

Uterine Surgery Is Performed Due To Serious Complications in a Woman's Body

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Abstract:

The uterus is a component of the female reproductive system situated within the pelvic cavity, positioned behind the bladder and anterior to the large intestine. This organ plays a central role in female reproduction. During pregnancy, the fetus grows within the uterus. Its primary role is to provide nourishment and protection to the developing fetus.

keywords: uterine; uterus; woman; surgery; health

Introduction

One of the major dangers associated with uterine surgery is bleeding, as this organ is well-supplied with blood [1]. Additionally, surgeries that aim to preserve the uterus tend to be intricate. Blood loss becomes a crucial issue in more complicated procedures like myomectomy, adenomyomectomy, and the removal of deeply infiltrating endometriosis. Considerable blood loss heightens the likelihood of surgical site infections, the need for blood transfusions, and the chance of needing to operate again. Moreover, significant blood loss during myomectomy can elevate the chances of requiring a hysterectomy. Although there is no current information regarding the hysterectomy risk during adenomyomectomy, it poses a serious concern due to the technical difficulties of these procedures. Bleeding stands out as the most prevalent complication following transvaginal ultrasound-guided egg retrieval, which is the most commonly executed procedure by reproductive endocrinologists.

Complications

Optimizing medical conditions before surgery diminishes complication rates [1]. Identifying preoperative anemia is essential; treating patients with either oral or intravenous iron supplements can lower the risk of requiring transfusions during high blood loss procedures. In patients with leiomyomas or adenomyosis, preoperative therapy using gonadotropin-releasing hormone (GnRH) analogs should be contemplated, as this can decrease uterine size and consequently lessen intraoperative blood loss. The overall risk of surgical complications is lower with laparoscopic myomectomy compared to traditional open myomectomy, significantly reducing the chance of blood transfusions by five times. Currently, the

probability of any complication is reduced with laparoscopic techniques in comparison to robotic methods, although this distinction may diminish as robotic training becomes more common. Reducing blood loss during operations enhances visibility and lowers the likelihood of encountering other surgical complications. When performing myomectomy through any method, injecting vasopressin into both the cervix and the fibroids aids in constricting blood flow to the operation site. The transient occlusion of the uterine arteries (TOUA) and employing a uterine tourniquet have shown efficacy in diminishing blood loss during adenomyomectomy. Administering misoprostol prior to surgery may also help reduce blood loss for any uterine-related operation. Prophylactic use of tranexamic acid is linked with lesser intraoperative blood loss. While intraoperative blood salvage is not suggested for everyday practice, it may help reduce transfusion risks in carefully chosen patients with significant disease loads, especially when prolonged and complicated surgeries are anticipated. Utilizing ultrasound guidance during oocyte retrieval allows the operator to avoid the iliac vessels that typically support a stimulated ovary. In a specific plane, these large vessels can easily be mistaken for a follicle. By monitoring vessel movement with pulsation and adjusting the ultrasound probe to change the viewing angle, one can distinguish between a large vessel and a stimulated follicle.

Uterine Prolapse

Uterine prolapse occurs when the essential muscular and connective tissue structures that support the vaginal apex and cervix are weakened [2]. Urogynecologists frequently encounter symptomatic uterine prolapse, making it one of the more prevalent issues in this medical field.

The Women's Health Initiative, which assessed over 16,000 women with a uterus, revealed that 14.2% had uterine prolapse of varying degrees, indicating its commonality in the general population. In addition to the difficulties in providing enduring relief from symptoms like vaginal bulging, pelvic reconstructive surgeons should recognize that many women see the uterus as an important symbol of their sexual and reproductive identity. Rather than using a one-size-fits-all approach for uterine prolapse treatments, modern surgical techniques offer options that can be customized to meet the individual goals of patients. In addition to conservative treatment alternatives, such as pelvic floor physical therapy and pessaries, becoming well-versed in surgical methods that preserve the uterus will improve a surgeon's capacity to select the most suitable procedure based on specific clinical circumstances and the treatment objectives of the patient. Symptoms of uterine prolapse consist of vaginal bulging, a feeling of pressure in the pelvis, difficulty in fully emptying the bladder, and the need to manually support the vagina to aid in urination. There does not seem to be a noteworthy correlation between low back or pelvic pain and pelvic organ prolapse. The prevalence of symptomatic prolapse increases with age, rising from approximately 6.6% in women aged 20 to 29 to 56% in the 50 to 59 age group. Urinary retention can be a complication associated with uterine prolapse, often due to the simultaneous prolapse of the anterior vaginal wall, which may cause the urethra to kink or the cervix and uterus to obstruct the bladder neck. Most women begin to experience prolapse symptoms when the leading edge descends 0.5 cm below the hymen. The detrimental effect of symptomatic uterine prolapse on one's quality of life is well-established. Utilizing the Pelvic Organ Prolapse Quantification (POP-Q) staging framework established by the International Continence Society, the extent of uterine prolapse can be evaluated. For apical prolapse, the main indicator is point C, which indicates the furthest prolapsed position of either the anterior cervix's most distal edge or the vaginal cuff post-hysterectomy when performing a Valsalva maneuver. POP-Q point D may approximate where the uterosacral ligament is connected to the upper posterior cervix; its clinical significance is subject to discussion, yet it can be referenced along with point C to assess cervical length. Cervical elongation, a condition that can be observed in nearly a third of women experiencing pelvic prolapse, should be evaluated through a bimanual examination, allowing for the palpation of the cervix's length and its position in the vagina. This assessment should occur while the upper vagina is fully elevated by placing fingers at each lateral fornix, followed by visual inspection utilizing a full bivalve speculum to lift the vaginal apex to the height of the ischial spines. If the cervix reaches the mid-vagina or lower, even with the apex supported, this indicates cervical elongation, which implies that surgeries preserving the uterus may be more prone to ineffectiveness in symptom relief, even when the apex has been effectively resuspended. Thus, an elongated cervix should be viewed as a relative contraindication for surgeries aimed at preserving the uterus. The difference between POP-Q points C and D ("C-D discrepancy") might serve as a method to measure and analyze cervical elongation; however, clinical decisions usually rely more on overall clinical evaluations rather than specific numerical thresholds. Alternatively, the Baden-Walker "halfway" system may be employed to indicate the cervix's position in relation to the hymen. To fully assess uterine descent and achieve precise prolapse quantification, regardless of the grading system in use, pelvic examinations are generally conducted with Valsalva or repeated coughing, and often in a standing posture. Accurate evaluation of apical support is critical when exploring surgical solutions for uterine prolapse, and it is important for surgeons to recognize that quantitative

measurements of the apex may differ based on the specific method and location of the evaluation. For example, distinct variations can be noted between assessments conducted in a clinical office setting versus those done in the operating theater while the patient is under anesthesia. One research finding highlighted that under anesthesia with traction applied, point C can average 3.5 cm lower compared to the assessment performed while the patient is awake in the office. This factor is significant as it can influence preoperative discussions with patients and the process of obtaining surgical consent. For patients who are scheduled for transvaginal POP repair but exhibit "borderline" uterine descent during their office evaluation, it is common for our team to inform them about the possibility of identifying more pronounced uterine prolapse once they are under anesthesia. In these cases, ensuring that the patient is informed and has consented to potential hysteropexy can be highly beneficial. For surgeons, becoming proficient with transvaginal hysteropexy techniques (like sacrospinous hysteropexy) instills confidence that should an unforeseen degree of apical descent be identified during the operation, uterine suspension can be seamlessly integrated into the surgical plan. This adaptability in managing the apex in all vaginal cases enhances the probability that each vaginal procedure achieves an optimal result, effectively addressing all compartments involved.

FSS

Fertility sparing surgery (FSS) directed at cancers affecting the reproductive organs involves excising only the portion of the reproductive tract that is impacted by cancer to treat the condition while keeping sufficient reproductive tissue intact to enable the patient to have the possibility of future pregnancies [3]. Not every patient qualifies for FSS, thus careful selection is vital. FSS may be suitable for women of childbearing age diagnosed with early-stage, lower risk gynecological cancers. Options for FSS may consist of preserving the ovaries, the uterus, and/or transposing the ovaries. Some women diagnosed with ovarian or uterine cancer might be eligible for FSS even if conventional treatment would typically necessitate the removal of all reproductive organs. For suspected early-stage ovarian cancer cases, it is feasible to carry out a unilateral salpingo-oophorectomy (USO), a USO paired with a hysterectomy, or a bilateral salpingo-oophorectomy while keeping the uterus. During any of these FSS methods, surgical staging can still take place through omentectomy, lymphadenectomy, and/or peritoneal washings with specific biopsies. FSS may also be a viable alternative for women facing uterine cancer. Women experiencing early low-grade uterine cancer and wishing to maintain fertility can consider undergoing hysteroscopy and curettage for a comprehensive assessment of the uterus, followed by progestin therapy. Those who cannot receive progestin therapy might look into ovarian preservation during hysterectomy and staging. Furthermore, uterine conservation might be an option for certain women diagnosed with cervical cancer by carrying out a cervical conization, where only a segment of the cervix is excised. This applies to low-risk cervical cancer patients classified as FIGO stage IA1, or through radical trachelectomy for specific individuals with FIGO stages IA2-IB. A radical trachelectomy entails the complete surgical removal of the cervix along with the surrounding parametrial tissue. Following this procedure, a cerclage may be applied to seal the remaining lower segment of the uterus, facilitating the possibility of future pregnancies. Women receiving pelvic radiation, likely at risk for causing early ovarian failure due to conditions like cervical or colorectal cancer, may also consider relocating the ovaries outside of the radiation zone to safeguard ovarian functionality and potentially allow for oocyte collection. The procedure

known as ovarian transposition, or oophoropexy, consists of surgically relocating the ovaries along with their blood supply to a position situated above the radiation area. This can be performed alongside other cancer-related surgical interventions if radiation therapy is expected, or as a standalone procedure before the commencement of definitive chemoradiation. Typically, this procedure is done using laparoscopic techniques.

Pregnancy Conditions

Pregnancy is not classified as an illness but condition a natural state experienced by many women during their childbearing years [4]. Nevertheless, this phase can pose health risks. Each pregnancy has the potential for complications such as excessive bleeding, obstructed labor, or the necessity of a cesarean section. The high rates of maternal morbidity and mortality globally demonstrate that all expectant mothers face hazards from surgically preventable obstetric issues that could result in severe outcomes, including death or disability. Maternal morbidity and mortality are significantly increased by conditions that can be prevented by access to safe obstetric surgery. Obstructed labor, which can result in conditions like fistulas, uterine perforations, massive blood loss, infections, or even death, is preventable by monitoring labor for irregularities and ensuring access to a nearby facility for emergency cesarean delivery. Many low- and middle-income countries (LMICs) lack qualified personnel present at childbirths to detect complications, and these regions often do not have the infrastructure to provide timely access to hospitals for safe cesarean operations. Severe bleeding during pregnancy and after childbirth can have dire consequences; instances of hemorrhage occurring far from surgical intervention, such as uterine curettage or emergency hysterectomy, contribute to unnecessary maternal deaths globally. A comprehensive medical history along with a physical examination should be conducted, including all previous and present obstetric details, gestational age, prenatal care quality, and any complications related to current and past pregnancies [5]. While pregnant patients may face general surgical issues, it's crucial to consider and exclude other obstetrical factors such as ectopic pregnancies, placental separations, preeclampsia, or ruptured blood vessels. Additionally, one must take into account the anatomical changes that occur during pregnancy. The assessment should incorporate a sterile speculum examination and fetal heart rate monitoring if necessary, as a supplement to a complete physical assessment. Typically, fetal monitoring is advised to start at 24 weeks of gestation when patients arrive with significant medical concerns. In the case of a laparoscopic procedure, obtaining transabdominal signals with pneumoperitoneum is not feasible, hence transvaginal monitoring is recommended. A transabdominal tocodynamometer can be positioned immediately post-operation to observe uterine contractions. Continuous, regular contractions (eight in an hour for over 4 hours) could indicate placental separation, which has a high risk of fetal loss. If fetal monitoring remains stable for more than 4 hours and there are no alarming signs on physical examination (such as vaginal bleeding, uterine sensitivity, or rupture of membranes), it is usually safe to stop monitoring. Although this data is derived from trauma studies, it likely applies to emergency general surgical scenarios, as these patients might also present in various types of shock with increased physiological stress. If continuous fetal monitoring is not accessible, the fetal heart rate can be assessed using bedside ultrasound temporarily as a substitute. A fundamental management principle concerning an injured pregnant individual is prioritizing the care of the mother, as the majority of medical interventions aimed at her resuscitation will also assist the

fetus [6]. It is most effective to treat the pregnant patient through a collaborative team effort. The involvement of both the trauma surgeon and the obstetrician should occur as early as possible. All relevant tests and procedures should be conducted if deemed necessary. Since maternal death is the leading cause of fetal demise, initiatives aimed at evaluating fetal health take a backseat to the resuscitation of the mother. Nevertheless, assessing fetal well-being can serve as a crucial indicator of the mother's health status. Signs of fetal distress can manifest early and may indicate maternal hemorrhage, even when the mother appears hemodynamically stable. Delaying intervention until there are signs of maternal instability can exacerbate the condition of the fetus. Evaluating and securing the maternal airway is essential, and all pregnant patients should be provided with supplementary oxygen as a minimum requirement. In the later stages of pregnancy, the oropharyngeal area may become swollen due to tissue edema, which can complicate the intubation process; therefore, a smaller than usual endotracheal tube, such as one measuring 6.5 mm or less, may be necessary. The likelihood of aspiration is heightened during pregnancy, making oxygenation monitoring vital. Caution is required when performing a chest tube thoracostomy if the situation arises. Once the primary assessment is complete and the patient's condition is stabilized, diagnostic tests will be employed to gauge the extent of injuries sustained by both the mother and fetus. Relevant laboratory tests related to the trauma scenario are conducted, and all female patients of reproductive age should undergo a β -human chorionic gonadotropin test. A thorough secondary assessment must be performed promptly and should include checking for signs of pregnancy. This assessment involves determining the fetal heart rate and movements, measuring uterine size and tone, and inspecting for any vaginal bleeding or amniotic fluid leakage. Fetal monitoring will commence. Fetal heart sounds can typically be detected via Doppler technology by the tenth week of gestation, providing a straightforward and non-invasive means of monitoring. After the twentieth week of gestation, routine continuous fetal heart rate monitoring should be implemented under the direction of the obstetrician. If fetal heart sounds are not present, efforts to resuscitate the fetus should be avoided.

Complex

A conversation regarding expected blood loss should occur before the surgical procedure with the entire surgical team from various specialties, allowing for the creation of a strategy to monitor and manage blood loss during the operation as necessary [1]. In hysteroscopic surgeries, significant blood loss becomes apparent quickly due to the rapid obstruction of the visual workspace by abundant bleeding. In intricate open or minimally invasive operations, the blood loss during surgery may be more gradual, necessitating careful observation. The surgeon must watch for indications of uterine atony and developing coagulopathy, which can arise from and exacerbate ongoing blood loss. Regular and effective communication among the surgeon, nursing team, and anesthesiology personnel enables a prompt reaction to any blood loss, utilizing intravenous fluids, blood products, and vasopressor therapy to sustain hemodynamic stability. In such situations, it is vital to conduct multiple evaluations of complete blood counts and coagulation profiles, as considerable blood loss could lead to coagulopathy or even disseminated intravascular coagulation (DIC), necessitating careful restoration of clotting factors.

Hemorrhage

In instances of bleeding, applying direct pressure quickly allows the surgeon adequate time to devise a management plan [1]. If the bleeding source is seen, the problematic vessel can be directly compressed. When the cause of the bleeding cannot be determined, temporarily compressing the internal iliac arteries or even the common iliac arteries can give the surgeon the opportunity to clear the operative field and locate the source of hemorrhage. An experienced surgeon should handle any vascular injuries that arise. Minor, low-volume bleeding can be treated with direct pressure, the use of cautery on the vessel using either monopolar or bipolar energy, suturing of the vessel, or the application of hemostatic agents. Mechanical hemostatic products are available in various formats, such as cloth, powder, foam, or sponge, and are generally less expensive than biological options. These agents facilitate the creation of a framework for platelet attachment and activation. Biological hemostatic products interact directly with the coagulation cascade's common pathway to generate a fibrin clot. These may need to be thawed or reconstituted by a qualified individual before application. Most bleeding that occurs following oocyte retrieval is generally self-resolving, and typically, the main approach in this situation involves careful monitoring along with periodic hemoglobin level checks.

Postpartum Hemorrhage

Globally, postpartum hemorrhage stands as the leading cause of maternal health complications [7]. This condition can be prevented if it is identified and treated in a timely manner. Roughly half of women experiencing postpartum hemorrhage may present with pre-existing risk factors, such as significant uterine enlargement due to (1) large babies, (2) multiple pregnancies, or (3) uterine fibroids, or if the hemorrhage occurs after an extended labor period. Every healthcare facility that offers childbirth services should possess the capability to prevent and manage the immediate care requirements of postpartum women facing hemorrhage. To prevent postpartum bleeding, it is essential to (1) accurately evaluate the labor process and make timely referrals if labor is prolonged, as this increases the likelihood of postpartum hemorrhage. Additionally, after the infant's delivery, (2) it is crucial to quickly assess and actively manage the delivery of the placenta within 30 minutes. In most instances, this can be achieved through the administration of IM or IV (diluted) Pitocin, abdominal massage of the uterus, and controlled traction on the umbilical cord. If the placenta is not delivered within 30 minutes, manual removal should be performed. The treatment for postpartum hemorrhage must be immediate, as any degree of blood loss can harm the woman. The first step is to establish large IV access, administer intravenous fluids, and introduce blood products to compensate for the ongoing loss of blood. Postpartum hemorrhage has four primary causes, known as the "4 Ts": (1) Tissue, (2) Tone, (3) Trauma, and (4) Thrombin. These include (1) retained products such as the placenta, membranes, or clots, (2) uterine atony, (3) damage to the birth canal, and (4) coagulopathy, which is typically caused by blood loss exceeding 25% of total blood volume and is rarely attributed to an existing coagulopathy. To identify or rule out retained tissue, an intra-uterine examination or uterine sweep is performed, while addressing uterine tone is crucial through uterine massage techniques, including bimanual massage and medications as listed in Table 44.1. If uterine tone is not the issue, addressing any trauma promptly is necessary, along with repairing any noted lacerations. Damage to the cervix can also result in considerable blood loss and, similarly, a uterine rupture can cause major vaginal or intra-abdominal bleeding. Managing hemorrhage during a miscarriage or molar pregnancy follows a similar protocol as detailed earlier. In early pregnancy, the

effectiveness of oxytocin might be limited due to a scarcity of oxytocin receptors. Unique clinical situations encompass uterine inversion and instances where the placenta abnormally adheres to the myometrium or the placenta accreta spectrum (PAS). These dangerous conditions can occur simultaneously. PAS is more frequently seen in individuals with previous uterine surgeries before the current pregnancy. Pulling on the placenta can lead to uterine inversion, although this condition can also arise independently of PAS. Correcting the uterus to its normal anatomical position is essential, after which administering medication to enhance uterine tone is recommended. If bleeding persists or if PAS is confirmed, urgent surgical intervention, typically a postpartum hysterectomy, is often the sole method to resolve this critical situation and preserve the woman's life.

Conclusion

The uterus is a hollow structure situated within the female pelvis. Its upper section connects to the fallopian tubes, while the lower section communicates with the vagina through the cervix. The uterus resembles an inverted pear shape. At one end lies the cervix, which is the uterine neck; its opening is located in the vagina, forming the lower third of the uterus. It is composed in part of muscle but predominantly of connective tissue. The middle section of the cervix features a canal that is coated with a thinner mucous membrane than that of the uterus's main body and consists of numerous glands that produce mucus, which varies throughout the menstrual cycle. Non-cancerous growths in the uterus are not uncommon, with fibroids being the most prevalent type, followed by uterine adenomas, which typically present as polyps and endometrial hyperplasia.

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