



Maternal and neonatal outcomes of morbidly adherent placenta in Ain Shams University Maternity Hospital from 2012 to 2017

A thesis

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BY

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

يَا أَيُّهَا النَّاسُ إِن كُنْتُمْ فِي رَيْبٍ مِّنَ الْبَعْثِ فَإِنَّا خَلَقْنٰكُمْ

مِّن تَرَابٍ ثُمَّ مِّن نَّطْفَةٍ ثُمَّ مِّن عَلَقَةٍ مَّخْلُوقَةٍ وَغَيْرِ

مَّخْلُوقَةٍ لِّنُبَيِّنَ لَكُمْ وَنُقَرِّ فِي الْأَرْحَامِ مَا نَشَاءُ إِلَىٰ

أَجَلٍ مُّسَمًّى ثُمَّ نَخْرِجُكُمْ طِفْلًا ثُمَّ لَتَبَلَّغُوا أَشَدَّكُمْ

وَمِنْكُمْ مَّن يَمُوتُ فِيهِ وَمِنْكُمْ مَّن يَرُدْ إِلَىٰ أَرْذَلِ الْعَمَرِ

لَكُمْ لَا يَعْلَمُ مَن بَعْدَ عِلْمٍ شَيْنًا وَتَرَى الْأَرْضَ هَامِدَةً

فَإِذَا أَنزَلْنَا عَلَيْهَا الْمَاءَ اهْتَزَّتْ وَرَبَتْ وَأُنَبِّتَتْ مِّن

كُلِّ زَوْجٍ مَّيِّتٍ

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List of abbreviations

ACR:	American College of Radiology.
AIP:	Abnormally invasive placenta.
CBC:	Complete blood count .
CS:	Cesarean section.
DIC:	Disseminated intravascular coagulopathy.
DVT:	Deep venous thrombosis .
D&C	Dilatation and curettage.
EVT:	Extravillous trophoblast.
FIGO:	International Federation of Gynecology and Obstetrics.
FFP:	Fresh frozen plasma:
HCT:	Haematocrit value.
HB:	Haemoglobin.
ICU:	Intensive care unit.
IS-AIP	International Society for Abnormally Invasive placenta
IUFD:	Intrauterine fetal demise.
IVF:	In-vitro fertilization.
LSCS:	Lower segment caesarean section.
MRI:	Magnetic resonance imaging.
MS-AFP:	Maternal serum alpha fetoprotein.
MAP:	Morbidly adherent placenta.

MDT:	Multidisciplinary team.
MOM:	Multiples of median.
NICU:	Neonatal intensive care unit.
NS:	Not significant.
PRBC:	Packed red blood cells.
PAS	Placenta accreta spectrum.
P-value:	Probability value.
SD:	Standard deviation.
Sig:	Significance.
SPSS	Statistical Package for Social Science.
SSI:	Surgical site infection.
TACO:	Transfusion associated cardiopulmonary overload.
TRALI:	Transfusion-related acute lung injury.
USCS:	Upper segment caesarean section.

Introduction

Abnormal placental implantation occurs when placental trophoblasts invade into the deep uterine endometrium (placenta accreta), into the myometrium (placenta increta), or beyond the uterine serosa (placenta percreta). The pathogenesis is primarily attributed to the defective decidualization of the implantation site and the absence of both the decidua basalis and the Nitabuch's layer, which results in a direct attachment of chorionic villi to the myometrium ([Dreux et al., 2012](#)).

Placenta accreta occurs more frequently than placenta Increta and percreta .In a pooled analysis of results from series of confirmed, abnormally implanted placentas from hysterectomy specimens, the type And frequency of abnormal placentation were the following: placenta accreta, 79%; placenta increta 14%;placenta percreta,7% ([Wu et al., 2005](#)).

Incidence estimates of abnormally invasive placenta (AIP) vary widely ranging from 1.7 to 90 per 10000 ([Fitzpatrick et al., 2012](#)). This wide range is likely due to differences in diagnosis and case definition (histopathological or clinical) of abnormally invasive placenta (AIP), and being predominantly based on tertiary hospital_based studies ([Upton et al., 2014](#)).

There is a significant increase in the incidence in women with multiple prior cesarean deliveries, particularly in the setting of a placenta praevia ([Eshkoli et al., 2013](#)). The rates of placenta accreta in women with a placenta praevia range from 3% in those undergoing their first cesarean delivery to over 60 % for those undergoing their fourth or fifth cesarean deliveries ([Silver et al., 2006](#)).

Abnormally invasive placenta is associated with severe pregnancy complications such as postpartum hemorrhage and requires complex multidisciplinary management which may include large volume of blood transfusion, embolization of major arteries, hysterectomy, and admission to intensive care unit (ICU) ([Fitzpatrick et al., 2014](#)).

Previous studies have focused on maternal morbidity, and there has been limited exploration of neonatal outcomes. Additionally, previous studies have had small sample sizes and limited generalizability as a result of being case reports or Institution_based medical reviews (*Fitzpatrick et al., 2012*).

Some studies have shown high neonatal morbidity associated with placenta accreta (*Balayla and Bondarenko, 2013*). On the other hand, other studies didn't observe adverse neonatal effects in such cases (*Rosenberg et al., 2011*).

Aim of the work

The aim of this work is:

To investigate patient characteristics and neonatal and maternal outcomes of placenta accreta in Ain Shams from 2012 to 2017.

The Placenta & The Morbidly Adherent Placenta

Background.

The placenta (Greek, plakuos = flat cake) named on the basis of this organ's gross anatomical appearance. The placenta, by all accounts an exceptional organ, is generated de novo from maternal and fetal tissues and bodily discarded when the pregnancy ends. The placenta is a materno-fetal organ which begins developing at implantation of the blastocyst and is delivered with the fetus at birth (*Maltepe and Fisher, 2015*).

The human placenta is described as discoid, deciduate, haemochorial (where the chorion comes in direct contact with maternal blood), chorioallantoic, labyrinthine, and villous organ. The basic function of placenta is to provide nutrition for the developing fetus and to remove the fetal waste. To establish intrauterine pregnancy trophoblast must anchor and invade decidualised endometrium and the uterine vasculature must change to allow progressive increase in blood flow (*Jing et al., 2018*).

Most commonly implantation takes place into the endometrium of the upper part and the more often on the posterior wall of the surface endometrium. The invading trophoblast burrow deeper into the endometrium and thus leading to the implantation. The role of the trophoblast in nutrition of the conceptus is reflected in its name. Its function as endocrine organ in human pregnancy is essential to maternal physiological adaptation and the maintenance of pregnancy (*Baumfeld et al., 2017*).

Placental structure.

Placental mammals, such as humans, have a chorioallantoic placenta that forms from the chorion and allantois. In humans, the placenta averages 22 cm in length and 2–2.5 cm in thickness, with the center being the thickest, and the edges being the thinnest. It typically weighs approximately 500 grams. It has a dark reddish-blue or crimson colour. It connects to the fetus by an umbilical cord of approximately 55–60 cm in length, which contains two umbilical arteries and one umbilical vein (*Burton et al., 2016*).

The umbilical cord inserts into the chorionic plate (has an eccentric attachment). Vessels branch out over the surface of the placenta and further divide to form a network covered by a thin layer of cells. This results in the formation of villous tree structures. On the maternal side, these villous tree structures are grouped into lobules called cotyledons. In humans, the placenta usually has a disc shape, (*Brown et al., 2014*).

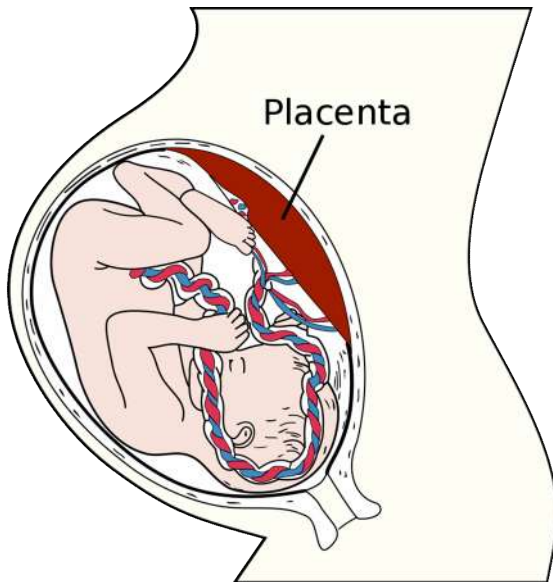


Figure (1): Human placenta from just after birth with the umbilical cord in placenta.

Internally, it comprises a series of highly branched villus trees that in total contribute a surface area for exchange of $12\text{--}14\text{ m}^2$, each tree arises via a stem villus from the chorionic plate and forms a lobule that is centered over the opening of a maternal spiral artery through the basal plate, so constituting an individual maternal-fetal exchange unit (Figure 2A) (*Burton and Jauniaux, 2018*).

There may be one or more lobule(s) per lobe. While some villi (the anchoring villi) extend between the two plates, the majority are free-floating within the cavity of the placenta, the intervillous space. The finest branches of the villus tree, the terminal villi, are highly vascularized with fetal capillaries. Dilations of the capillaries, referred to as sinusoids, bring the endothelium into close apposition with the overlying syncytiotrophoblast, which is often locally thinned to form a vasculosyncytial membrane. Consequently, the diffusion distance between the two circulations may be reduced to $1\text{--}2\text{ m}$ at these sites, aiding diffusional exchange (Figure 2B) (*Burton and Jauniaux, 2018*).

The syncytiotrophoblast forms the epithelial covering of the villus tree, and during the second and third trimesters and is bathed directly with the maternal blood circulating in the intervillous space (Figure 2B). Hence, the human placenta is described as being of the hemochorial type (*Raesside, 2017*). The syncytiotrophoblast is a terminally differentiated, multinucleated syncytium. The apical surface bears numerous microvilli, amplifying the surface area for receptor-mediated transport by a factor of 7, a wide variety of receptors have been localized to the microvillous surface, and their activity is responsive to maternal nutrition (*Ferner and Mess, 2011*).

The basal surface of the syncytiotrophoblast contacts either the progenitor unicellular cytotrophoblast cells, or the trophoblastic basement membrane. In early pregnancy, the cytotrophoblast cells form a complete layer, so nutrients must either pass through the cells or through the narrow intercellular clefts. Towards term these cells become more dispersed, with studies finding that they occupy 44% or up to 90% of the basement membrane, creating larger gaps for potential paracellular transport (*Burton et al., 2016*).

The progenitor cytotrophoblast cell is the stem cell of the placenta. These cells proliferate throughout gestation, differentiating along two pathways to form either villous cytotrophoblast, which ultimately can become syncytiotrophoblasts,(outer cellular layer), or extravillous cytotrophoblast[EVT](inner cellular layer),

Syncytiotrophoblast is a specialized epithelium that has several functions, including transport of gases, nutrients, and waste products and synthesis of peptide and steroid hormones that regulate placental, fetal, and maternal systems. EVT has a proliferative component and an invasive component. There is also a migratory EVT, which is neither invasive nor proliferative. These cells populate the cell islands, septum, chorionic plate, and chorion leave (*Burton et al., 2016*).

At four to five weeks of gestation, EVT erupts in columns with proliferative trophoblast at the base and invasive trophoblast at the distal portion of the column. Invasive EVT that invades decidua is called interstitial EVT, whereas EVT that invades and remodels the spiral arteries is called endovascular EVT. Endovascular invasion (intramural or intra-arterial) involves replacement or displacement of vascular smooth muscle and endothelial cells and