments. Once docking is complete, the position of the patient should not be changed to avoid injury to the abdominal wall.

Surgeons can after this begin surgery from the console.

What are the indications for robotics in gynecologic surgery?

- *Procedures that require suturing:* Sacro colpopexy, myomectomy, tubal recanalization
- *Procedures requiring dissection:* Deep infiltrating endometriosis, lymphadenectomy, patients with previous abdominopelvic surgeries where adhesions are expected
- Procedures in obese patients
- *Procedures with large pathology:* Hysterectomy in large size of uterus, myomectomy in large fibroids.

How is tissue retrieval of specimens done after robotic surgery?

Large uterine specimens can be removed by coring or cold knife morcellation through the vagina. Robot allows for minimally invasive hysterectomy in larger uteri; however, removal of the large specimens may take up a lot of time, sometimes more time than the hysterectomy itself. Fibroids after myomectomy can be removed either by colpotomy or may be put in a bag and removed by in-bag cold knife morcellation by extending the center port. The robot will have to be undocked for the same.

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What are the advantages of robotic surgery over laparoscopic surgery?

Robotic surgery and laparoscopic surgery are both minimally invasive surgical approaches that offer several advantages over traditional open surgery. While they share some similarities, robotic surgery has distinct advantages over conventional laparoscopic surgery including the following:

- *Enhanced dexterity and precision:* Robotic arms can mimic the wrist-like movements of a surgeon's hands, with a high degree of accuracy and 7 degrees of freedom.
- *Improved visualization:* Robotic surgery provides a three-dimensional, magnified view of the surgical site, offering enhanced depth perception and visualization.
- *Easier learning curve:* Learning curve for robotic surgery is considered to be easy and much smoother as compared to laparoscopic surgery.
- *Reduced surgeon fatigue:* Robotic systems can filter and scale a surgeon's hand movements, reducing the physical strain on the surgeon during long and intricate procedures. This can contribute to less fatigue and allow for longer procedures.
- *Improved ergonomics:* Robotic systems allow surgeons to operate from a console in a comfortable and ergonomically favorable position. This can reduce the physical strain associated with prolonged periods of surgery.
- *Expanded range of motion*: Robotic instruments can rotate 360° providing a wider range of movements than conventional laparoscopic instruments. This can be especially advantageous when working in confined spaces or manipulating organs in challenging anatomical locations and provides ease in suturing (like in myomectomy).
- *Camera:* It is under control of the main surgeon.
- *Shorter hospital stay and quicker recovery:* Minimally invasive surgeries, whether performed with laparoscopic or robotic techniques, generally result in shorter hospital stays and quicker recovery times compared to open surgery. However, some studies suggest that certain robotic procedures may have a slightly faster recovery compared to traditional laparoscopy in specific cases.

Enumerate the disadvantages of robotic surgery over laparoscopic surgery.

- *Cost:* Robotic surgery systems are expensive to acquire and maintain. The initial investment, as well as ongoing costs for maintenance and training, can be significantly higher than those associated with laparoscopic equipment.
- *Training and learning curve:* Robotic surgery requires specialized training for surgeons to operate the robotic system effectively.
- *Size and port placement:* Robotic system itself takes up space in the operating room limiting the available space for the surgical team and instruments.
- *Dependency on technology:* Robotic surgery relies heavily on technology, and technical malfunctions or system failures/errors can occur. In such cases, there may be a need to quickly switch to an alternative method, such as open surgery or laparoscopy.
- *Lack of tactile feedback:* One of the drawbacks of robotic surgery is the lack of tactile feedback for the surgeon. In laparoscopic surgery, the surgeon can feel resistance and pressure, providing a sense of touch. Robotic systems typically do not provide this tactile feedback, and

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surgeons must rely on visual and auditory cues.

- *Procedure time:* Some studies suggest that robotic surgery may take longer than laparoscopic surgery, although in the author's experience, the same surgery may be done quicker with robotic surgery as compared to laparoscopic surgery. Docking is an extra step that may increase the time of surgery as compared to laparoscopy, but with time and experience docking time may be reduced to only a few minutes.

SUGGESTED READING

1. Leal Ghezzi T, Campos Corleta O. 30 years of robotic surgery. World J Surg. 2016;40(10):2550-7.
2. Sood A, Jeong W, Ahlawat R, Campbell L, Aggarwal S, Menon M, et al. Robotic surgical skill acquisition: What one needs to know? J Minim Access Surg.2015;11(1):10-5.

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