Uterine inversion, whether partial or complete, is a rare but serious obstetric complication. It usually occurs in the second stage of labour and is a life-threatening complication requiring prompt diagnosis and definitive management. It very rarely occurs in non-pregnant patients, when it is usually associated with prolapsing uterine fibroids or other benign pathologies, although in 15% the cause is a malignant tumour.

**Epidemiology**

Incidence varies widely from as many as 1 per 1,584 deliveries to as few as 1 per 20,000 deliveries in a recent population-based study in the Netherlands. Mortality due to uterine inversion has been reported to be as high as 15%. However, in high-resource countries it is now extremely rare, presumably due to earlier identification and appropriate management.

It is extremely rare in non-pregnant patients; only 150 cases were reported in the USA between 1887 and 2006.

**Classification**

In puerperal inversion, part of the uterus indents towards, and eventually prolapses through, the dilated cervix. It requires relaxation of the uterus to allow the initial indentation, followed by resumption of contractions in such a way that inversion ensues.

Description of the degree of inversion:

- **First-degree** - the inverted fundus extends to, but not through, the cervix.
- **Second-degree** - the inverted fundus extends through the cervix but remains within the vagina.
- **Third-degree** - the inverted fundus extends outside the vagina.
- **Total inversion** - the vagina and uterus are inverted.

Description by the time since inversion:

- **Acute inversion** occurs within 24 hours of delivery.
- **Subacute inversion** occurs between 24 hours and one month after delivery.
- **Chronic inversion** occurs more than one month after delivery.

**Aetiology**

Various factors have been linked to puerperal uterine inversion, although there may be no obvious cause. Identified factors include:

- Short umbilical cord.
- Excessive traction on the umbilical cord.
- Excessive fundal pressure prior to placental separation.
- Premature cord traction prior to placental separation.
- Fundal implantation of the placenta.
- Retained placenta and abnormal adherence of the placenta.
- Chroniic endometritis.
- Vaginal births after previous caesarean section.
- Multiparity.
- Uterine atony.
- Exceptionally large fetus.
- Polyhydramnios.
- Precipitate labour.
- Previous uterine inversion.
- Antepartum use of certain drugs such as magnesium sulfate (drugs promoting tocolysis).
- Structural anomaly of the uterus, such as unicornuate uterus.
- Connective tissue disorders such as Marfan's syndrome.

Poor management of labour may be a cause in up to 75% of cases, especially when the rate is high. Active management of the third stage of labour may reduce the incidence.

In the non-obstetric uterine inversion, a fundally placed tumour is usually the cause.

**Presentation**

It presents most often with symptoms of a postpartum haemorrhage. The classic presentation is of:
Postpartum haemorrhage, which occurs in 65-94% of cases and can be massive.\cite{10, 11} Haemorrhage occurs due to the invaginated fundus preventing uterine contraction following delivery and the stretching of the endometrium leading to increased blood loss from the mucosal surface of the placental bed.\cite{4}

- Lower abdominal pain.
- Sudden appearance of a vaginal mass.
- Cardiovascular collapse, which may be out of proportion to the apparent blood loss.

The sudden appearance of a large dark red mass accompanying the placenta is alarming. Pain is extreme. The diagnosis is usually then immediately obvious and confirmed by inability to feel the fundus.

Diagnosing a first-degree inversion is much more difficult. Obesity can make diagnosis more difficult. Ultrasound may be required to confirm the diagnosis. Complete inversion is accompanied by extreme cardiovascular collapse, more than might be expected from the degree of blood loss alone.

Chronic cases are unusual and difficult to diagnose. They may present with spotting, discharge and low back pain.

**Differential diagnosis**

- **Postpartum haemorrhage (PPH)** due to more common causes.
- Prolapse of a uterine tumour.
- Gestational trophoblastic disease.
- Occult genital tract disease.
- Marked uterine atony.
- Undiagnosed second twin.

**Investigations**

If not clinically obvious, ultrasound can be used to identify the inversion.\cite{11, 12}

**Management**

The important principles are:

- Treatment should follow a logical progression.
- Hypotension and hypovolaemia require aggressive fluid and blood replacement.\cite{13} Steps should follow those set out by the Royal College of Obstetricians and Gynaecologists (RCOG) guidelines. (See separate Postpartum Haemorrhage article for more details.) The four components of management to be instigated at the same time are:
  - Communication.
  - Resuscitation.
Further reading & references

- Monitoring and investigation.
- Measures to arrest the bleeding.
- Immediate uterine repositioning is essential for acute puerperal inversion.

Measures to reposition the uterus may include:\[6\]
- Preparing theatres for a possible laparotomy.
- Cautious administration of tocolytics to allow uterine relaxation; however, this may aggravate haemorrhage:
  - Nitroglycerin (0.25-0.5 mg) intravenously over 2 minutes; or
  - Terbutaline 0.1-0.25 mg slowly intravenously; or
  - Magnesium sulfate 4-6 g intravenously over 20 minutes.
- Attempting prompt repositioning of the uterus. This is best done manually and quickly, as delay can render repositioning progressively more difficult. Reposition the uterus (with the placenta if still attached) by slowly and steadily pushing upwards towards the umbilicus, commonly referred to as Johnson’s method. Maintain bimanual uterine compression and massage until the uterus is well contracted and bleeding has stopped.
- If this fails, hydrostatic replacement should be attempted under spinal or general anaesthetic:
  - O’Sullivan’s technique involves an infusion of warm saline into the vagina, making a water seal with the operator’s hand and the vulva. Successful modifications of this technique, including using a vacuum cup to obtain a better vaginal seal and using a transurethral resection of prostate (TURP) set to increase the hydrostatic pressure, have been reported.\[6\]
  - An SOS Bakri tamponade balloon has also been successfully used to replace the inverted uterus and to maintain its position.\[6, 7\]
- If this is unsuccessful, a surgical approach is required. Laparotomy for surgical repositioning is more usual (find and apply traction to the round ligaments). Incision of the cervical ring may be required. A vaginal or even laparoscopic approach can be used, although this is more likely in the non-obstetric inversion.\[1, 14, 15\]
- If this is unsuccessful, hysterectomy, which may be life-saving, is the final option.

If placenta is still present, careful examination and removal are required to ensure it is not abnormally adherent.

General anaesthetic or uterine relaxant is then stopped and replaced with oxytocin, ergometrine or prostaglandins. Antibiotics are started and the stimulant continued for at least 24 hours. The woman must be monitored closely after repositioning, in order to avoid re-inversion.

Complications

Complications include endomyometritis, and damage to intestines, ureters or uterine appendages. Death can occur quickly if the condition is not recognised.\[4\]

Prognosis

The condition carries a good prognosis if managed correctly.

Further reading & references
