

Management of Atonia Uteri

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Abstract

Background: Uterine atony is one of the post-partum bleedings that can cause death in the mother. Uterine atony is an obstetric emergency and is one of the top five causes of maternal death. Post-partum/post-partum bleeding (PPH) is bleeding that occurs after delivery. Uterine atony is the 5th cause of maternal death. **Method:** The source search was carried out on the online portal of journal publications as many as 16 sources from Medscape, Google Scholar and the Nation Center for Biotechnology Information / NCBI with the keywords "uterine atony" and "postpartum hemorrhage". **Discussion:** Bleeding in uterine atony occurs during the third stage of labor, where after the delivery of the placenta the myometrial muscles should contract to constrict the arteries and stop bleeding at the placental implantation site. Management of the third stage is an important stage in labor that plays a role in preventing post-partum bleeding. **Conclusion:** Uterine atony can be diagnosed when there is more blood loss than usual and a flaccid and enlarged uterus. Active management of the third stage is a way to prevent uterine atony.

Keyword: uterine atony; Bleeding; PPH;

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Introduction

Postpartum hemorrhage (PPH) is the most common obstetric complication of childbirth (Gonzalez-Brown and Schneider 2020). All pregnancies beyond 20 weeks of gestation are at risk for postpartum hemorrhage. Although there are several risk factors associated with PPH, it is important to know that it often occurs without early signs (Newsome et al. 2017). PPH remains the leading cause of maternal death in developing countries. In developed countries, it has fallen to second or third for maternal mortality directly behind hypertension and thromboembolic complications. In high-income countries, 80 to 90% of maternal deaths from PPH are avoidable (Sentilhes et al. 2016). Postpartum hemorrhage is defined as blood loss of 1,000 mL or more or signs and symptoms of hypovolemia in the first 24 hours after delivery and up to 12 weeks postpartum, regardless of the method of delivery (Watkins and Stem 2020).

Uterine atony is one of the post-partum bleedings that can cause death in the mother. Uterine atony is an obstetric emergency and is one of the top five causes of maternal death (Gill et al., 2021). Post-partum hemorrhage (PPH) is bleeding that occurs after delivery. Uterine atony is the 5th cause of maternal death. The absence of effective uterine contractions after delivery complicates 1 in 40 births in the United States and is responsible for at least 75% of cases of postpartum hemorrhage (Gill, et al., 2021). The incidence of uterine atony increased by 26% between 1994 and 2006. In contrast, maternal mortality due to obstetric PPH has decreased since the 1980s and accounted for slightly more than 10% of maternal deaths in 2009 (Shields, Goffman, and Caughey 2017). Uterine atony occurs during the third stage of labor, where after the placenta is born, the myometrial muscles should contract to constrict arteries and stop bleeding at the placental implantation site (Nelson, Yost, and Cunningham 2013). If uterine atony occurs, health care providers should be prepared for initial medical management directed at the use of drugs to increase tone and induce uterine contractions (Gill, et al., 2021).

the study focuses on explaining the related postpartum hemorrhage due to uterine atony from the definition, epidemiology, etiology and risk factors, pathophysiology, clinical manifestations, and management of uterine atony.

Research Method

The writing of this article was sourced from scientific journals and government guidelines and relevant agencies and focused on stroke and its radiological features. Source searches were carried out on the online portal of journal publications as many as 16 sources from Medscape, Google Scholar (scholar.google.com) and the Nation Center for Biotechnology Information/ NCBI (ncbi.nlm.nih.gov) with the keywords "uterine atony" and "postpartum hemorrhage".

Result and Discussion

Definition

Uterine atony is a condition where there is an inadequate contraction of the uterine myometrial muscles to endogenous oxytocin released during labor to stop bleeding after delivery of the placenta (Nelson, Yost, and Cunningham 2013) (Gill, et al., 2021). Bleeding in uterine atony occurs during the third stage of labor, where after the placenta is born, the

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myometrial muscles should contract to constrict arteries and stop bleeding at the placental implantation site (Nelson, Yost, and Cunningham 2013). Management of the third stage is an important stage in labor that plays a role in preventing postpartum bleeding. Management of the third stage is carried out by injecting oxytocin 10 IU IM, controlled cord stretching (PTT), and uterine fundus massage (Prawirohardjo, 2010). Oxytocin injection in the third stage plays a role in helping uterine myometrial muscle contractions thereby reducing the incidence of bleeding, shortening the third stage of labor, and reducing the occurrence of retained placenta (Prawirohardjo, 2010).

Epidemiology

Globally, uterine atony is one of the 5 causes of maternal death. Maternal hemorrhage cases are more common in low and middle-income countries, in 2017 of 38,000 deaths, more than 90% occurred in low and middle-income countries (Suarez et al. 2020). The absence of effective uterine contractions after delivery complicates 1 in 40 births in the United States and is responsible for at least 75% of cases of postpartum hemorrhage (Gill, et al., 2021) and increased by as much as 26% between 1994 and 2006 mainly for the incidence of atony. uterus. In contrast, maternal mortality due to obstetric PPH has declined since the 1980s and accounted for slightly more than 10% of maternal deaths in 2009 (Shields, Goffman, and Caughey 2017). Uterine atony specifically causes up to 80% of cases of postpartum hemorrhage. Unlike other causes of obstetric bleeding such as placental abnormalities which can be detected before birth, uterine atony is difficult to predict (Wetta et al. 2013). In Indonesia, the maternal mortality rate is still relatively high and postpartum hemorrhage is the main cause of maternal death and approximately 90% of maternal deaths occur during delivery and immediately after delivery. In 2012, the maternal mortality rate was classified as still high, namely 359 per 100,000 live births (Julizar and Sukandar 2019; Yuliati et al. 2018).

Etiology and Risk Factor

The most common cause is the failure of the uterus to contract after delivery to stop bleeding from the blood vessels at the placental implantation site. Uterine atony can at least be anticipated well before delivery is known from the history of risk factors. However, in one study, up to half of the women who developed atony after a cesarean delivery were found to have no risk factors. Thus, the ability to identify which individual women will experience atony is limited (Nelson, Yost, and Cunningham 2013). Some risk factors for uterine atony include prolonged labor, rapid delivery, uterine distension (multiple pregnancies, polyhydramnios, fetal macrosomia), uterine fibroids, chorioamnionitis, indications for magnesium sulfate infusion, and prolonged use of oxytocin. Ineffective uterine contractions, both focal and diffuse, are also associated with a variety of etiologies including retained placental tissue, placental disorders (such as an unhealthily attached placenta, placenta previa, and placental abruption), coagulopathy (increased fibrin degradation products), and uterine inversion (Gill, et al., 2021). However, 20% of postpartum hemorrhages occur in women without risk factors, so clinicians should be prepared to manage this condition in every case (Evensen, Anderson, and Fontaine 2017).

Pathophysiology

The uterus is the site of implantation of a fertilized ovum, the site of fetal development during pregnancy and childbirth. Anatomically, the uterine subdivision can be divided into three parts, namely the fundus which is the superior part of the uterine tube which is dome-shaped, the corpus which is the tapered middle part of the uterus, and the cervix which is the narrow inferior part that opens into the vagina (Tortora and Derrickson 2016). The inside of the uterine body is called the uterine cavity and the inside of the cervix is called the cervical canal. Histologically the uterus consists of three layers of tissue (outside-inside) namely the perimetrium, the myometrium, the endometrium. The perimetrium is a visceral peritoneum consisting of simple squamous epithelium and areolar connective tissue. The myometrium is the middle layer of the uterus which consists of three layers of smooth muscle (outside-inside) longitudinal, oblique, and circular, the thickest muscle content is in the uterine fundus and the thinnest in the uterine cervix (Tortora and Derrickson 2016). The endometrium is the innermost layer of the uterus which consists of many blood vessels and has 3 components, namely the innermost layer of columnar epithelium, endometrial stroma, and endometrial glands. Differences in the anatomical and histological arrangement will affect the management of cases of uterine atony. Post-partum hemorrhage (PPH) is bleeding that occurs after delivery. PPH can be divided into 2 namely, primary PPH and secondary PPH. Primary PPH is bleeding from the birth canal with a volume of >500cc in normal delivery and >1000cc in cesarean section delivery within 24 hours. Secondary PPH is an increase in bleeding that occurs after 24 hours to 42 days / the end of the puerperium. Based on the etiology, PPH can be divided into 4Ts, namely tone, trauma, tissue (placental retention), and thrombin (blood clotting disorders) (Prawirohardjo, 2010).

Anatomically, the uterus is composed of the endometrium, myometrium, and serosa. The endometrial layer is the inner layer of the endometrium and in pregnancy is the site of attachment of the placenta, this layer consists of endometrial arterioles and endometrial venules. The myometrial layer is the layer of the uterus that is dominated by smooth muscle. In normal delivery when the placenta is delivered, the blood vessels in the endometrial lining that were previously connected to the placenta will open and cause bleeding. In the endometrial layer, there are no muscles or other structures that can help these blood vessels to vasoconstrict, in normal pregnancy the myometrium layer plays a role in helping blood vessel contractions after the placenta is born so that further bleeding does not occur (Nelson, Yost, and Cunningham 2013; Tortora and Derrickson 2016). In uterine atony, the role of the myometrium in helping vasoconstriction of these blood vessels is inadequate/maximal, so that bleeding continues. Myometrial contractions are influenced by various factors such as excessive stretching of the myometrial muscles in Gemelli pregnancy, polyhydramnios, and macrosomia; myometrial muscle fatigue in prolonged labor; intrapartum infection; administration of narcosis; and others (Prawirohardjo, 2010).

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Clinical Manifestations

Symptom monitoring was performed after a physical examination and immediately after vaginal delivery. Direct palpation at cesarean delivery (usually after the closure of the uterine incision) or indirect examination by bimanual examination after vaginal delivery reveals a tender, tender, and unusually enlarged uterus, usually with bleeding from the cervical us. Diffuse uterine atony is usually confirmed by the discovery of more blood loss than usual during an examination showing a flaccid and enlarged uterus, which may contain a large amount of blood. With focal localized atony, the fundal region may contract well while the lower uterine segment is dilated and atonic, which may be difficult to recognize on abdominal examination but detectable on vaginal examination. Digital exploration of the uterine cavity (if adequate anesthesia is available), or obstetric ultrasound imaging at the bedside to reveal echogenic endometrial lines are important investigations to establish the diagnosis (Gill, et al., 2021).

Management

If uterine atony occurs, health care providers should be prepared for initial medical management directed at the use of drugs to increase tone and induce uterine contractions (Gill, et al., 2021). Medications that may be used for postpartum hemorrhage secondary to uterine atony include:

- **Oxytocin (Pitocin)** can be given IV 10 to 40 units per 1000 ml or 10 units intramuscularly (IM). Rapid infusion of pure may cause hypotension.
- **Methylergonovine (Methergine)** is given IM 0.2 mg. Given every 2 to 4 hours. Should be avoided in patients with hypertension.
- **15-methyl-PGF₂-alpha (Hemabate)** was given IM 0.25 mg. Administered every 15 to 90 minutes for a maximum of 8 doses. Should be avoided in people with asthma. May cause diarrhea, fever, or tachycardia. That's expensive.
- **Misoprostol (Cytotec)**: 800 to 1000 mg placed rectally. May cause low-grade fever. It has pending actions.
- **Dinoprostone (Prostin E2)** 20 mg vaginal or rectal suppository may be given every 2 hours (Gill, et al., 2021).

If the above treatment fails with excessive bleeding, there are several non-pharmacological therapies that can be done:

- **Uterus massage**, performed by rubbing or stimulation of the uterine fundus
- **Aortic compression**, can help control bleeding that occurs through reduced blood flow in the distal area including as well as blood flow in the uterine arteries. Compression of the aorta is done by pressing on the joint area that is flat above the uterine contractions and slightly to the left.
- **Bimanual compression**, by inserting the right hand into the vagina on the front surface of the uterus and the left hand on the abdomen on the fundus towards the back surface of the uterus. (Sarim 2020)
- **Wrapping of the uterus with gauze (with vaginal dressing to ensure retention, thus uterovaginal dressing)**, with Foley catheter insertion to allow bladder drainage.

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The wrapping of the uterus should be tight and uniform, and this is achieved quickly and efficiently with rolled gauze tape.

- **Bakri balloon (with vaginal wrap to ensure retention)**, with Foley catheter insertion to facilitate bladder drainage. (Gill, et al., 2021)

In addition to the above treatment, surgical management techniques can also be used as below:

- **Uterine artery ligation (O' Leary)**, with the option to extend arterial ligation to the tubo-ovarian vessels. In this technique, occlusion of the upper uterine vessels is performed with a success rate of 80%–96%. This technique is safe for trauma to the ureter.
- **Compression sutures such as the B-Lynch Suture**, to predict the success of this procedure, manual uterine compression is performed first. If there is a reduction in the amount of blood that comes out, then compression with these sutures is most likely effective.
- **Hypogastric artery ligation (performed by Gyn/Onc)**, the success rate of hypogastric artery ligation varies between 42–93%. Improper ligation can result in lower extremity ischemia, pain in the buttocks, continued bleeding, and possible trauma to the ureters and nerves.
- **Hysterectomy**, although generally a last resort but in certain cases can be the first choice when fertility is no longer needed. The incidence varies above 8 per 1000 births, while the morbidity from peripartum hysterectomy is 30–40%.
- **Embolization**, in addition to the use of uterine tampons at the same time uterine artery embolization can be performed in order to avoid hysterectomy so as to maintain fertility. The success rate for uterine artery embolization is 70–100%. Complications that may occur including failure of embolization are persistent bleeding, infection, trauma to blood vessels, postoperative pain, and heat. (Sarim 2020)

Conclusion

Uterine atony is a condition in which uterine myometrial contractions are inadequate for endogenous oxytocin released during labor to stop bleeding after delivery of the placenta. Uterine atony is an emergency case that can cause death in the mother.

Uterine atony can be diagnosed when there is more blood loss than usual and a flaccid and enlarged uterus. Active management of the third stage is a way to prevent uterine atony. If uterine atony occurs, it must be managed quickly and appropriately, both non-pharmacologically, pharmacologically, and surgically.

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