

Sonographic Findings in Acute Uterine Inversion

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Abstract

We present a case of acute uterine inversion in the third stage of labor in which critical management decisions were facilitated by ultrasound imaging in the operating room. Identification of the ovary and adnexa pulled into the inclination of the inversion allowed successful diagnosis and guidance of uterine replacement.

Introduction

Although rare, uterine inversion is an obstetric complication that is associated with serious risks such as hemorrhage, sepsis and in some cases an emergency hysterectomy if it is not timely managed. Ultrasound imaging is used in fetal monitoring throughout pregnancy but it is not employed as frequently as a diagnostic tool during labor and delivery. Clinical assessment alone may not be sufficient to diagnose and replace an inverted uterus.

Case Report

The patient was a 26-year-old gravida 3 para 2 with an uncomplicated prenatal course who presented to Labor and Delivery at 40 weeks gestation at 6 cm dilated in active labor. She had two previous normal spontaneous vaginal deliveries. The patient's surgical history was significant only for an abdominal hernia repair. She had no other history of uterine procedures. Artificial rupture of membranes was performed and progressed normally to complete dilation. She had an 18-minute second stage of labor followed by a spontaneous vaginal delivery of a 3475g male infant. A true knot was noted in the umbilical cord. The third stage of labor was managed expectedly, without spontaneous expulsion of the placenta within 30 minutes. A manual extraction of the placenta was attempted. As the placenta was delivered, clinical examination identified a uterine inversion. An attempt was immediately made to replace the uterus within the abdominal cavity using manual pressure on the inverted fundus. Clinically, it was felt that the replacement was successful; however, she was taken to the operating room for an

exam under anesthesia which confirmed that the uterus was only partially replaced. Nitric oxide was administered to assist the further replacement of the uterus which was initially believed to be successful. An ultrasound examination was performed in the operating room (GE Pro LOGIQ 200, Proseries, Milwaukee, WI). The sagittal plane just lateral to the midline showed what appeared to be an essentially normal configuration of the uterus with a midline stripe. (Figure 1)

However, when the transducer was moved to the midline, an indentation of the cephalad portion of the uterus was identified with a structure on top that seemed to be coming from the indentation. (Figure 2) This was identified as the left ovary with the hyperechoic proximal adnexal structures pulled with the inverted uterus towards the vagina. The image of the ovary at the indentation orifice, simulated the appearance of a “stuffed olive.” Inhaled nitric oxide was given again, and using ultrasound guidance, the uterus was reverted to a normal uterine position with post-procedure confirmation. Uterotonics were administered.

The patient tolerated the procedures well; however, due to significant bleeding and postoperative hemoglobin of 6.4, she was transfused postpartum. She was discharged to home on day three in good condition.

Discussion:

Uterine inversion is considered an obstetric emergency, and is associated with significant maternal morbidity including maternal hemorrhage, sepsis, need for laparotomy, and hysterectomy. Mortality is a risk, especially in resource poor delivery situations, although death is rare in the recent literature.^{1,2} Reported rates vary from

1:1,200 to 1:57,393 births which probably reflects wide variations in management of the third stage of labor.¹ Management is based upon timely recognition of the inversion with immediate attempts to reposition the uterus. While largely successful if performed immediately, some uterine inversions can be difficult to correct. Availability of ultrasound in most labor and delivery suites has given an opportunity to use imaging to guide clinical management. Although the ultrasound equipment used on a Labor and Delivery is often less sophisticated than that used for intensive prenatal diagnosis programs, capture and recognition of obstetric abnormalities in the acute care setting is still possible and desirable.³

The ultrasound appearance of acute purpurulent uterine inversion was first described in 1985, with a total of eight cases having images including the present case.⁴⁻¹⁰ (Table 1) Of these, two (25%) showed ultrasound features of uterine inversion in the early postpartum period, but the significance of the images was not initially recognized.^{4,8} In four (50%) of the cases, a uterine inversion was not immediately recognized after delivery with delays in diagnosis ranging from 20 hours to 8 weeks.^{4,6,8,10} One case (12.5%), had an immediate uterine replacement performed, but returned for a “routine” post partum visit where a chronic inversion was diagnosed both clinically and with ultrasound.⁹ Our case could have followed a similar course, if ultrasound had not been used to confirm that the initial attempts at the inversion correction were not successful. Importantly, of the five cases requiring laparotomy, four (80%) were associated with delayed diagnoses.^{4, 5, 8-10} Given that morbidity increases proportionately to the amount of time the diagnosis is delayed, prompt recognition and treatment of the condition is critical.

Ultrasound in this case was helpful in clarifying an incomplete correction of the inversion, which assisted in timely and successful attempts to complete the uterine replacement, thereby avoiding delay and further complications. In addition, we were able to identify clearly an ultrasound feature of uterine inversion, which would be the ovary positioned at the uterine inversion indentation in a sagittal plane giving the appearance of a “stuffed olive.” Based on our experience with this case and reviewing the literature, we would suggest that ultrasound be used for all clinical suspected cases of uterine inversion to confirm appropriate replacement of the uterus to its normal anatomic position. The ultrasound examination should include sagittal images across the entire uterus, since images that are not exactly midline may be misleading and could give the false impression of normal anatomic position of the uterus. If identified, even partial uterine inversion should be corrected due to the increased risk for the development of a chronic uterine inversion requiring laparotomy for treatment.

TABLE 1- Summary of reported cases of uterine inversion having associated ultrasound findings with clinical outcomes.

Author	Year	GA at delivery	Inversion Recognized at Delivery	Timing of ultrasound	Ultrasound Findings	Clinical Outcome
Gross ⁴	1985	38 weeks	No	Early postpartum	Partial inversion, Y-shaped central uterine echoes	Initially not treated, returned 5 wks. Postpartum and required laparotomy for inversion correction
Hsieh ⁵	1991	39 weeks	Yes	Immediate postpartum	Stellate echogenic center of inverted uterus (transverse); longitudinal groove from cephalad part of mass into the center (sagittal)	Laparotomy with inversion correction
Chou ⁶	1995	Not reported	No	2 days Postpartum	Fundal indentation (sagittal); echolucent zone between an echogenic mass filling the uterine cavity and the uterine wall (transverse “ball in donut” appearance)	Uterine replacement under halothane anesthesia 2 days postpartum
Ward ⁷	1995	Term	Yes	Immediate postpartum	Progression of hydrostatic reduction of inversion	Successful hydrostatic inversion reduction
Momin ⁸	2009	Not reported	No	8 hrs. postpartum	Plane of cleavage from expected position of fundus to the cervix, ill-defined endometrial cavity, poorly define cx (sagittal); stellate echogenic center (transverse)	Initially not treated, returned eight weeks later with chronic uterine inversion requiring laparotomy for correction
Rana ⁹	2009	Not reported	Yes	After “routine postpartum visit”	Hyperechoic fundus with hypoechoic rim (transverse); two opposed serosal surfaces creating endometrial pseudostrip within uterine structure (sagittal)	Laparotomy with hysterectomy due to necrotic uterus.
Pauletta ¹⁰	2010	40 weeks	No	20 hrs. postpartum	Crater-like depression in cephalad portion of uterus, 3D image of inversion constriction ring	Laparotomy with inversion correction and repair of ruptured cesarean scar
Smulian	2012	40 weeks	Yes	Immediate postpartum	Indentation of cephalad portion of uterus with ovary protruding from indentation and hypoechoic adnexal structures pulled into inversion (“stuffed olive”)	Successful uterine replacement under ultrasound guidance.

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FIGURE LEGEND



Figure 1. Slightly parasagittal image of uterus simulating the appearance of normal uterine position and internal stripe.



Figure 2. “Stuffed Olive” appearance of acute uterine inversion with the ovary positioned at the indentation of the inversion ring as the adnexa are pulled into the inversion.