

Acute uterine inversion as a cause of major post-partum haemorrhage : a case report and review of the literature

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Abstract

Uterine inversion is an uncommon but potentially life threatening obstetric emergency. The typical presentation is that of major obstetric haemorrhage and shock, with most patients requiring blood transfusion. It is imperative that the condition is recognized quickly and managed promptly and appropriately by a multi-disciplinary team, in order to minimize the potential for maternal morbidity and even mortality. A short case report is used to illustrate the importance of the condition, as it is crucial for clinicians to have a heightened awareness of the condition and know how to best manage it, when it does occur. The accompanying review of the literature provides helpful insights into the diagnosis and optimal management of this potentially life threatening condition.

CASE REPORT

A 33-year-old primigravida was induced at 38 weeks for pre-eclampsia. She had artificial rupture of membranes, followed by Syntocinon infusion and an epidural. Due to a prolonged second stage, she had a ventouse assisted delivery. However, following delivery of the placenta, she developed a major post-partum haemorrhage (PPH). All members of the obstetric crash team were rapidly summoned to provide assistance. Although uterine inversion was immediately diagnosed, manual repositioning was not possible. The diagnosis of uterine inversion was further confirmed by ultrasound scan.

The patient was resuscitated, stabilized and taken to theatre for an examination under anaesthesia. Uterine repositioning was achieved successfully through manual reduction after administration of a general anaesthetic. Following this the uterus remained atonic and major post-partum haemorrhage ensued. Her total blood loss exceeded 3.5 liters and she required eleven units of blood, six units of fresh frozen plasma, two units of cryoprecipitate and four units of platelets. As her uterus failed to respond to the step-wise administration of numerous uterotonic agents, a decision was taken to proceed to laparotomy to elucidate and treat the cause of her ongoing bleeding. There was no evidence of perforation and the cavity was explored to ensure the absence of residual placental tissue. A modified B-Lynch brace suture was then performed to overcome the persistent

uterine atony and was successful in arresting the bleeding.

Once haemostasis was secured, the patient was transferred to ITU for three days. She made a good recovery and was ultimately discharged home on day 10.

This case highlights the importance of early recognition and a prompt response by a multidisciplinary team, in the management of uterine inversion. Despite the rarity of this obstetric emergency, it has the potential for significant morbidity. Therefore, it is important for clinicians to have a heightened awareness of the condition and know how to best manage it, when it occurs. Thus a review of the literature provides helpful insight into making a diagnosis and the optimal management of this potentially life threatening condition.

REVIEW OF THE LITERATURE

Uterine inversion is said to occur when the uterine fundus prolapses within the endometrial cavity or when the uterine fundus turns inside out, into the cavity. It can present either in the puerperal (obstetric) or non-puerperal (gynaecological) setting.

Spontaneous non-puerperal inversion is quite rare. This usually occurs in the presence of a polypoid uterine tumor. Although submucous leiomyoma's have usually been implicated, teratoma and sarcoma have also been reported.(1,2,3,4)

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Puerperal (obstetric) uterine inversion is relatively uncommon. Occurring with a variable incidence of between 1: 2148 to 1: 6407 (5, 6) It has also been reported at the time of caesarean section but to a far lesser extent.(7) It is an obstetric emergency, with the potential for significant maternal morbidity and even mortality.(8)

Uterine inversion may be classified according to either the degree (anatomical severity) and / or timing of the inversion (9) :

Stage 1: Inversion of the uterus is intrauterine or incomplete. The fundus remains within the cavity.

Stage 2: Complete inversion of the uterine fundus through the fibromuscular cervix.

Stage 3: Total inversion, whereby the fundus protrudes through the vulva.

Stage 4: The vagina is also involved with complete inversion through the vulva.

The timing of the inversion may be acute (within 24 hours of delivery), subacute (more than 24 hours postpartum) or it may be chronic (more than a month postpartum).(10)

The relative prevalence of each class of inversion is 83.4%, 2.6% and 13.9% respectively. (11)

A number of aetiological factors have been implicated but often there is no clear cause. In about half of reported cases it appears to occur spontaneously, mostly in young primiparous women.(5) However, factors associated with puerperal uterine inversion are listed in the table below.(12,13)

Figure 1

Table 1 : Factors associated with puerperal uterine inversion

Maternal	Uterine structural anomaly, connective tissue disorders (Marfan's/Ehler's-Danlos)
Placental	Fundal placenta, placenta praevia abnormal placental adherence
Umbilical cord	A short umbilical cord
Fetus	Macrosomia
Labour / Intrapartum	Precipitate labour, uterine atony
Iatrogenic	Antepartum tocolysis eg. MgSO ₄ , poor management of the third stage of labour due to premature cord traction prior to placental separation
Idiopathic	

The presentation of the uterine inversion will vary depending of the degree or severity of the inversion. Severe cramping lower abdominal or uterine pain or signs of mild shock may occur in the early stages. However, the typical clinical presentation of acute uterine inversion is that of haemorrhage, which occurs in up to 94% of cases.(14) Shock occurs in 40% of cases with an estimated blood loss of about two liters and many patients will require at least a two units blood transfusion.(15, 16) Puerperal uterine inversion should always be excluded in cases of sudden post-partum collapse and / or major post-partum haemorrhage.

Shock is generally thought to be neurogenic, due to the traction effect on the surrounding peritoneum which is classically associated with bradycardia.(17) The intense vagal stimulation leading to hypotension reported with uterine inversion may even lead to cardiac arrest.(18) But ultimately shock will be as a result of haemorrhage. Non – puerperal or chronic uterine inversion is more likely to present sub-acutely with persistent vaginal bleeding and anaemia.(10) Thus maternal morbidity may be significant with a uterine inversion and mortality rates approach 15%.(19) Therefore it is paramount that further assistance is promptly summoned, so that the patient can be effectively resuscitation and appropriately stabilized.

The key approach which is usually successful if done immediately, is a non-surgical technique referred to as Johnson's method. Once diagnosed an attempt is made to replace the uterus digitally; which entails manual replacement of the uterus through the vagina past the

cervical ring. "The hand is placed inside the vagina, with the cup of the inversion in the palm of the operator's hand and the tips of the fingers towards the utero-sacral ligaments. The uterus is then forcefully lifted inside the abdominal cavity above the level of the umbilicus and held for 3 – 5 minutes until the passive action of the uterine ligaments corrects the inversion."(20)

It is pivotal that manual repositioning should be attempted without removing the placenta, if separation has not yet occurred.(16) Otherwise the patient is liable to bleed excessively, which could precipitate shock.(21)

Should manual reduction fail to achieve uterine repositioning, then employing the use of hydrostatic replacement or O'Sullivan's technique would be the next approach. This is usually done with the patient in the lithotomy position, in theatre. It was initially described 64 years ago, when warm fluid was infused into the vagina and the created pressure used to achieve successful uterine reduction.(22) This idea was subsequently modified 12 years ago by Ogueh & Ayida, when they described using a 6cm silastic ventouse cup to correct uterine inversion.(23) A good saline seal is crucial to the success of hydrostatic reduction. It is important to resist the tendency to push the cup deeper inside the vagina. An excellent seal is automatically maintained by gently withdrawing the ventouse cup (inside the vagina) until it fits snugly at the vaginal orifice, as described by Tan & Luddin. (24) The accumulating saline will exert pressure backwards to maintain the seal. This technique modification by Tan & Luddin is simple and effective.

Historically, tocolysis has been used to facilitate repositioning of uterine inversion. A number of agents have been used including magnesium sulphate and nitroglycerine. However, terbutaline is generally considered the drug of choice due to its easy administration, rapid onset of action and its ready availability on the delivery suite.(25) Its success rate approaches 63%.

Nowadays, tocolytic drugs are being used with far greater frequency for a number of different obstetric indications. An example, is the use of tocolysis for the management of the impacted fetal head in 2nd stage caesarean sections.(26) However, a cautious approach needs to be adopted as this could potentially predispose to iatrogenic uterine inversion and associated post-partum haemorrhage. Nitroglycerine has previously been used as a tocolytic during caesarean section,

at which time it has been associated with uterine inversion and atony.(27) The use of tocolytic agents in the management of uterine inversion remains controversial and judicious use should be made on a case by case basis.

Bhalla R et al, have suggested rather than using tocolytic agents in a conscious patient, perhaps it would be better to transfer patients to theatre relatively early for general anaesthesia. This would provide pain relief and promote uterine relaxation, making reduction easier.(28) Although general anaesthesia (with a potent inhalational anaesthetic) may help to facilitate uterine replacement; it still potentially exposes the mother to a number of serious risks. These include the possibility of aspiration, morbidity associated with failed intubation, further cardiovascular depression in a haemodynamically unstable patient and of course the potential for worsening post-partum haemorrhage.(27) Thus there may be some argument for employing the use of regional anaesthesia instead.

If uterine inversion has persisted despite non-surgical approaches, then surgery will usually be required. However, this is the case in only a small proportion of inversions. Although quite a number of surgical approaches have been described in the literature, only the most common will be discussed further.

The most well known is the Huntington's technique which is performed following laparotomy. The cup or dimple of the inversion is identified and Allis forceps are placed in the cup two centimeters below the ring. Gentle upward traction is exerted on the clamps. There is further placement of forceps on the advancing uterus and traction applied. The process is repeated until the inversion has been corrected.(29)

The Haultain technique describes when a longitudinal incision is made in the posterior portion of the uterine wall, through the cervical ring. This releases the constriction pressure and facilitates uterine replacement by the Huntington method. After replacement has been completed the hysterotomy site is repaired.(30)

Another technique has been described by Tews et al in 2001.(31) Where the constriction ring is released by performing an anterior hysterotomy. The bladder is dissected off the cervix. Then the vagina is entered by means of a longitudinal incision inferior to the constriction ring. This opening is then used to advance two fingers into the vagina just above the prolapsed uterine fundus, which facilitates repositioning of the inversion.

The Spinelli & Kustner techniques are trans-vaginal approaches that involve replacing the uterine fundus through the anterior and posterior transections of the cervix, respectively.(32,33) Kustner's vaginal approach is usually used to treat cases of chronic puerperal inversion.(11) In practicality these techniques are rarely if ever used nowadays, as a number of newer methods have recently been described.

Antonelli E et al, has advocated using a silastic cup to facilitate reduction of uterine inversion by gentle upward pressure, performed at the time of laparotomy.(34) And most recently a technique to reduce uterine inversion using laparoscopy has been described as well.(35) The most recent suggestion to correct uterine inversion has come from Soleymani majd et al, who have employed the use of a SOS Bakri balloon to maintain the structural integrity of the uterine body following manual repositioning. It is recommended that this technique is used when there is a concern about uterine re-inversion, as it may circumvent the need for a repeat laparotomy and possible hysterectomy. SOS Bakri balloon insertion ensures that the balloon conforms to the contours of the uterine cavity to prevent re-inversion of the uterus.(36)

Despite the fact that uterine inversion is uncommon, all obstetric care givers need to have a heightened awareness of the inherent dangers that can occur with uterine inversion. An argument should be made for introducing it into our regular obstetric skills drills because of the potential for significant morbidity if the diagnosis is delayed or missed. By being more aware and preparing for this obstetric emergency, we will be able to respond quickly and appropriately manage this potentially life threatening condition.(37)

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