



Subperitoneal placenta accreta succenturiate in the case of a successful near-term extrauterine abdominal pregnancy

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Summary Placenta from an extrauterine abdominal pregnancy was examined after a 37-week healthy infant gestation. The placenta, with its fetal surface down and maternal surface up, protruded from the pelvic area to peritoneal cavity in the wall of the amniotic sac containing fetus. The placenta was implanted under the thin subperitoneal layer of maternal tissue completely covered by peritoneal serosa and was formed by several small lobes connected by intramembranous placental vessels. Insertion of the trivascular umbilical cord was velamentous. Partially remodeled arteries infiltrated by intermediate trophoblast and frequent veins directly communicating with the placental intervillous space were identified in the subperitoneal maternal tissue. The term “placenta accreta” is appropriate in this case because villi in the basal plate implanted directly in the maternal subserosal connective tissue without intervening decidua.

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1. Introduction

Ectopic pregnancy occurs with the frequency of less than 1 per 100 births and is often related to several factors, including history of pelvic inflammatory disease, use of intrauterine devices, history of abdominal surgery, use of certain hormonal preparations, history of previous ectopic pregnancies, and race [1-3]. Extrauterine abdominal pregnancy is a significantly less frequent entity, occurring in a range of 1:3000 to 1:20 000 of births in the large population analyses [3-6]. However, a full-term or near-term pregnancy completed outside the uterus and resulting in a cesarean

delivery of a normally developed and live newborn is unusual [7-12]. In most of the reported cases, placenta was attached to adjacent organs or vessels and was left intra-abdominally to avoid hemorrhages or perforations as possible complications of placental separation. In the current case, the placenta was implanted under the peritoneum, did not infiltrate adjacent organs, and was safely removed. Subsequently, the interface between the placenta and the adjacent maternal tissue was examined, with the focus on morphological changes in the maternal stroma favoring placental survival.

2. Case report

The pathology department, in one of several community hospitals served by the Robert Wood Johnson University Medical Group, received a placenta removed during

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laparotomy from an extrauterine abdominal pregnancy. The gestation age was approximately 37 weeks in a 26-year-old mother. After a normally developed live 3255-g male infant, with a crown-heel length of 51 cm, was delivered by modified cesarean section from an abdominal extrauterine location; the placenta was excised during the same operation. The placenta, with its fetal surface down and maternal surface up, covered by peritoneum, protruded to the peritoneal cavity in the wall of the amniotic sac, and therefore, it could be safely and completely removed. The uterus was found not involved by the pregnancy and was left intact.

The placenta weighed 772 g untrimmed and measured 20 cm in greatest dimension when preserved in its original dome-like shape. On the maternal side, it showed smooth serosa, reportedly from a broad ligament area, with a complete right ovary measuring $5 \times 1.5 \times 1.4$ cm closely attached and a segment of right fallopian tube measuring 5×1 cm loosely attached at the margins. The ovary and the segment of fallopian tube were morphologically normal. A corpus luteum was present in the ovary. Close to the ovarian attachment, a ligated vascular bundle measuring approximately 1.1 cm in diameter was present, suggestive of hypertrophied vessels of paraovarian origin connecting with the subperitoneal maternal tissue surrounding the placenta. No other major vascular bundles were identified at the margins of the maternal tissue. On the fetal side of the placenta, a smooth blue-purple amniotic lining of aggregated small lobes was present. Dissection demonstrated a succenturiate placenta with a group of placental parenchymal lobules located near each other and connected by intramembranous vessels, with a velamentous insertion of the umbilical cord. The above reported weight of the placenta included the lobes, the interlobar membranes with a narrow margin of extralobar membranes fused with peritoneum, and the umbilical cord. The umbilical cord

measured 25×1.3 cm, weighed 26 g, and showed 3 typical vessels on cross-section. After the interlobar membranous areas were partly dissected, 5 lobes spread flat and measured individually from 5 to 13.5 cm in greatest dimension and ranged in thickness from 1.5 to 4 cm (Fig. 1). The interlobar membranous areas showed a layer of crowded necrotic villi with collapsed intervillous space and with rare foci of necrotizing villi showing karyorrhectic debris, consistent with villous infarction and suggestive of unsatisfactory blood supply. Parts of the extralobar membranes were formed by a membranous fusion of placental membranes and peritoneum and measured 0.2 to 0.3 cm in average thickness, although some other membranous margins were thicker, consistent with ligament tissue. Integrity of those relatively thin membranes assured continuation of the pregnancy and safe fetal maturation; an accidental rupture of the membranes would have terminated this pregnancy.

The placental parenchyma was implanted under the subperitoneal layer of the broad ligament tissue. The thin layer of maternal stroma was entirely covered by peritoneal serosa on the side opposite to the implantation side. The remaining fetal membranes were reportedly found during surgery extending deeply to the retroperitoneal space without eroding either vessels or ureter, and they were left in situ. Microscopically, placental architecture and villous maturation were normal. Rare foci of fibrin deposits were present. The subserosal maternal stroma consisted predominantly of fibrous tissue with occasional areas showing smooth muscle. Frequent dilated large and small venous vessels and occasional arterial vessels were present in the maternal stroma. It was difficult to quantitate their number and size; however, the venous volume in the subserosal tissue of this case appeared many times larger than that observed in sections of the parauterine subserosal tissue of a nonpregnant woman used as a control. No decidual tissue was detected in any of the sections examined. The thickness

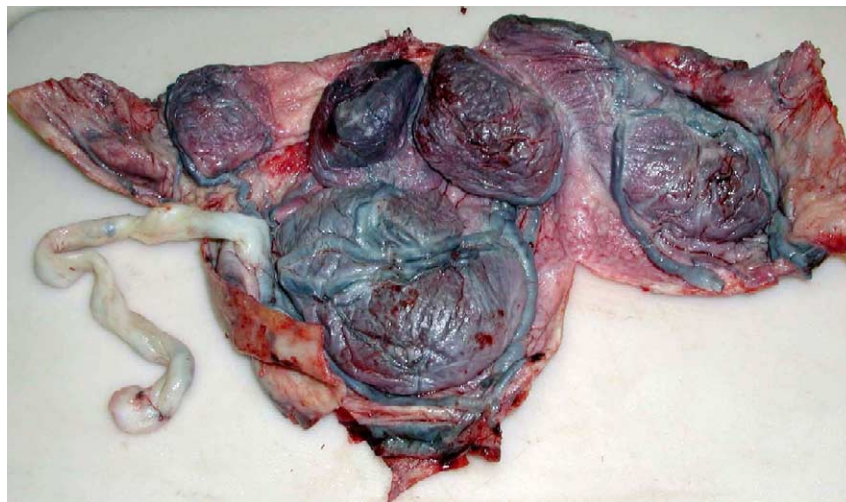


Fig. 1 Gross view of the placenta showing predominantly fetal surface. Multilobar architecture (placenta succenturiate) and velamentous insertion of the umbilical cord are seen. The other side of this placenta is entirely covered by peritoneal serosa with a thin layer of subserosal maternal stroma. The peritoneal surface is shown focally on the folded edge.

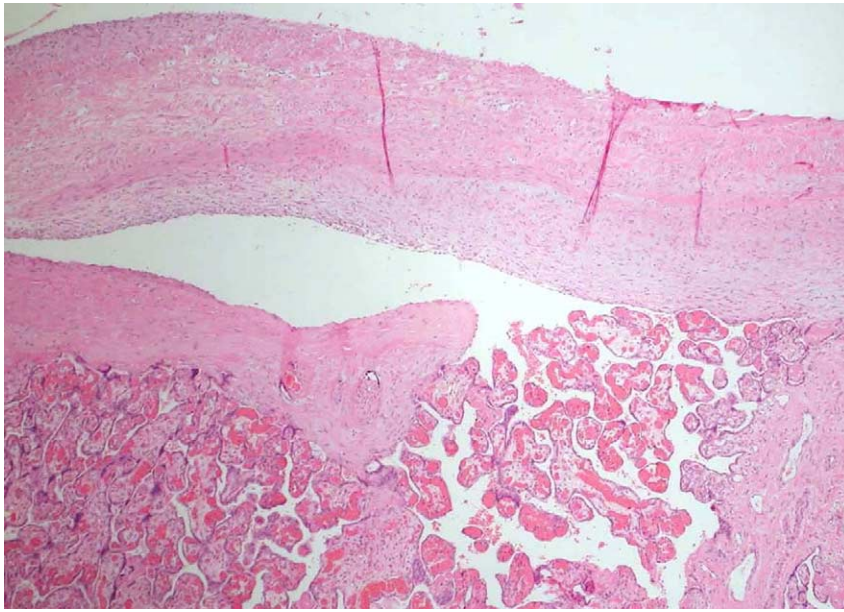


Fig. 2 Interface of the placenta with the maternal subperitoneal tissue, including the maternal vascular space communicating with the placental intervillous space. No decidual cells are present, and the anchoring villi directly implant in the subserosal fibrous tissue. Serosal surface is seen on the side opposite to the implantation side (hematoxylin-eosin stain, original magnification $\times 40$).



Fig. 3 Interface of the placenta with the maternal subperitoneal tissue, including the maternal venous vessel. Special stain for cytokeratins (AE-1/AE-3) highlights the intermediate trophoblast infiltrating the maternal fibrous tissue close to the anchoring villi, without infiltration of the maternal venous wall. Some peritoneal mesothelial cells stain as well. The distance between the anchoring villi and the serosa at the illustrated point measures approximately 0.1 cm (original magnification $\times 100$).

of the subperitoneal maternal stroma between the peritoneal serosa and the placental implantation site varied between 0.04 and 1.2 cm in the examined sections. In the areas thicker than 0.1 cm, vessels parallel to the serosa and basal plate were present in most sections of the maternal stroma adjacent to the placental lobes. No prominent subserosal vessels were found in the interlobar membranous areas.

The subserosal maternal veins communicated with the placental intervillous space; such foci were found in one third of the examined sections of the placenta. The length of each section varied between 2 and 3 cm. The sections were selected for both usual and unusual features in the placental-maternal interface, including areas suspected for vascular connections (Fig. 2).

Immunohistochemical stains were performed to define decidual cells and other morphological features. Antigens were examined in representative sections of this placenta and an age-adjusted intrauterine placenta as the control. Eosinophilic cells with moderate amount of cytoplasm were found in the paraplacental subserosal maternal tissue. These cells were positive for cytokeratins (CK7, AE-1/AE-3) confirming their trophoblastic origin. As expected, the intermediate trophoblastic cells did not infiltrate venous vascular walls located in the subserosal maternal fibrous tissue, which communicated with the placental intervillous space (Fig. 3). Occasional small arterial vessels infiltrated by intermediate trophoblast and partially remodeled, with retention of some smooth muscle cells, could be demonstrated in histological sections of the maternal stroma (Fig. 4), up to 1 cm away from the basal plate. Decidual cells, as defined by typical morphological features and positivity for vimentin and desmin, were abundant in the control placenta but totally absent in the extrauterine placenta. Mesothelial cells (cytokeratins, HBME-1, calretinin-positive) were demonstrated on the side opposite to the subserosal implantation site.

3. Conclusion

Despite lack of the specialized uterine environment for sustaining such a pregnancy, a successful outcome of the extrauterine abdominal pregnancy was observed in this case. The placenta functioned satisfactorily throughout pregnancy and sustained normal fetal development. Rare cases of the successful near-term extrauterine pregnancy have been reported; however, placentas were generally not removed because of infiltration of intestines or other vital structures [8,11,12]. It appears that the right pelvis is somewhat favored over the left, as what was present in our case [2,7]. However, any intra-abdominal area can be a site of trophoblast implantation, including liver and spleen, although the 2 latter sites usually result in hemoperitoneum [13,14]. Extrauterine placentas tend to be multilobar in gross appearance (succenturiate), developing unevenly in conditions of the compromised blood supply [7,9].

During the examination of this placenta, we looked for possible typical changes including decidual transformation and vascular remodeling of the paraplacental maternal tissue. The interface between the placenta and the adjacent subperitoneal stroma from this extrauterine pregnancy was thoroughly examined, and no decidual cells were found in the examined tissue. The term “placenta accreta” is appropriate in this case because villi in the basal plate implanted directly in the maternal subserosal connective tissue without intervening decidua, a condition that precludes normal separation at the time of delivery. Frequent small to large vessels in the maternal tissue of the basal plate were demonstrated, supporting essentially a normal pregnancy in this unusual environment. Some arterial vessels showed trophoblastic infiltration with partial remodeling, similar to what is seen in the uterine arteries in the implantation sites of pregnancies complicated by pre-eclampsia, intrauterine growth restriction, and decreased

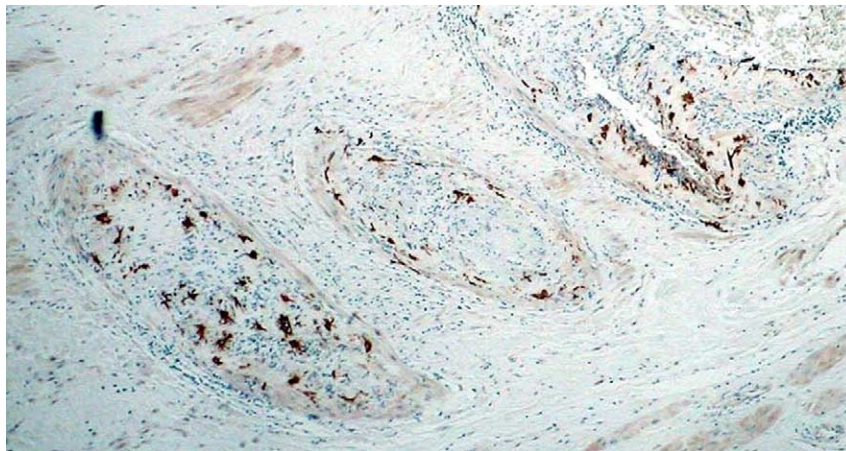


Fig. 4 Paraplacental subperitoneal maternal tissue, including the maternal arterial vessels demonstrating partial trophoblastic remodeling with retention of some arterial smooth muscle cells. Special stain for cytokeratins (AE-1/AE-3) highlights the intermediate trophoblast infiltrating the arterial wall. The distance between the anchoring villi and the arterial vessels at the illustrated point measures approximately 0.2 to 0.3 cm (original magnification $\times 40$).

ambient oxygen (high altitude) [15,16]. Compared with the pelvic subserosa of a nonpregnant woman, veins were dilated, suggestive of pregnancy-related remodeling. In summary, the placenta of this extrauterine pregnancy showed morphology of a placenta accreta succenturiate. The paraplacental subperitoneal maternal tissue demonstrated a vascular system supporting the placental space intervillous blood flow.

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