

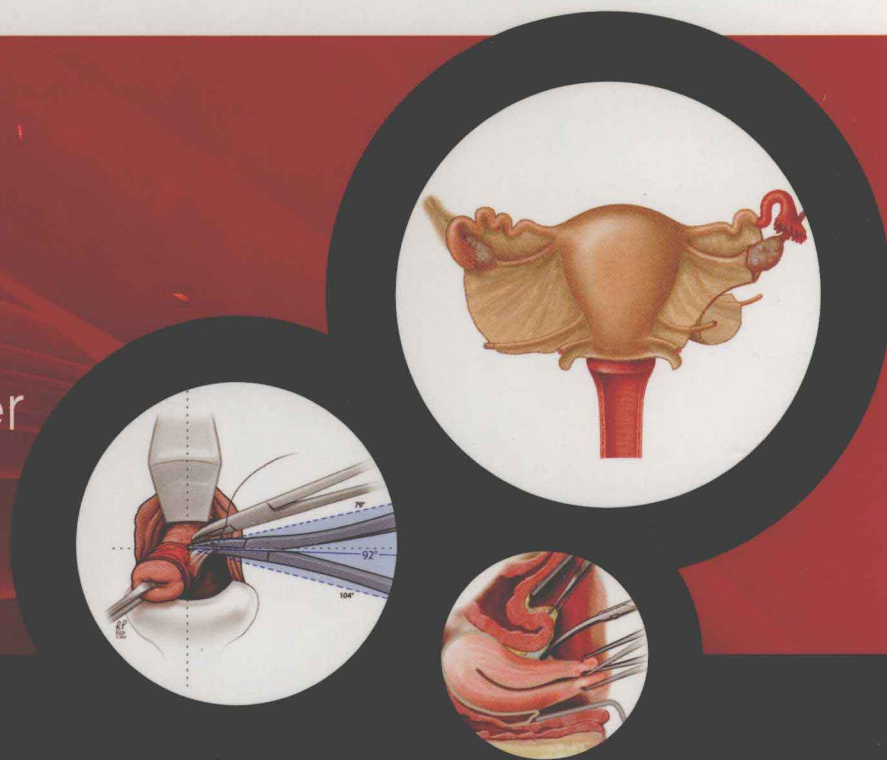
# FEMALE PELVIC SURGERY VIDEO ATLAS SERIES

MICKEY KARRAM, SERIES EDITOR



## Hysterectomy for Benign Disease

Mark D. Walters  
Matthew D. Barber



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Mickey Karram, Series Editor

# Hysterectomy for Benign Disease

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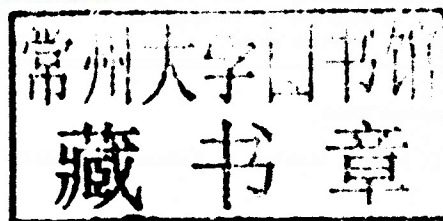
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To ginny, with my everlasting love

-Mark D. Walters

To my wife, Heather, for all her love and support, and to my children,  
Samantha, Sydney, and Adam, who fill me with pride and joy

-Matthew D. Barber



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# Preface



The knowledge of and ability to do uterine surgery and hysterectomy are defining aspects of the specialty of gynecology. For much of the 20th century, hysterectomy was the only effective option for treating many gynecologic conditions. Fortunately, the last half century has brought considerable advances in the medical and surgical management of benign gynecologic conditions. An expanding number of medical treatments, office procedures, and uterine-sparing surgical techniques are available to the modern gynecologist to safely and effectively treat most common gynecologic conditions, making hysterectomy with its increased risks less necessary. This has resulted in a steady and appropriate decline in the number of hysterectomies performed in the United States since the mid-1970s. That said, hysterectomy still remains the second most frequent major operation performed on U.S. women, following only cesarean section. More than 600,000 hysterectomies are done each year in the U.S. with an estimated annual cost of more than \$5 billion. Approximately 23% of U.S. women today have had a hysterectomy. These imposing statistics underscore the great need for continued and up-to-date education on this important subject.

Hysterectomy remains a popular and important option in spite of the growing number of alternative therapies because it is a highly effective and permanent treatment for many of the most common benign gynecologic conditions including abnormal uterine bleeding, uterine fibroids, dysmenorrhea, and endometriosis. It is the procedure of choice for these conditions when other less invasive options have failed. Additionally, technologic advances and surgical innovation have increased the availability of minimally invasive options to hysterectomy, including vaginal, laparoscopic, and robotic approaches, resulting in decreasing risk and an improved patient experience. For these reasons, hysterectomy will remain an essential gynecologic treatment for the foreseeable future.

A number of excellent and distinguished texts and atlases of gynecologic surgery currently are available. What makes this book unique is its specific and comprehensive focus on hysterectomy. Our goal for this video atlas is to provide a comprehensive clinical resource for the gynecologic surgeon and obstetrician-gynecologist trainee, addressing this most fundamental of gynecologic procedures. With this goal in mind, we have included a broad array of clinically relevant hysterectomy-related topics, including a thorough discussion of the surgical techniques of abdominal, vaginal, laparoscopic, and robotic hysterectomy and the many hysterectomy alternatives. We include many concise real-life case presentations and discussions with corresponding narrated videos.



Also included are interesting discussions of the historical evolution of uterine surgery and hysterectomy, pelvic anatomy related specifically to hysterectomy, the changing trends of hysterectomy and its indications, an in depth discussion of the pros and cons of different routes of hysterectomy and oophorectomy, an evidence-based discussion of preoperative and postoperative care, and strategies for preventing and managing hysterectomy complications.

Given the decline over the last several decades in the number of hysterectomies and other surgical cases available to residents, coupled with the increase in the number of surgical alternatives for managing gynecologic disease, there is a clear need for more effective and efficient methods for teaching gynecologic surgery. The final chapter of this text is dedicated to teaching and learning gynecologic surgery, a topic rarely found in surgical texts in spite of its importance. The chapter includes discussions of modern learning theory as it applies to teaching surgical techniques and the use of surgical simulation and mental imagery to improve outcomes. A description and video on giving effective feedback to trainees about their performance will be of value to both OB/GYN faculty who train residents and practicing surgeons learning a new technique.

The format of the *Female Pelvic Surgery Video Atlas Series* with its combination of case-based presentations, detailed topic discussions, numerous illustrations, and hours of complementary video footage is an ideal way to present all of these topics and make them readily accessible. We hope that this book will meet the training needs for residents in obstetrics and gynecology and prove to be a valuable resource for physicians who teach medical students, residents, and fellows. We also hope that practicing OB/GYNs will find it interesting and useful as they strive to take better care of their patients.

**Mark D. Walters, MD**  
**Matthew D. Barber, MD, MHS**

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# The Evolution of Uterine Surgery and Hysterectomy

1

**Anthony P. Tizzano M.D.**  
**Mark D. Walters M.D.**

*"What cannot be cured with medicines is cured by the knife, what cannot be cured by the knife is cured by fire, and what fire cannot cure is incurable."*

Hippocrates

The evolution of uterine surgery is an intriguing story whereby original procedures and theories would fall from favor only to be successfully resurrected and popularized by subsequent generations. Prior to the nineteenth century an inadequate understanding of pelvic anatomy and physiology plagued practitioners. Moreover, despite a surgeon's best efforts, early attempts at uterine surgery were often foiled by an ignorance of asepsis, the absence of anesthesia, faulty suture materials, inadequate instrumentation, and suboptimal exposure. As a result, any consistent success was delayed until the midnineteenth century. Particularly intriguing was the development of an amazing variety of innovative instruments of remarkable craftsmanship and materials that paralleled the many surgical advances.

This chapter is an attempt to touch upon the milestones leading to successful trachelectomy and hysterectomy and to acknowledge the many pioneers who paved the way. The author's selection of important milestones is listed in Table 1-1. Kindly note that this chapter emphasizes American and some European contributions and benchmarks that influenced contemporary thought, patient care and surgical practices. Throughout the chapter an effort is made to identify individuals who were first to perform a particular operation or technique. However, a number of variables confound the process including whether or not the procedure was purposefully planned or the result of intraoperative necessity or misadventure. Also important are whether or not the patient survived the actual operation and had a full recovery and whether there is documentation (clinical or pathologic) that verifies all the surgical details.

Clearly we owe a great debt of gratitude to these and many others who established the foundation for successful pelvic surgery and ultimately for our specialty. Perhaps Kelly, an avid historian and bibliophile, summarized it best by stating, "No group should ever neglect to honor the forebears upon whom their contributions are based. Great is the loss to anyone who neglects to study the lives of those he follows." We are particularly grateful for the works of Dr. Thomas Baskett, Dr. James V. Ricci, and Dr. Harold Speert, whose extensive research on the subject made this chapter possible.

**Table 1-1** Timeline of Milestones Related to Uterine Surgery

100 CE	First good description of the human uterus: <i>De Morbis Mulierum</i> by Soranus.
1507	Earliest authentic account of vaginal excision of the uterus in a case of prolapse: Giacomo Berengario da Carpi.
1561	First accurate description of the human oviduct: <i>Observationes Anatomicae</i> by Gabriele Falloppio.
1663	First work on operative gynecology: <i>Heel-konstige aanmerkingen betreffende de gebreeken der vrouwen</i> by Hendrick van Roonhuijze.
1672	First accurate account of the female reproductive organs and ovarian follicles—"graafian follicles": <i>De Mulierum Organis Generationi Inservientibus</i> by Regnier de Graaf.
1737	Description of the peritoneum and the posterior cul-de-sac: <i>A Description of the Peritoneum</i> by James Douglas.
1774	The finest work on uterine anatomy to date: <i>Anatomy of the Gravid Uterus</i> by William Hunter.
1801	Friedrich Benjamin Osiander performed the first partial trachelectomy by means of a knife for the treatment of cervical cancer.
1812	Although planning to perform a trachelectomy for cancer, G.B. Paletta inadvertently performed the first vaginal hysterectomy; the patient died 3 days later.
1813	Conrad Langenbeck performed the first intentional complete vaginal extirpation of the uterus for prolapse with cervical ulceration, using an apparent extraperitoneal approach, after which the patient survived.
1822	J.M. Sauter of Baden, Germany, performed the first planned and successfully executed complete vaginal hysterectomy for cervical cancer.
1826	First American textbook on gynecology: <i>A Treatise on the Diseases of Females</i> by William Potts Dewees.
1829	Earliest report of a successful trachelectomy in America: <i>Case of a successful excision of the cervix uteri in a scirrhus state</i> by John B. Strachan.
1846	First deliberate abdominal supracervical hysterectomy in America for fibroids (with the correct preoperative diagnosis) was performed by John Bellinger of Charleston, South Carolina. The patient died on the fifth postoperative day.
1849	Anders Adolf Retzius described the prevesical space.
1850	First successful vaginal hysterectomy performed in America by Paul F. Eve of Augusta, Georgia.
1852	Hugh Lenox Hodge detailed the use of his pessary for the correction of uterine displacement.
1853	Walter Burnham of Massachusetts performed the world's first successful (albeit unplanned) abdominal supracervical hysterectomy. <i>Extirpation of the uterus and ovaries for sarcomatous disease</i> (Nelsons Am Lancet 1853;7:147). It was done with the patient under chloroform anesthesia; the patient survived.
1853	Gilman Kimball performed the first deliberate and successful abdominal supracervical hysterectomy for a fibroid uterus. (Kimball G: Successful case of extirpation of the uterus. Boston Med Surg J 1855;52:249–255.)
1861	Samuel Chopin performed the first successful vaginal hysterectomy for prolapse in America.
1861	James Marion Sims described method for trachelectomy: <i>Amputation of the cervix uteri</i> .
1863	Earliest successful excision of the uterus and ovaries for tumor. <i>Extirpation de l'uterus et des ovaries</i> by Eugene Koeberle.
1868	First attempt at cesarean hysterectomy in America by Horatio Robinson Storer of Boston.
1876	First successful cesarean hysterectomy by Edorado Porro of Pavia, Italy.
1878	First carefully planned and successful abdominal hysterectomy for cancer using Lister's antiseptic method. <i>Eine neue Methode der extirpation des ganzen uterus</i> by Wilhelm Alexander Freund. Freund also introduced "compression forceps" (clamps) to vaginal hysterectomy to secure vascular pedicles.
1890	Freidrich Trendelenburg described his manner for positioning patients to enhance exposure.



**Table 1-1** Timeline of Milestones Related to Uterine Surgery—cont'd

1893	Karl August Schuchardt described his mediolateral incision to enhance exposure for radical vaginal hysterectomy in cases of cervical cancer. He performed the first radical hysterectomies for cervical cancer. (Garrison FH, Morton LT: <i>Morton's Medical Bibliography</i> , 5th ed. Aldershot, England, Scholar Press, 1991.)
1895	The first radical hysterectomy for invasive cervical cancer by John Goodrich Clark at Johns Hopkins Hospital.
1895	Alwin Mackenrodt provided a comprehensive and accurate description of the pelvic connective tissue and its relationship to pelvic prolapse.
1898	Howard Atwood Kelly's text <i>Operative Gynecology</i> published. Provided the foundation for the specialty in America.
1900	Hermann Johannes Pfannensteil introduced a transverse incision for laparotomy.
1900	Ernst Wertheim described his radical operation for cervical and uterine cancer.
1901	Alfred Ernest Maylard advocated an oblique transection of the rectus muscles to improve exposure.
1906	Albert Doderlein and S. Kronig described their technique for vaginal hysterectomy beginning with an anterior colpotomy incision.
1908	Friedrich Schauta described his method for radical vaginal hysterectomy in cases of carcinoma of the cervix.
1911	Max Brödel chaired the world's first Department of Medical Illustration at Johns Hopkins University.
1915	William Edward Fothergill modified Archibald Donald's operation for complete uterine prolapse: <i>Anterior colporrhaphy and its combination with amputation of the cervix</i> , the so-called Manchester operation.
1915	Arnold Sturmdorf introduced his tracheloplasty technique.
1928	Edward H. Richardson reported his simplified technique for abdominal hysterectomy, using the uterosacral and cardinal ligaments in vaginal cuff closure.
1934	Nobel Sproat Heaney described his technique for vaginal hysterectomy using a clamp, needle holder, and retractor of his own design. His method for suturing the vaginal cuff in a manner that incorporates peritoneum, vessels, and ligaments is eponymously termed the "Heaney stitch."
1941	A.F. Lash described the coring method for reducing the size of the uterus to facilitate vaginal hysterectomy.
1941	Leonid Sergius Cherney proposed a modified low transverse abdominal incision, whereby the rectus muscle is reflected off its insertion into the posterior pubis, to maximize access to the space of Retzius.
1946	Richard Wesley TeLinde published his <i>Operative Gynecology</i> , which remains the standard American work on the subject under successive authors.
1972	Allen and associates first reported that perioperative prophylactic antibiotics (cephalothin versus placebo) reduce major infection rate after abdominal hysterectomy.
1989	Reich described the first laparoscopic hysterectomy.

## Antiquity

*"Never as yet have I gone astray, whether in treatment or in prognosis, as have so many physicians of great reputation. If anyone wishes to gain fame ... all that he needs is to accept what I have been able to establish."*

Claudius Galen

The foundation of all surgical specialties is predicated on an accurate and thorough understanding of the pertinent anatomy. Magnificent prehistoric draw-



ings on the walls of caves and carvings of human figures have been dated as far back as 40,000 to 16,000 BCE. However, it was not until many millennia later that any real effort was devoted to the study and illustration of human anatomy. The earliest descriptions of the uterus are gleaned from the Ebers Papyrus (1500 BCE), which depicts the uterus as an independent animal, capable of movement within the abdomen and pelvis of its host. Similar accounts in other documents correspondingly describe the uterus as a salamander, crocodile, or tortoise (Fig. 1-1).

Accounts by Hippocrates (460–377 BCE) regarding the uterus portray the organ as going wild when not sufficiently nourished with male semen. During the second century CE the eminent Greek physician Aretaeus reinforced this animalistic concept stating in his *Causes and Indications of Acute and Chronic Diseases*:

*In the middle of the flanks of women lies the womb, a female viscus closely resembling an animal, for it moves hither and thither in the flanks, also upwards in a direct line to below the cartilage of the thorax, and also obliquely to the right or the left, either to the liver or the spleen; and it is likewise subject to prolapse downwards; and in a word is all together erratic. It delights also in fragrant odors and advances towards them, and it has an aversion to fetid odors and flees from them; and on the whole the womb is like an animal within an animal.*

Aretaeus

This animalistic concept of the uterus was subsequently replaced, during the Common Era, by the notion that the uterine cavity comprised seven separate compartments—three on either side and one elongated compartment in the center. The so-called “seven cell doctrine” proposed that male embryos developed in cells on the right, females developed on the left, and from the center cell hermaphrodites were produced. This and other similar theories remained popular throughout the Middle Ages until cadaver dissections would prove otherwise.

Perhaps the earliest acceptable description of the uterus came from Soranus of Ephesus (98–138 CE), a learned and leading medical figure of the early

**Figure 1-1** An eighteenth century umbilical cord clamp mounted on a tortoise representing the uterus.





second century CE. Soranus is best known for his text on the diseases of women, *De Morbis Mulierum*, which ultimately provided a basis for gynecologic texts up to the seventeenth century. He suggested that a prolapsed uterus that had become gangrenous could be safely excised without harm to the patient but otherwise a pessary should be employed to restore the prolapse. His description of the uterus is clearly based on cadaver dissections as evidenced in his elaborate description regarding adjacent organs in the pelvis. Soranus related his concept of the uterus and appreciation for its surrounding structures in his narrative, "What Is the Nature of the Uterus and of the Vagina?"

*The uterus (metra) is also termed hystera and delphys. It is termed metra because it is the mother of all the embryos borne of it or because it makes mothers of those who possess it: or, according to some people, because it possesses a metre of time in regard to menstruation and childbirth. And it is termed hystera because afterwards it yields up its products, at least broadly speaking. And it is termed delphys because it is able to procreate brothers and sisters.*

*The uterus is situated in the large space between the hips, between the bladder and the rectum, lying above the rectum and sometimes completely, sometimes partly, beneath the bladder, because of the variability of the uterus. For in children the uterus is smaller than the bladder (and lies, therefore, wholly beneath it). But in virgins in their prime of puberty, it is equal to the size of the superimposed bladder, whereas in women who are older and have already been deflowered and even more in those who have already been pregnant, it is so much bigger that in most cases it rests upon the end of the colon.*

*By thin membranes the uterus is connected above with the bladder, below with the rectum, laterally and posteriorly with the excrescences of the hips and the os sacrum. When these membranes are contracted by an inflammation, the uterus is drawn up and bent to the side, but when they are weakened and relaxed, the uterus prolapses. Although the uterus is not an animal (as it appeared to some people), it is, nevertheless, similar in certain respects, having a sense of touch, so that it is contracted by cooling agents but relaxed by loosening ones.*

*The shape of the uterus is not curved as in dumb animals, but is similar in shape to a cupping vessel. For beginning with a rounded and broad end at the fundus, it is drawn together proportionally into the isthmus, neck and finally a narrow orifice. The orifice lies in the middle of the vagina, for the neck of the uterus is enclosed tightly by the vagina while the outer part ends in the labia. ... In the natural state the orifice is in most cases as large as the external end of the auditory canal. Yet at certain times it is dilated, as in the desire of intercourse for the reception of semen. ... and to an extreme degree till it even admits the hand of a grown-up person. In its natural state in virgins, the orifice is soft and fleshy, similar to the spongy texture of the lung or the softness of the tongue. But in women who have borne children it becomes more callous and, as Herophilus says, similar to the head of an octopus or to the larynx.*

Soranus (from Temkin, 1956)

The ancients are credited with a great many basic instruments fashioned from tin, iron, steel, lead, copper, bronze, wood, and horn. Ferrous metals were likely the most popular, but few survived the oxidation of more than 2000 years. Nonetheless, a surprising number of instruments including scalpels, forceps, and catheters that date to the first century were recovered from archeological digs at Pompeii. Of the instruments recovered, the most impressive are the massive bivalve, trivalve, and quadrivalve vaginal specula which were fabricated from bronze and thus remain nicely preserved.

Arabian medicine texts, despite their large numbers, contained very little with respect to gynecology and are, for the most part, an accumulation of Greek contributions with numerous translations from the Indian, Persian, and Syrian. Perhaps their greatest value was the preservation of Greek medical literature and culture that likely would have all but vanished during the Dark Ages.