



Postnatal inversion of the uterus – management in specific cases

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Abstract

Inversion of the uterus is defined as the turning inside out of the fundus into the uterine cavity. According to the literature, uterine inversion occurs in 1/20,000 or even 1/1,584 deliveries. Mortality rates following acute uterine inversion were reported by some authors to have been as high as 80%. Therefore, it is very important to make an early diagnosis. The shorter the time between the moment of uterine inversion and its repositioning, the better the results of conservative treatment, and bigger chance of avoiding surgical management. The article presents two cases of patients hospitalised in 2010 – 2011 in the Gynaecologic and Obstetrics Department of the Regional Polyclinic Hospital in Kalisz, Central Poland, diagnosed with acute uterine inversion in accordance with the applicable classification. Surgical management was applied in one of the patients. The other patient was managed in a conservative manner. Both women were discharged from the hospital in a good general condition.

Key words

uterine inversion, manual repositioning of the uterus, hydrostatic method, The Huntington technique, The Haultain technique

INTRODUCTION

Uterine inversion is currently one of the least frequently occurring complications of the third stage of labour. Inversion of the uterus is defined as the turning inside out of the fundus into the uterine cavity [1]. It usually occurs in the fourth stage of labour as a consequence of mismanagement of third stage of labour [1]. Inversion of the uterus occurs more frequently in primiparas. The risk of recurrence of this complication in the subsequent pregnancy increases up to 25% [2]. Uterine inversion can be diagnosed both during spontaneous labour as well as during caesarean section. In his research carried out in the Grace Maternity Hospital in Halifax, Nova Scotia, Canada, Thomas F. Baskett proved that acute uterine inversion occurs twice as often during delivery by caesarean section (1 in 1,860 delivery) than during spontaneous labour (1 in 3,737 deliveries) [3].

Inversion of the uterus occurs between one in 2,000 deliveries and one in 50,000 deliveries [4]. Mortality rates following acute uterine inversion were reported by some authors to have been as high as 41%. [5]. During their eight-year observation in the Gynaecologic and Obstetrics Department in Jinnah Postgraduate Medical Centre, Karachi, Pakistan, between 1995 – 2002, Hussain et al. described 36 cases of acute uterine inversion in 57,036 deliveries that took place in this hospital. Death occurred in only one case. After analysis, it was concluded that uterine inversion in 75% of

patients was caused by mismanagement at the third stage of labour (pulling the umbilical cord while the placenta had not separated at all, and wrong uterine fundal pressure) [6]. In the literature, different risk factors predisposing to uterine inversion are described, e.g. short umbilical cord, placenta in the uterine fundus, chronic uterine mucosa inflammation, sudden or prolonging labour, application of tocolytics, uterine atony, one-horn uterus, and connective tissues diseases [7]. It is claimed that in approximately 50% of cases no specific reason for this complication can be found [5].

The article presents two cases of patients hospitalised in the Gynaecologic and Obstetrics Department of the Regional Polyclinic Hospital in Kalisz, Central Poland in 2010 – 2011, in which acute uterine inversion was diagnosed in accordance with the applicable classification. Surgical management was applied in one of the patient, while the other patient was managed in a conservative manner. Both women were discharged from the hospital in a good general condition.

OBJECTIVE

The aim of the study was to present the difficulties in the diagnosis and treatment of acute, life-threatening uterine inversion, to show how the type and the success of management depend on the time of diagnosis, and to introduce a new, alternative surgical method of treatment, other than the ones described to-date in the literature.

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CASE REPORTS

Case 1. The first case concerns a primigravida, aged 21, admitted to the hospital Pregnancy Pathology Department in the 41st week of pregnancy (PW) for pregnancy observation. However, due to oligohydramnion, the first induction of labour was administered by means of 5 units of Oxytocin in 500 ml 0.9% NaCl. The patient was transferred to the Delivery Ward at 11:15 on the same day. During admission to the hospital, the patient's general condition was good: arterial blood pressure was around 120/70, 130/80 and pulse rate 80 bpm. In laboratory tests, the following results were obtained: haemoglobin (HGB) 12.7 g/dl; haematocrit (HCT) 37.8%; leucocytes $13.9 \times 10^3/\mu\text{L}$; platelets (PLT) $206 \times 10^3/\mu\text{L}$. Contractile activity started after a drip infusion with Oxytocin was administered to the patient. Contractions occurred every 10 minutes and lasted for 20 seconds. Heart rate of the foetus was 140 bpm. At 19:45, during another contraction and perineotomy, a live son was born at term, weighing 3,200 g, Apgar score 6 in the first minute after labour, pH 7.27; BE (base deficiency) -3.4 mmol/L. The placenta was born spontaneously after 15 minutes after birth by means of the Duncan mechanism, partly delivered. The first stage of labour lasted 6 h 40', the second 05'; the third stage lasted for 15'. The quantity of lost blood was approximately 300 ml. Uterine bleeding was observed. Patient's blood pressure – 90/60; pulse rate – 100 bpm. During examination performed before uterine abrasion, a nodular change of 10 cm diameter was diagnosed in the vagina. Initially, no ultimate diagnosis was made. Due to the first signs of hypovolemic shock (tachycardia, decrease of blood pressure) another intravenous insertion was administered as well as a transfusion of 500 ml 0.9% NaCl and 500 ml HAES. Acute postnatal uterine inversion was diagnosed in the subsequent examination.

After obtaining consent to operate, the patient was taken to the operating suite at 20:40. RR 80/50; pulse 110 bpm. Under general anaesthesia by means of Fenoterol 25ug IV, manual repositioning of the uterus was initiated. After an unsuccessful trial, the decision was made to perform laparotomy. The abdominal cavity was opened and uterine inversion confirmed. Bleeding from the uterus was not identified. Allis forceps (a surgical instrument with sharp teeth, used to hold or grasp heavy tissue, which has the advantage of causing less bleeding than the more commonly used tenaculum) were introduced into the crater that formed as a result of the uterine inversion, and gentle upward traction was exerted on the forceps. At the same time, the fundus of the uterine was pressed from the side of the vagina. An attempt was made to raise the fundus of the uterus; however, the procedure was unsuccessful.

A decision was made to try another method. Stitches were laid on the front wall of the uterus in the direction of the fundus of the uterus, and at the same time, the previous stitch was pulled upward, gradually raising the fundus of the uterine. At the same time, assistants pressed the fundus of the uterine from the side of the vagina. This technique was successful and the inverted uterus was repositioned. After dispensing uterus-shrinking drugs: Oxytocin 10 u. IV, Pabal 100 ug IV, Methergina 0.2 mg IV, Cytotec 0.8 mg rectally, massaging the uterus and dispensing five units of Oxytocin to the uterine cervix, the uterus shrank back. After that, integuments were sutured. About 23:00 the patient was handed over to the Intensive Care Unit in a stable general

condition: RR 45/35,70/40; pulse 100 bpm; HGB 8.3 g/dl; HTC 23.9%; leucocytes $29.5 \times 10^3/\mu\text{L}$; PLT $97 \times 10^3/\mu\text{L}$.

Next day, the results were as follows: HGB 6.5 g/dl; HCT 19.2%; leucocytes $21.6 \times 10^3/\mu\text{L}$; PLT $130 \times 10^3/\mu\text{L}$. The patient was given a total of eight units of red blood cells concentrate. She was also given infusion fluids, Cefuroxime 750 mg IV every eight hours, Metronidazole 1g IV every 12 hours, and Enoxaparin sodium 40mg/0.4ml SC (subcutaneous) every 24 hours. During her stay in the hospital, the patient was also given Hemofer Prolongatum 105 mg PO every 12 hours; Betadine 200 mg intravaginal globules every 24 hours.

The patient was discharged from the hospital in a good general condition. The result of blood tests were as follows: HGB 8.1g/dl; HCT 23.9%; leucocytes $9.7 \times 10^3/\mu\text{L}$, PLT $438 \times 10^3/\mu\text{L}$.

Case 2. A primigravida, aged 19, 40th week of pregnancy, was admitted to the Labour Ward at 11:15 in a good general condition, with regular contractions every 10 min. During admission, the results of examinations were as follows: RR 130/100; pulse rate 80 bpm, and in laboratory tests: HGB 11.9 g/dl; HTC 33.5%; leucocytes $11.9 \times 10^9/\text{L}$; PLT $121 \times 10^3/\mu\text{L}$. Heartbeat of the foetus 135/min, light amniotic fluid in amnioscopy. Contractions occurred every five minutes and were increasingly stronger. At 12:25, during another contraction and perineotomy, a live daughter was born during spontaneous labour, at term, weighing 3,210 g, Apgar 9 in the first minute after the labour, pH 7.35 BE – 0.5 mmol/l. Five minutes after the third stage of labour, the afterbirth was born by means of the Schultz mechanism. The first stage of labour lasted for 1h 45', the second stage of labour lasted 40', the third stage of labour lasted 5'. Heavy bleeding occurred and the loss of blood was approximately 700 ml. During genital tract control, acute postnatal uterine inversion was diagnosed. Another intravenous insertion was administered, as well as a transfusion of 500 ml HAES.

The patient was transferred to the operating suite, where under general anaesthesia by means of Fenoterol 25ug IV, manual repositioning of the uterus was initiated by inserting a hand in the vagina and pushing out the fundus of the uterus, via the ostium of the uterus. Uterus-shrinking drugs were then administered: Oxytocin 10 U IV, Carbetocin 100 ug IV, Methylergometrine 0.2 mg IV. After that, the uterus shrank back.

The patient was transferred to the Intensive Care Unit. Blood pressure was around 98/55, 100/65; pulse rate 100 bpm. Laboratory tests were as follows: HGB 7.2 g/dl; HCT 20.3%; leucocytes $12.5 \times 10^9/\text{L}$; PLT $120 \times 10^3/\mu\text{L}$. The patient was given a total of four units of red blood cells concentrate. Moreover, during her stay in the department, the patient was given Oxytocin five units IM every eight hours, Gentamicin 160 mg IV every 24 hours, Metronidazole 0.5 g IV every 12 hours, Amoxicillin 1.2 g IV every eight hours, and Dalteparinum 7,500 units SC every 24 hours. During her stay in the hospital, the patient was also given Hemofer Prolongatum 105 mg PO every 12 hours.

After a five-day stay, the patient was discharged from hospital in a good general condition with the following results: normal RR and pulse rate, HGB 10.1g/dl; HCT 29.2%; leucocytes $5.5 \times 10^9/\text{L}$, PLT $152 \times 10^3/\mu\text{L}$.

DISCUSSION

Uterine inversion is a very dangerous and difficult to manage complication. There are many classification criteria regarding inversion of the uterus, e.g. puerperal uterine inversion that is connected with labour, miscarriage or termination of pregnancy and nonpuerperal concerning non-pregnant uterus. In the literature dating from 1887–2006, only 150 cases of non-puerperal uterine inversion had been described [8]. This complication is most frequently connected with the coexistence of uterine tumours, e.g. myomas, sarcomas [8–11]. In the instance of puerperal inversion, depending on the time between the labour and the diagnosis, the following types of inversion can be distinguished: acute inversion of the uterus if the diagnosis was made within 24 hours after labour (83.4% of all cases of inversion), subacute if the diagnosis was made after 24 hours up to 4 weeks after labour (2.62%), and chronic when inversion of the uterus was diagnosed more than four weeks after the labour (13.9%) [12]. The most frequently used classification concerns the degree of inversion:

- first degree, when the inverted fundus extends to, but not beyond, the cervical ring;
- second degree, when the inverted fundus extends through the cervical ring;
- third degree, when the inverted fundus extends down to the introitus, and the vagina is also inverted [13].

In both clinical cases described, acute postnatal uterine inversion was diagnosed according to applicable classification.

Inversion of the uterus is not a common complication in obstetric practice and can therefore cause diagnostic difficulties. Clinical symptoms are non-specific which makes it difficult to establish diagnosis. In the instance of acute uterine inversion, sudden patient deterioration occurs shortly after labour, with symptoms of shock and circulatory insufficiency in which intensification is not proportional to the loss of blood of the patient. Shock can be either hypovolemic (69% of cases) or neurogenic (13% of cases) [7]. Neurogenic shock occurs as a result of pulling the funnel-shaped pelvic ligaments and ovarian ligament system. Acute uterine inversion can be diagnosed when the fundus of the uterus is not palpable, and a smooth bluish-red tumour in or outside the vagina.

It may be difficult to make diagnosis especially in the instance of first or second degree of uterine inversion. Acute inversion of the uterus can be suspected when unknown circulatory insufficiency occurs during the third stage of labour, or shortly afterwards, especially when no heavy bleeding has been diagnosed. Clinical symptoms in subacute and chronic uterine inversion are less severe. This complication should be suspected in a situation when prolonging heavy bleeding and a purulent vaginal discharge occur in a woman at least 24 hours after labour, and also in women, mainly older women, in instances not connected with pregnancy, with abnormal uterine bleeding, a purulent vaginal discharge, as well as pelvic pain. In such cases, it might be necessary to carry out some additional investigation (ultrasonography, magnetic resonance) to confirm the diagnosis [14].

After diagnosing uterine inversion, its repositioning should be initiated by means of a manual hydrostatic procedure, bearing in mind the necessity to manage shock, which might be difficult, before minimising uterine inversion. Manual

uterine repositioning is the most frequently used method, described for the first time in 1949 by Johnson [15, 16]. Holding the fundus in the palm and keeping the tips of the fingers at the uterocervical junction, the fundus is raised above the level of the umbilicus. The World Health Organization recommends that if manual replacement fails, a hydrostatic method should be used [17]. This method was described for the first time in 1945 by O'Sullivan. Warm sterile water or isotonic sodium chloride solution is rapidly instilled into the vagina via a rubber tube or intravenous giving set, while the accoucheur's hand blocks the introitus. The fluid distends the vagina and pushes the fundus upwards into its natural position by hydrostatic pressure. The quantity of liquid instilled and retrieved from the vagina should be controlled. According to many authors, this method is effective [18]. The use of tocolytic drugs and general anaesthesia plays an important role in the management of uterine inversion. In the literature there is much evidence about the effectiveness of tocolytic drugs used during inversion of the uterus. Betamimetics (terbutaline 0.1–0.25 mg IV) [19], magnesium sulfate (4–6 g IV) and the most frequently used nitroglycerine (0.25–0.5 mg IV) are considered to be most effective [20]. After repositioning of the uterus, the patient should be given uterus-shrinking drugs enabling the uterus to return to its normal shape, and antibiotics to avoid infections [21, 22].

If conservative treatment is unsuccessful, or if uterine inversion lasts for a longer period of time and the cervical canal has shrunk, surgical intervention is required. In the literature, different surgical techniques used during uterine inversion are described. They include both abdominal (Huntington and Haultain methods) and vaginal access (Kustner and Spinelli methods), which are the most frequently used abdominal access methods. During surgery using the Huntington method, after opening abdominal integuments and visualization of the uterus, Allis forceps are introduced into the crater that arises as a result of uterine inversion, and gentle upward traction is exerted on the forceps. At the same time, the fundus of the uterine is pressed from the side of the vagina. In the technique described by Haultain, the uterus is repositioned in a way similar to that used in the Huntington method, by means of Allis forceps. However, an incision of ca. 5–6 cm is made longitudinally at the back of the uterine cervix. After that, the muscular coat is sutured with two or three layers of PDS stitches [23]. The Kustner method includes entering the pouch of Douglas vaginally, and splitting the posterior aspect of the uterus and cervix, and finally re-inverting the uterus. In Spinelli's method, an incision is made in the anterior aspect of the cervix, and the uterus is re-inverted. This technique involves dissection of the bladder from the inverted uterus. If the above-mentioned methods proves to be unsuccessful and if ischaemia of uterine muscle occurs, it is necessary to perform a hysterectomy. In recent research, the effectiveness of laparoscopy in the management of uterine inversion has been proved. [24, 25]. Algorithm of management of acute puerperal uterine inversion is presented on Figure 1.

Results of the treatment of uterine inversion depend on the time between the complication and diagnosis. In the first clinical case described above, around 40 minutes passed between inversion of the uterus and diagnosis. After that time, conservative treatment turned out to be unsuccessful and it was necessary to apply surgical management. The other example shows that the less time that passes between

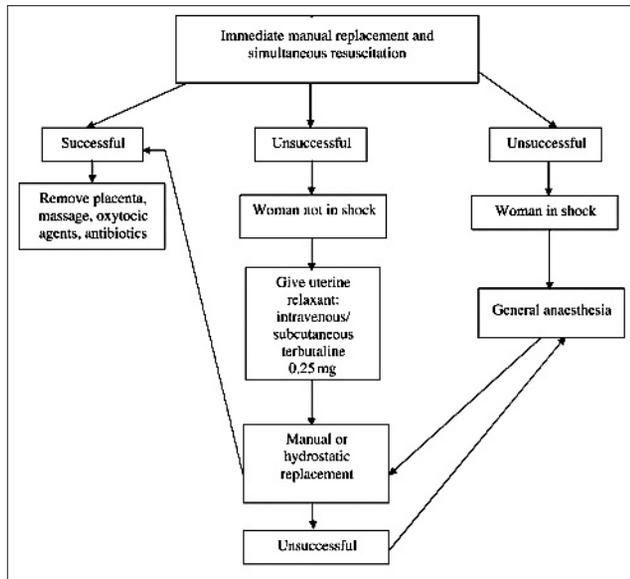


Figure 1. Algorithm of management of acute puerperal uterine inversion [18]

uterine inversion and its repositioning, the better the result of conservative treatment.

CONCLUSIONS

1. Complications concerning the third stage of labour, and especially life-threatening uterine inversion, can be avoided by careful education of the medical staff, specifically regarding the management of labour and quick diagnostics.
2. The time necessary to make a diagnosis from the moment uterine inversion occurs to the moment conservative treatment begins, should be as short as possible to increase the chances of avoiding surgical management.
3. In the instances of extremely acute and life-threatening cases of uterine inversion, only immediate and outright actions can contribute to favourable prognosis for a patient.
4. The surgical method described in the paper can be carried out successfully in case when other surgical methods failed.

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