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Mini Review

UTERINE RUPTURE

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Introduction

Uterine rupture is one of the most urgent cases in emergency obstetrics. In rupture, all layers of the uterus are separated. Ruptures of ectopic pregnancies before the fetus become viable and uterine perforations are excluded from our study. Uterine rupture causes very serious complications for both mother and child [1-3].

Causes of uterine Rupture Include

Trauma from previous pregnancies: Previous section, myoma enucleation, abortion, uterine perforation, hysterotomy, endometritis, scars left by manual removal, strangulation or metroplasty, and regular resection. Because the rupture site is avascular, scar ruptures do not bleed much. This type of scar rupture progresses insidiously. Increased tenderness at the scar site should raise suspicion of rupture.

Birth-Related Factors in the Current Pregnancy

Uterine stimulation (induction and operative deliveries), version extraction (internal), hydrocephalus, mid- and high-forceps applications, basiotripsy, embryotomy, shoulder dystocia, neglected lateral presentation, excessive fundal pressure, grand multiparity, placental abruption, placenta accreta, placenta increata, breech deliveries. Uterine dehiscence is a similar condition characterized by incomplete division of the uterus that does not penetrate all layers. Uterine dehiscence can produce a uterine window thinning of the uterine wall that may allow the fetus to be seen through the myometrium. Often, uterine dehiscence is an occult finding in an asymptomatic patient. There is no standard for managing uterine dehiscence in a parturient with a stable fetal heart rate tracing. Uterine dehiscence in a full-term pregnancy is often managed by cesarean delivery, while expectant management has been shown to be successful when there is uterine dehiscence in the preterm period. While the terms uterine dehiscence and uterine rupture are, at times, used interchangeably, we will keep them separate.

Other Factors

Uterine anomalies, trauma, automobile accidents. Cornual pregnancy, unknown factors [4-7].

Uterine rupture is classified in various ways, based on various authors and factors.

I. **Based on the acting forces:** a- Spontaneous rupture, b- Traumatic rupture

II. **According to the location of the tear:** a- The tear occurs in the corpus or lower segment of the uterus. b- Separation and rupture of the cervix from the vagina (Colporrhexis) is included in uterine rupture.

III. **Based on peritoneal involvement:** a- Incomplete uterine rupture (The peritoneum is intact, only the uterine wall is torn). b- Complete uterine rupture (All layers of the uterus, including the peritoneum, are torn).

IV. **Based on the time:** a- Ruptures occurring during pregnancy. b- Ruptures occurring during labor are called [6-8].

The key to successful treatment of uterine rupture is early diagnosis. After every delivery, whether spontaneous or forceps-assisted, the vagina, cervix, and uterus should be carefully examined vaginally.

Because the scar rupture site is avascular, bleeding is less common than spontaneous or traumatic rupture. If rupture occurs during labor, contractions are maintained. If the rupture extends into the ligamentum latum, hypotension occurs late. 24% of scarred uteruses may rupture before labor contractions begin. Sometimes, the rupture site becomes obstructed by a fetal fragment, and bleeding controlled by compression delays diagnosis. It should be noted that both uterine rupture and atony bleeding can occur simultane-

ously in a patient. Uterine rupture should be considered first in the differential diagnosis of idiopathic obstetric shock. Pulmonary embolism, myocardial infarction, and amniotic fluid embolism must be distinguished from other factors complicating labor and pregnancy [9-12].

The uterine wall, or myometrium, is weakened in conditions such as Ehlers-Danlos and Loeys-Dietz, which increases the risk of rupture. A uterine rupture in a woman that has not had a previous cesarean section is now a criterion that is used to diagnose vascular Ehlers-Danlos syndrome. The presentation of a woman with a uterine rupture is highly dependent upon whether they have a labor epidural, a scarred or unscarred uterus, and the location of the rupture. For women with a suspected uterine rupture, the initial assessment is for hemodynamic stability. Blood pressure and heart rate should be obtained to assess for hypotension and tachycardia. Common symptoms of hypotension include lightheadedness, dizziness, nausea, vomiting, and anxiety. Most of the bleeding associated with a uterine rupture is intraabdominal and cannot be detected by the patient. When vaginal bleeding occurs, it is helpful to differentiate between light spotting and significant blood-soaked linen.

Bladder injury is not uncommon with uterine rupture. Patients with a suspected uterine rupture should have their urine examined for hematuria. Pink, red, or brown urine can imply the presence of red blood cells. Blood clots can also pass through the urethra—these can be painful. Patients with a uterine rupture may describe acute onset abdominal pain that begins with a "ripping" sensation. Subsequent contracts are often quite painful. Chest pain may occur if blood enters the peritoneum. Blood in the peritoneum can irritate the diaphragm and cause referred to shoulder or chest pain similar to ischemic cardiac pain. A labor epidural may mask the pain associated with a uterine rupture and lead to delayed diagnosis. The fetal heart rate provides insight into both the health of the fetus and the health of the woman—the fetal heart rate is one of the most sensitive indicators of maternal end-organ perfusion. Reduced blood flow to the fetus can present as fetal bradycardia, reduced variability, or late decelerations. Fetal bradycardia is the most common abnormality associated with uterine rupture. No fetal heart rate tracing is pathognomonic for uterine rupture. The absence of fetal heart sounds is obviously an ominous sign and requires an ultrasound to confirm absent cardiac activity.

Palpating the abdomen to localize the area of most pain and guarding can be helpful in women with a suspected uterine rupture. A uterine rupture should cause midline pain. Most women with a uterine rupture will have a tender abdomen, even when receiving labor epidural analgesia. Palpation of the abdomen can also provide insight into whether the contraction pattern or uterine shape has changed. Uterine contraction amplitude may decrease, and contractions may stop altogether in women who experience a uterine rupture. An internal examination can identify products of conception, fresh blood, or clots in the vaginal canal. In a uterine rupture, the vaginal canal is usually not full of blood—unless the tear extends into the vagina or cervix. Speculum examination may help diagnose non-pregnancy related bleeding such as a laceration or abnormal cervical growth. A vaginal exam can also identify loss of fetal station (movement of the fetal presenting part towards the abdominal cavity), which can occur with a uterine rupture if part of the fetus enters the peritoneum.

Due to the potential for serious maternal and neonatal morbidity, uterine rupture must be excluded in all cases of vaginal bleeding during pregnancy. The classic symptoms described for uterine rupture include acute onset abdominal pain, vaginal bleeding, a non-reassuring fetal heart rate tracing, and a change in the contraction pattern on tocodynamometry. Unfortunately, these symptoms are often not present. Radiographic and laboratory tests can be helpful in diagnosing a minor uterine rupture. Imaging is not appropriate when there is a significant rupture because of the emergent need for delivery and hemorrhage control.

The most important initial laboratory test is hemoglobin or hematocrit. If significant bleeding has occurred, coagulation tests (prothrombin time, activated partial thromboplastin time, fibrinogen, thromboelastogram) should be considered. If significant bleeding has not yet occurred, baseline hemoglobin or hematocrit can be used to monitor for ongoing blood loss. A uterine rupture must prompt immediate action. A delay in delivery, resuscitation, or surgery increases maternal and fetal risk [13]. A uterine rupture will typically be associated with fetal bradycardia. Thus, the initial treatment step is an emergent cesarean delivery—with or without an exploratory laparotomy. General endotracheal anesthesia is typically required to facilitate quick delivery—even when a labor epidural is in place. Labor epidurals take 5 to 15 minutes to achieve a surgical block; this is typically an unacceptable delay in the setting of uterine rupture. General anesthesia has the added advantages of allowing for better management of the maternal acid-base status through adjustment of minute ventilation, stabilizing the airway, and providing neuromuscular blockade to facilitate laparotomy. Lastly, neuraxial anesthesia is contraindicated in the setting of hemodynamic instability and in patients with severe bleeding diathesis.

A uterine rupture requires simultaneous delivery and treatment of maternal hemorrhage [14]. A second large-bore intravenous line should be placed, and blood should be ordered and brought to the operating room. If large-bore intravenous access cannot be obtained, central venous access with a large bore sheath introducer should be considered. Initial resuscitation is often provided by infusing Lactated Ringer's electrolyte solution. Brisk and large volume blood loss should prompt early blood transfusion. If bleeding is not quickly controlled, an arterial line will improve the accuracy and frequency of blood pressure monitoring, lead to a shorter response to hypotension, and facilitate serial laboratory tests. A midline abdominal incision, as opposed to the Pfannenstiel incision, should be considered when intraperitoneal bleeding is suspected. A midline incision provides better surgical exposure for the identification of the bleeding source and may shorten the time interval between surgical incision and delivery [15]. In a smaller rupture, the uterus may be amenable to repair. When there is hemodynamic instability or significant uterine injury, a hysterectomy

is indicated. Approximately one in three women who experience uterine rupture require a hysterectomy.

Material and Method

This study analyzes the published literature on uterine rupture through a bibliometric approach, focusing on the characteristics of the reports. Bibliometric studies in medicine generally do not require ethical approval because they do not involve direct interaction with human participants, collection of personal data, or clinical interventions. Instead, they rely on publicly available data, such as published articles, citation metrics, and other scientific outputs, which pose no risk to individual privacy or welfare. Consequently, these studies fall outside the ethical review guidelines applicable to research involving human subjects.

Results

The majority of the documents were research articles, followed by reviews and meeting abstracts. Uterine rupture is a clinical challenge that is likely to become increasingly prevalent in the future, primarily due to rising rates of cesarean section and uterine surgery. Emergency physicians and obstetricians should be well-versed in the risk factors and diagnostic methods associated with uterine rupture. A comprehensive examination of existing studies reveals a steady annual increase in research on this topic, suggesting that high publication rates will persist, with future publications expected to achieve significant citation and impact. While there is a wealth of case reports and clinical studies focusing on risk factors and management, there remains a notable scarcity of meta-analyses and compilations that adopt a multidisciplinary approach. It is anticipated that the volume of research evaluating uterine rupture will continue to grow in the future, with an emphasis on integrating multidisciplinary strategies.

Acknowledgement

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Conflict of Interest

None.

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