

Opinion Paper

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Abnormally invasive placenta (AIP): pre-cesarean amnion drainage to facilitate exteriorization of the gravid uterus through a transverse skin incision

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Abstract: The number of pregnant women with abnormally invasive placenta (AIP) including clinical relevant placenta increta and percreta has markedly increased with a reported incidence of as high as one in 731. By 2020 in the United States, there will be an estimated 4504 new cases of AIP and 130 AIP-associated maternal deaths annually. The preoperative diagnosis and operative management of AIP is challenging. In a planned cesarean delivery, a vertical lower abdominal skin incision is widely used in order to have enough space to perform a hysterotomy above the cranial edge of the placenta to avoid significant fetal and/or maternal hemorrhage. We have used preoperative drainage of the amniotic fluid after epidural anesthesia and immediately before a planned cesarean delivery through a transverse skin incision in five patients with AIP of the anterior uterine wall. With less uterine volume, exteriorization of the gravid uterus is easily performed through a transverse laparotomy. The combination of amnion drainage, transverse laparotomy and exteriorization of the gravid uterus facilitates identification of the exact site of placental implantation,

provides adequate space for performing fundal or high anterior or even posterior uterine wall incisions and to deliver the fetus safely while minimizing the risk of placental separation and subsequent uncontrolled blood loss. Furthermore, this technique provides the chance to leave the untouched placenta *in situ* or to remove the placenta *in toto* with a uterine wall segment.

Keywords: abnormally invasive placenta; amnion drainage; placenta percreta; uterus exteriorization.

Introduction

In patients with abnormally invasive placenta (AIP), normal separation of the placenta from the uterine wall during the third stage of labor is impossible, resulting in high maternal morbidity and a mortality of up to 7% [1]. The number of pregnant women with AIP including clinically relevant placenta increta and percreta has increased 10-fold over the last 50 years [2], with incidence rates as high as one in 731 [3, 4]. Most likely attributed to the increased rate of cesarean section, the preoperative diagnosis and operative management of AIP remains challenging [5, 6].

In the presence of placenta previa involving the anterior wall, the rate of AIP increases even more, from 24% in patients with a history of one previous cesarean delivery to 67% in patients with a history of three or more cesarean deliveries [7]. Therefore, in most of the case series reported so far, a vertical laparotomy incision is used in order to have enough space to perform a hysterotomy above the cranial edge of the anterior placenta and to avoid significant fetal and/or maternal hemorrhage which can occur with a uterine incision through the placental implantation site. Additionally, exteriorization of the gravid uterus through a vertical laparotomy in order to avoid transplacental delivery has been proposed in patients with placenta previa percreta [8, 9]. The optimal gestational age

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Table 1: Patients characteristics.

No	Age, gravidity/parity	Previous intrauterine surgery	Gestational age at delivery (weeks + days)	Amnion drainage, mL	Exteriorization	Localization of AIP	Procedure	Blood loss; transfusion	Complications	Newborn
1	29a, III/III	2 Cesarean deliveries	31 + 1	1000	Yes, cesarean delivery	Anterior wall percreta 18 × 10 cm, no cervical invasion	Subtotal hysterectomy	1200; –	–	APGAR 6/8/10; 7.26 pH; 2120 g
2	39a, V/III	2 Cesarean deliveries, 1 miscarriage + curettage, 1 termination	35 + 3	650	Yes, cesarean delivery	Anterior wall percreta with invasion into the left parametrium	Subtotal hysterectomy	3500 mL; 6 units whole blood cells, 10 units fresh frozen plasma, 1 unit platelets	Re-laparotomy day 4 after cesarean section due to postoperative obstruction	APGAR 9/10/10; 7.24 pH; 2475 g
3	41a, III/III	1 Emergency cesarean delivery, 1 spontaneous delivery	34 + 3	1300	Yes, cesarean delivery	Anterior-posterior previa totalis, percreta	Subtotal hysterectomy	500 mL; –	–	APGAR 5/8/9; 7.25 pH; 2640 g
4	30a, III/II	1 Cesarean delivery, 1 termination + curettage	33 + 5	600	Yes, cesarean delivery	Anterior wall placenta previa totalis percreta 7 × 4 cm diameter	Focal resection	2000 mL; 4 units whole red blood cells, 6 units fresh frozen plasma	–	APGAR 1/6/7; 7.22 pH; 2655 g
5	34a, V/IV	3 × Cesarean delivery, 1 miscarriage + curettage	33 + 0	300	Yes, cesarean delivery	Anterior and left lateral wall percreta with cervix invasion	Subtotal hysterectomy, partial bladder resection	5500 mL; 8 units whole red blood cells, 12 units fresh frozen plasma	–	APGAR 8/8/9; 7.29 pH; 2000 g

for scheduled delivery in these patients is controversial; however, delivery between 34 and 36 weeks of gestation is generally recommended to reduce the risk of emergency surgery [10], but at this gestational age, exteriorization of the uterus before delivery of the infant is challenging and mostly impossible.

We report our approach in five patients with placenta percreta (Table 1), in which we perform amniotic fluid drainage immediately before the cesarean delivery, which allows easier exteriorization of the gravid uterus through a transverse laparotomy and facilitates a uterine incision cranial to the placental implantation site.

Methods

After administration of epidural anesthesia and preparation for a cesarean section, under ultrasound guidance amnion drainage is performed with a 18G needle



Figure 1: Luer-Lock-Connector (LLN 2047 Coloplast GmbH Hamburg, Germany) to connect to the amniotic drainage needle.



Figure 2: Preoperative drainage of the amniotic fluid in an AIP patient with placenta previa percreta immediately before the cesarean delivery, which allows exteriorization of the gravid uterus through a transverse laparotomy and performance of a uterotomy cranial to the placental implantation site.

and a Luer-Lock-Connector (LLN 2047 Coloplast GmbH Hamburg, Germany; Figure 1) which can be directly connected to the surgical suction equipment. As much amniotic fluid as possible is removed under continuous ultrasound monitoring (Figure 2, Supplementary Material Video 1). At 32–36 weeks of gestation, between 300 and 1200 mL can be drained, resulting in easy exteriorization of the gravid uterus through a wide, low transverse abdominal incision placed about 2 cm above the symphysis (Figure 3A, Supplementary Material Video 2). One must be cautious of possible complications of preoperative amnion drainage, such as umbilical cord puncture and fetus puncture with fetal bradycardia. Monitoring of the fetal heart rate and immediate initiation of surgical procedures are suggested.

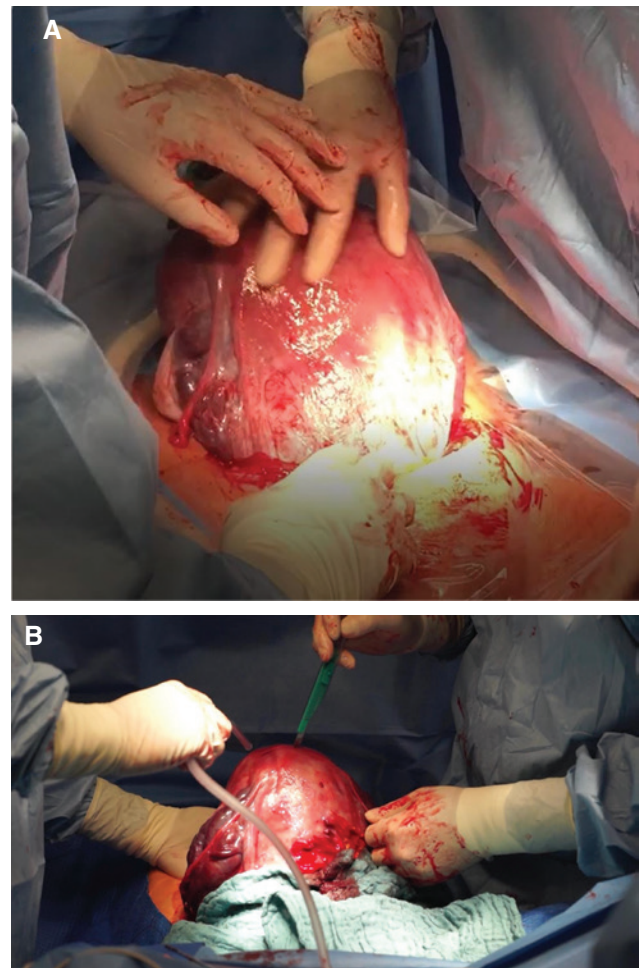


Figure 3: Exteriorization of the gravid uterus after pre-operative amnion drainage to allow uterotomy cranial of the placental implantation site.

After preoperative amniotic drainage, easy exteriorization of the gravid uterus through a generous low transverse abdominal incision placed about 2 cm above the symphysis is possible (A). The margin of the placental implantation side can then be easily identified and uterotomy can be performed in the fundal area, if necessary (B).

After uterine exteriorization, the margin of the placental implantation side can be easily identified and uterotomy can even be performed in the fundal area, if necessary (Figure 3B, Supplementary Material Video 2).

Conclusion

When a transverse laparotomy is performed, the combination of preoperative drainage of the amniotic fluid to reduce uterine size and the exteriorization of the gravid uterus provides enough space to perform fundal or high anterior or even posterior wall incisions and to deliver the fetus safely without touching the placenta. The benefits of an exteriorization of the gravid uterus have been previously reported and include avoiding significant placental, uterine or fetal bleeding following uterotomy [8]. Surgical field exposure is excellent even for deep posterior wall invasion and so far did not require any further extensions of the laparotomy. With our technique, this can be achieved via a low transverse laparotomy, thereby avoiding the additional scarring, increased postoperative pain and higher complication rates associated with a vertical laparotomy [10].

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