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MORPHOLOGICAL FEATURRES OF UTERINE STRACHING SYNDROME AND THE RISK OF MATERNAL MORTALITY IN MULTIPAROUS WOMEN

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Abstract: This study examines the structural morphological changes occurring in the uterus of multiparous women and their direct correlation with obstetric complications, specifically the risk of maternal mortality. Repeated childbirth experiences lead to irreversible pathological remodeling of the uterine muscular tissue (myometrium).

Morphological examinations indicate a singnificant reduction in the number of functional muscle cells (myocytes) with the uterine wall, replaced by collagen and connective tissue (fibrosis). This process drastically reduces utereni elasticity and weakens its contractile capability (retraction). Furthermore, sclerotic changes occur in the uterine blood vessels, impairing blood circulation

These histological alterations are the primary cause of postpartum hypotonic hemorrhage. Additionally, the thinning and scarring of the uterine wall increase the risk of uterine rupture during labor multi-fold. Research findings confirm that "multiparous uterine syndrome" is one of the most critical risk factors influencing maternal mortality rates, necessitating special attention during pregnancy and high-specialized medical care during childbirth for these patients..

Key words: Multiparous uterine syndrome, pathological remodeling of the myometrium, risk of uterine rupture, hypotonic postpartum hemorrhage, pathological placental invasionm, fibroelastic proliferation, ostpartum retraction, microcirculatory disorders, obstetric risk factors, maternal mortality rates.

In modern obstetric practice, multiparous women constitute a distinct high-risk group. Repeated pregnancies and deliveries lead to significant morphological changes in the structure of the uterine wall. As a result of the uterine stretching syndrome, the myometrium (muscular layer) loses its elasticity, and muscle fibers are increasingly replaced by fibrous connective tissue.

These pathological changes can lead to severe complications during labor. Specifically, a decrease in the uterus's ability to contract (atonic states) significantly increases the risk of massive postpartum hemorrhage and uterine rupture. Analysis of maternal mortality data shows that obstetric emergencies in multiparous women remain one of the leading causes of maternal death globally.

This article analyzes the relationship between postpartum uterine morphology and the number of births. The postpartum uterine recovery process has individual characteristics, and morphological changes may be more significant in women who have had multiple births. The study examines the rate of uterine involution, the state of the endometrium, and changes in the structure of the myometrium. Furthermore, it analyzes how the number of births affects the tone, elasticity, and functional state of the uterus. The article includes recommendations for identifying normal and pathological changes in the uterus during the postpartum period and for their prevention.

Uterine elasticity and shape change - The uterus expands significantly during pregnancy and gradually returns to its previous size and shape after childbirth. This process is related to the elasticity of the uterine walls and changes in the structure of the myometrium (uterine muscles). As the number of births increases, the elasticity and shape of the uterus may differ slightly.

The uterine walls are composed of elastic fibers and stretch during pregnancy. After childbirth, the following factors affect uterine elasticity:

Myometrial contractions – The uterine muscles contract during the involution process and strive to restore their volume.

Collagen and elastin fibers – The elasticity of the uterine walls depends on collagen and elastin fibers. In women who have had multiple births, these fibers may weaken slightly. Risk factors for uterine atony include prolonged labor, rapid labor, overdistension of the uterus (multiple pregnancy, polyhydramnios, fetal macrosomia), uterine fibroids, chorioamnionitis, magnesium sulfate infusions, and prolonged use of oxytocin. Ineffective uterine contraction, both focal and diffuse, can be caused by various reasons, including retained placental tissue, placental pathologies (e.g., placenta accreta, placenta previa, and placental abruption), coagulopathy (increased fibrin degradation products), and uterine inversion. A body mass index (BMI) higher than 40 (class III obesity) is also a recognized risk factor for postpartum uterine atony.Uterine atony (weakened uterine tone) occurs when the uterus does not contract (or tighten) properly during or after childbirth. This is a serious complication that can lead to life-threatening blood loss. Uterine atony (weakened uterine muscle tone) means the uterus is soft or not tight enough.

During pregnancy, your baby grows in the uterus and receives blood, oxygen, and nutrients through the placenta. Blood vessels and arteries supply the baby with blood through the placenta. After delivery, the uterus contracts to expel the placenta. These contractions help prevent bleeding by compressing the blood vessels connecting the uterus to the placenta. Without pressure on these vessels, they can bleed freely, leading to postpartum hemorrhage (heavy bleeding after childbirth).

Uterine atony can occur during miscarriage or other uterine surgeries, and can also be a complication of vaginal delivery or cesarean section. Uterine atony occurs in approximately 2% of all births in the United States, but not all cases result in postpartum hemorrhage.

Uterine atony requires immediate medical intervention. With prompt treatment, most patients experience a full recovery.

What happens if the uterus doesn't contract after childbirth?

If the uterine muscles don't contract after childbirth, there is a risk of excessive blood loss. After childbirth, blood vessels in the uterus rupture to allow the placenta to separate from the uterine wall. Contractions help compress the blood vessels. If the muscles don't contract strongly enough, blood flows freely, and there is a risk of severe bleeding. This is an emergency and can be life-threatening.What are the risk factors for uterine atony? Uterine atony can be caused by several risk factors. These factors can prevent the uterus from contracting after birth:This is your first child, or you've had more than five children.

You are having twins, triplets, etc.

Your baby is larger than average (fetal macrosomia).

You are over 35 years old.

You have too much amniotic fluid (polyhydramnios).

You are obese.

You have uterine fibroids.

According to medical professionals, if the following factors are present during labor, the uterus may not contract after birth:

You had a very long or very rapid labor.

You had a difficult labor.

You had induced labor.
You have chorioamnionitis (inflammation of the fetal membranes).
You had general anesthesia.
You have an enlarged uterus.

You are at high risk for uterine atony if you have more than two risk factors. For women with known risk factors, healthcare providers can take steps in advance to be prepared for surgical intervention.

Symptoms and Causes

What Causes Uterine Atony?

Uterine atony occurs when the uterine muscles do not contract sufficiently in response to oxytocin, a hormone produced in the body before and during labor to stimulate contractions.

What are the symptoms of uterine atony?

The most obvious sign of uterine atony is prolonged or heavy uterine bleeding. In most cases, uterine atony is diagnosed shortly after birth. Additionally, after childbirth, the uterus is relaxed, weakened, and stretched.

Other symptoms of uterine atony include:

Low blood pressure.
Rapid heartbeat.
Dizziness or lightheadedness.
Paleness.
Loss of consciousness.
Inability to urinate.
Pain, especially in the back.

Postpartum hemorrhage (PPH) remains the leading direct cause of maternal mortality worldwide, accounting for approximately a quarter of all maternal deaths annually. PPH is defined as blood loss of 500 mL or more within 24 hours of vaginal delivery or 1000 mL after caesarean section. PPH is an obstetric emergency that requires immediate recognition and treatment, as delay in treatment is a leading cause of maternal death. Despite advances in obstetric care, women continue to die from preventable hemorrhage, particularly in low-resource settings where challenges in health systems exacerbate the situation. Say et al. Noted that worldwide, PPH accounted for 8% of maternal deaths in developed regions and 20% of maternal deaths in developing regions. More recent estimates place the incidence of postpartum hemorrhage after vaginal birth at between 6% and 10%, with rates varying significantly by region, availability of skilled birth attendants, timely intervention, and health infrastructur.

In sub-Saharan Africa, postpartum hemorrhage is a leading cause of maternal mortality. Research shows that it is common and leads to poor outcomes due to delayed recognition, inadequate blood transfusion services, and limited surgical capacity. In Zambia, despite national and global commitments, maternal mortality remains unacceptably high. Zambia's National Health Strategic Plan (2017–2021) targets a reduction in the maternal mortality ratio (MMR) from 398 deaths per 100,000 live births in 2014 to 162 per 100,000 by 2021, in line with Sustainable Development Goal (SDG) 3.1 of reducing the MMR to less than 70 deaths per 100,000 live births by 2030. However, studies conducted after the 2021 target was achieved found that Zambia's maternal mortality rate remains above 300 per 100,000 live births, with postpartum hemorrhage (PPH) being the leading cause. This study examined postpartum hemorrhage (PPH) outcomes such as need for blood transfusion, hemorrhagic shock, hysterectomy, referral to a specialized unit, admission to a specialized unit (SU) or intensive care unit (ICU), and maternal mortality. Although the most common immediate cause of primary PPH was cervical laceration, most secondary complications were related to uterine atony, consistent with global data indicating that uterine atony remains a major cause of severe

maternal morbidity. Several studies have highlighted that the obstetric shock index (SI) is a more reliable predictor of adverse outcomes in postpartum hemorrhage..

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