

Heterotopic caesarean section scar pregnancy after embryo transfer: a case report successfully treated with aspiration

Marcelo Lucchesi Montenegro¹; Rodrigo Furtado²; Carolina Westphalen Savari¹; Francisco Furtado Filho¹

¹ Fertway Fertility Clinic, Curitiba, Parana, Brazil.

² Mackenzie Evangelical College of Paraná (FEMPAR), Curitiba, Parana, Brazil.

Abstract

Heterotopic caesarean section scar pregnancy (HCSP) is a rare presentation of an ectopic pregnancy with no standard treatment proposed due to the low number of cases. Besides, it faces the challenge of preserving the concurrent intrauterine pregnancy. The early diagnose and conservative management is mandatory in order to preserve fertility and to prevent catastrophic outcomes to the mother. We present a 35-year-old Brazilian woman submitted to an embryo transfer followed by a HCSP. In order to spare the concurrent intrauterine pregnancy, we performed an embryo reduction of the ectopic gestational sac by ultrasound guided aspiration on 6th week of gestation. The patient gave birth to a healthy baby on 39th week. With this case report we intend to review similar cases described previously and discuss the best options available for management of this complex situation.

Keywords: Caesarean scar pregnancy, embryo aspiration, heterotopic pregnancy, selective embryo reduction

Introduction

Ectopic pregnancies (EP) occur, by definition, after embryo implantation on an anomalous location. The rarest form of an EP happens when the implantation occurs on the scar of a previous caesarean section embedded in local myometrium. The incidence of this event is estimated between 1:1688 to 1:2216 pregnancies.¹⁻³ If they are not identified at early stages, they can be associated with serious complications, such as extensive haemorrhages or uterine rupture, resulting in possibly catastrophic maternal and fetal outcomes.⁴ Thus, early diagnosis by transvaginal ultrasound (TVUS) is essential to enable conservative treatment and fertility preservation.⁵

Even more uncommon, heterotopic pregnancies occur when one embryo is normoimplanted and another embryo is implanted on an ectopic location, which can be on a previous caesarean section scar. Only a few cases of heterotopic caesarean section scar pregnancy (HCSP) have been reported, being the first published in 2003.⁶ Due to its rarity, the incidence of this condition has not been established. Therefore, there are no defined protocols about management to guide treatment. Thus, different attempts have been described, varying from expectant management to clinical or surgical intervention – ultrasound guided aspiration or infusion of potassium chloride or methotrexate and hysterectomy.^{7,8}

On this report, we intend to describe a HCSP resulting from a double embryo transfer treated successfully by embryo reduction performed by ultrasound guided aspiration of the ectopic gestational sac. On this case, the patient evolved to a normal gestation up to term, when a healthy baby was delivered. By presenting our experience and results, we aim to review previous similar cases and discuss the best option for management of future occurrences.

Financial support: None

Conflicts of interest: Authors do not have any potential conflict of interest.

Received: 08 July 2020

Accepted: 03 Sep. 2020

Study carried out at Fertway Fertility Clinic – Curitiba/PR – Brasil.

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Case Report

A 35-year-old Brazilian woman, from Curitiba (Parana), gravida 4, para 1 and 3 previous abortions, was admitted on a fertility clinic because of her 8 years history of secondary infertility. She had been previously submitted to *in vitro* fertilization (IVF) treatments that resulted in three miscarriages and one pregnancy delivery by elective caesarean section at the 39th week four years ago. Besides infertility, no other particularities were identified on her medical records. Once she desired a second child, a further cycle of ovarian stimulation and IVF was proposed.

After pre-treatment with oral combined contraceptive, she was submitted to a controlled ovarian stimulation with recombinant FSH + hMG (300 UI/day); a series of TVUS was performed to follow follicles development; as soon as the leading follicle achieved 14 mm of diameter, a GnRH antagonist was added (Cetrotide 0.25mg/day). On the tenth day of stimuli, hCG was administered (Ovidrel 500UI) to trigger ovulation and, 36 hours later, 6 mature oocytes were retrieved. After intracytoplasmic sperm injection (ICSI), 3 blastocysts were cultivated until day 5. Genetic analysis of trophectoderm cells by next generation sequencing (NGS) test demonstrated 3 euploid embryos.

On the following month, endometrium was prepared with estradiol 6 mg/day for 12 days plus micronized progesterone 600mg/day on 5 extra days. Two embryos were thawed and transferred on D5 guided by transabdominal ultrasound. Eleven days after the procedure, pregnancy test was positive.

Four weeks after transfer, TVUS evidenced presence of an intrauterine gestational sac with one live embryo and a second ectopic gestational sac implanted on previous caesarean section scar also filled with an embryo with cardiac heartbeat present. Both embryos had a crown-rump length compatible with 6 weeks plus 1 day. Patient remained asymptomatic, without any vaginal discharge or bleeding and with stable vital signs.

Owing its abnormal location and non-evolving aspect of the ectopic pregnancy, it was opted to perform an embryo reduction of the unviable gestational sac as soon as possible, in order to reduce maternal and fetal risks. Consent forms were signed by the couple. When the gestational age was 6 weeks + 5 days, an aspiration puncture of the ectopic gestational sac was performed, guided by TVUS, over slight sedation (intravenous propofol). An oocyte retrieval needle of 16 gauges was used to aspirate the content, without any undesirable intercurrents (Figure 1).



Figure 1. Ultrasound image showing the moment of gestational sac aspiration with a puncture needle (A) and intrauterine concurrent embryo with normal heartbeat short after the procedure was finished (B).

Three day later, a control TVUS evidenced one topic gestational sac implanted on uterine fundus with a viable embryo and, on the anterior uterine wall, at the level of uterine isthmus, a heterogenic and vascularized image was seen, interpreted as ovular remains of the reduced ectopic pregnancy. This image was visible by ultrasound until 35th week of gestation, when a rounded amorphous nodule was expelled vaginally.

Pre-natal care had no other problems and the patient was taken to a second elective caesarean section delivery at 39 weeks and 3 days of pregnancy. A healthy male baby was born weighing 3775 grams.

Discussion

The current case illustrates a HCSP successfully managed. There are only a few similar reports described in previous literature. The first report of this rare pathology was published in 2003,⁶ and was treated successfully with ultrasound guided potassium chloride (KCl) injection inside cardiac area of the ectopic embryo. Since then, some other treatments were proposed and instituted.

On a review from 2016, it was demonstrated other 23 similar pregnancies since then, approached on a varied gestational age, as soon as 5 weeks until one case treated at 16 weeks of gestation (Table 1).⁸ Seven patients were submitted to expectant treatment - from them, four delivered live babies. Therefore, this approach emerged as an alternative, especially when the ectopic pregnancy has non-viable characteristics (i.e., absence of cardiac heartbeat). The remaining 16 patients were referred to embryo reduction procedures, which can be considered the most suitable when embryonic heartbeat is identified. KCl injection was done in 10 cases; surgical removal of the gestational sac in 3 and TVUS guided aspiration also in 3 patients; those treatments resulted in 9, 3 and 2 alive babies' births of the concurrent embryo, respectively.

Other case reports were also published describing similar situations. For instance, it was described the treatment of a triplet pregnancy where one of the embryos was located on caesarean scar and was eliminated by aspiration on

Table 1. Summary of previous heterotopic caesarean section scar pregnancy cases reported

Author and Reference	Age	Conception	Gestational age at treatment (weeks + days)	Symptoms	Diagnostic Method	Treatment	Gestational symptoms	Pregnancy Outcome	Complications
Salomon et al. ⁶	36	IVF	8	No	TVUS	KCl injection	No	Live birth by C-section at 36 wk due to PROM	No
Wang et al. ⁹	38	IVF	10	No	TVUS	KCl injection	No	Live birth by CD at 35 wk due to preterm labor	Bilateral internal iliac artery ligation and blood transfusion due to massive bleeding
Litwicka et al. ¹⁰	31	IVF	8	No	TVUS	KCl and Methotrexate injection	Vaginal bleeding and uterine contractions	Live birth by C-section at 36 wk due to placental abruption	Birth defect and blood transfusion due to blood loss
Hsieh et al. ¹¹	38	IVF	6	No	TVUS	TVUS guided embryo aspiration	No	Live birth by C-section at 36 wk due to preterm labor	No

In vitro fertilization (IVF); transvaginal ultrasound (TVUS); transabdominal ultrasound (TAUS); weeks (WK); potassium chloride (KCl); premature rupture of membranes (PROM).

Table 1. Continued...

Author and Reference	Age	Conception	Gestational age at treatment (weeks + days)	Symptoms	Diagnostic Method	Treatment	Gestational symptoms	Pregnancy Outcome	Complications
Demirel et al. ¹²	34	Spontaneous	6+5	Vaginal bleeding	TVUS	Laparoscopic Excision	No	Live birth by C-section at 32 wk	No
Gupta et al. ¹³	37	IVF	6+3	No	TVUS	TVUS guided embryo aspiration	-	Pregnancy terminations at 12 wk due to trisomy 13	No
Bai et al. ¹⁴	37	IVF	7+6	Vaginal bleeding	TVUS	Expectant management	No	Live birth by C-section at 36 wk + 4 days due to preterm labor	No
Uysal and Uysal ¹⁵	29	Spontaneous	8	No	TVUS	KCl injection	No	Live birth by C-section at 35 wk due to preterm labor	No
Yazicioglu et al. ¹⁶	23	Spontaneous	7+2	Vaginal bleeding	TVUS	KCl injection	No	Live birth by C-section at 30 wk + 3 days due to PROM	No
Jurkovic et al. ¹	36	Spontaneous	7	No	TVUS	KCl injection	No	Live birth by C-section at 31 wk	No
Wang et al. ⁹	31	IVF	7	Vaginal bleeding	TVUS	Hysteroscopic excision	No	Live birth by C-section at 39 wk	No
Taşkin et al. ¹⁷	24	Spontaneous	8+4	Vaginal bleeding	TVUS	KCl injection	Vaginal bleeding	Live birth by C-section at 34 wk due to preterm labor	Blood transfusion due to massive bleeding
Dueñas-García and Young ¹⁸	34	Spontaneous	5	No	TVUS; TAUS; MRI	4 doses of intramuscular methotrexate	No	Pregnancy termination	Induced abortion
Ugurlucan et al. ¹⁹	34	IVF	6	No	TVUS	KCl injection + TVUS guided embryo aspiration	Placenta previa and placenta accreta	Live birth by C-section at 34 wk	Bilateral internal iliac artery ligation + subtotal hysterectomy due to massive bleeding
Lui et al. ²⁰	36	Intrauterine insemination	5 and 5+3	No	TVUS	Consecutive TVUS guided embryo aspiration	No	Live birth by C-section at 37 wk	Elective embolization of uterine artery due to massive bleeding

In vitro fertilization (IVF); transvaginal ultrasound (TVUS); transabdominal ultrasound (TAUS); weeks (WK); potassium chloride (KCl); premature rupture of membranes (PROM).

Table 1. Continued...

Author and Reference	Age	Conception	Gestational age at treatment (weeks + days)	Symptoms	Diagnostic Method	Treatment	Gestational symptoms	Pregnancy Outcome	Complications
Kim et al. ²¹	34	Spontaneous	5 + 5	No	TVUS	Expectant management	Placenta accreta	Live birth by C-section at 37 wk + 3 days	Bilateral internal iliac artery ligation + subtotal hysterectomy due to massive bleeding
Armbrust et al. ²²	36	IVF	7	No	TVUS	Laparoscopic excision	No	Live birth by C-section at 37 wk	No
Yu et al. ⁸	33	IVF	16+4	No	TVUS	KCl injection	Placenta previa and placenta accreta	Live birth by C-section at 37 wk + 6 days	Subtotal hysterectomy and blood transfusion due to uterine rupture and massive bleeding
Ouyang et al. ³	34	IVF	6 + 5	Abdominal pain and Vaginal bleeding	TVUS	Expectant management	Placenta previa	Live birth by C-section	Massive bleeding due to placenta previa
Ouyang et al. ³	32	IVF	5+6	Abdominal pain	TVUS	Expectant management	-	Pregnancy termination at 13 wk	-
Ouyang et al. ³	38	IVF	7+4	Abdominal pain	TVUS	Expectant management	-	Spontaneous abortion	-
Ouyang et al. ³	28	IVF	6+3	No	TVUS	Expectant management	No	Live birth by C-section at 36 wk due to PROM	No
Ouyang et al. ³	36	IVF	6+3	Vaginal bleeding	TVUS	KCl injection	-	Spontaneous abortion	-
Ouyang et al. ³	34	IVF	7+1	Abdominal pain and Vaginal bleeding	TVUS	Expectant management	-	Ongoing pregnancy at 18 wk when case reported	-

In vitro fertilization (IVF); transvaginal ultrasound (TVUS); transabdominal ultrasound (TAUS); weeks (WK); potassium chloride (KCl); premature rupture of membranes (PROM).

the first trimester, followed by birth of two babies on the 32nd week.¹¹ The use of TVUS was proposed later. A HSCP was treated with the aid of TVUS aspiration on the United Kingdom in 2010; unfortunately, even though the procedure successfully kept the intrauterine embryo alive, further investigation demonstrated trisomy 13 on the remaining one, thus its suction on 12th week was also performed.¹³ Finally, in 2014, a group from Hong Kong executed the first successful aspiration of the ectopic gestational sac of a HSCP, also resulting in healthy pregnancy of the concurrent baby, which was delivered at term.²⁰

EP occurred more frequently after assisted reproductive techniques (ART).²³ Besides, embryo transferred performed on the third day of embryo development (D3) and the use of GnRH agonist as an ovulation trigger were associated with higher incidences of EP.^{24,25} Interestingly, neither of those features were present on the case described previously.

As seen, the case presented here is the first HSCP reported in Brazil and the third successfully treated by aspiration of the ectopic sac followed by a live birth of the remaining embryo. Even though the low number of cases still do not allow the definition of a protocol, a trend can be established by this review. Expectant management can be an option in cases when embryonic heartbeat is not identified and some embryo reduction method must be performed if cardiac activity is observed on the ectopic embryo. Our experience and previous literature review support that TVUS guided aspiration is a safe and effective method that can be used to treat HSCP.

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*Correspondence:

Marcelo Lucchesi Montenegro
Fertway Fertility Clinic
EAv. Silva Jardim, 2103 - Água Verde,
CEP 80250-200, Curitiba, Parana, Brazil
(41) 99529-8899
marcelolucmonte@gmail.com

Author information

MLM: Fertway Fertility Clinic (Curitiba, Parana, Brazil) Assistant Doctor. RF: Medical Student - Mackenzie Evangelical College of Paraná – Curitiba (FEMPAR). CWS: Fertway Fertility Clinic (Curitiba, Parana, Brazil) Assistant Doctor. FFF: Fertway Fertility Clinic (Curitiba, Parana, Brazil) Assistant Doctor.

Author contributions

MLM: responsible for gathering of data, literature review and article writing.
RF: responsible for table contents and figures edition; helped on literature review.
CWS: responsible for the case description and helped on literature review.
FFF: coordinate data analysis; responsible for patient management, procedures and therapeutic decisions.