



# **Outcomes of Patients with Morbidly Adherent Placenta in Ain Shams Maternity Hospital: A Retrospective Study**

Thesis

*Submitted for Partial Fulfillment of Master Degree in  
Obstetrics and Gynecology*

By

**Ahmed Mohammed Ragab**

*MBBCh (2012)*

*Resident of Obstetrics and Gynaecology  
Ain Shams Maternity Hospital*

Supervisors

**Prof. Amr Hassan El-Shalakany**

*Professor of Obstetrics and Gynaecology  
Faculty of Medicine, Ain Shams University*

**Dr. Amr Abdel Aziz Elsayied**

*Lecturer in Obstetrics and Gynaecology  
Faculty of Medicine, Ain Shams University*

*Faculty of Medicine  
Ain Shams University*

**2017**

# *List of Contents*

Title	Page No.
List of Tables .....	i
List of Figures.....	ii
List of Abbreviations .....	vii
Introduction .....	1
Aim of the Work .....	5
Review of Literature	
▪ Definition, Epidemiology and Risk Factors of Morbidly Adherent Placenta.....	6
▪ Pathophysiology of Morbidly Adherent Placenta.....	19
▪ Clinical presentation and Diagnosis of Morbidly Adherent Placenta.....	44
▪ Management of Morbidly Adherent Placenta.....	75
Subjects and Methods.....	106
Results .....	111
Discussion.....	138
Summary .....	151
Conclusion .....	157
Recommendations .....	158
References .....	159
Arabic summary.....	—

## *List of Tables*

Table No.	Title	Page No.
<b>Table (1):</b>	Histopathological and Immunostaining Changes Observed in PA.....	37
<b>Table (2):</b>	Second and Third Trimester Sonographic Markers of Placental Accreta .....	53
<b>Table (3):</b>	Proposed Standardized Ultrasound Markers for the Diagnosis of Placenta Accreta .....	74
<b>Table (4):</b>	Statistics of reviewed data for the study period at Ain Shams University Maternity Hospital.....	111
<b>Table (5):</b>	Characteristics of the study population.....	113
<b>Table (6):</b>	Obstetric and medical co-morbidities during the index pregnancy with MAP.....	114
<b>Table (7):</b>	Findings in different antenatal imaging modalities .....	120
<b>Table (8):</b>	Peri-operative data, operative technique and post-operative complications in the study group.....	122
<b>Table (9):</b>	Comparison between caesarean hysterectomy and uterine conservation groups regarding different pre-operative findings and post-operative complications.....	125
<b>Table (10):</b>	Comparison between elective and emergency interventions regarding different peri-operative data, technical variables and complications .....	128
<b>Table (11):</b>	Comparison between LSCS and USCS regarding operative technique and complications.....	131
<b>Table (12):</b>	Perinatal outcomes for pregnancies with MAP.....	136

## *List of Figures*

Fig. No.	Title	Page No.
<b>Figure (1):</b>	Microscopic view of accreta (arrow) placental villi (PV) within the uterine myometrium (UM) .....	19
<b>Figure (2):</b>	Diagram showing a normal and an accreta placental cotyledon .....	42
<b>Figure (3):</b>	(a) Macroscopic view of the uterus at the level of the placentation site in a case of placenta accreta (PA). (b) The uterine wall is almost transparent and area of the abnormally implanted villous tissue is very thin and friable and surrounded by dilated vascular channels.....	42
<b>Figure (4):</b>	Sagittal view of the uterus in a low uterine segment implantation of the gestational sac (GS) in a pregnancy with three prior cesarean sections .....	51
<b>Figure (5):</b>	Sagittal view of the lower uterine segment and the cervix in a cesarean section scar implantation of the GS in a pregnancy with one prior cesarean section .....	51
<b>Figure (6):</b>	Color Doppler of a sagittal view of the lower uterine segment and the cervix in a cesarean section scar implantation of the GS in a pregnancy with one prior cesarean section .....	52
<b>Figure (7):</b>	Sagittal view of the lower uterine segment in grayscale ultrasound in a patient with placenta accreta.....	55
<b>Figure (8):</b>	Sagittal view of the lower uterine segment and cervix in grayscale (a) and color Doppler (b) ultrasound in a patient with placenta accreta .....	55

## *List of Figures cont...*

Fig. No.	Title	Page No.
<b>Figure (9):</b>	Transabdominal ultrasound in gray scale in a pregnancy with an anterior placental accreta .....	57
<b>Figure (10):</b>	Transabdominal ultrasound in gray scale in a pregnancy with an anterior-fundal normal placenta .....	57
<b>Figure (11):</b>	Transvaginal ultrasound of a sagittal view of the lower uterine segment in a pregnancy with a placenta preavia and accreta.....	59
<b>Figure (12):</b>	Transvaginal ultrasound of a sagittal view of the lower uterine segment in color Doppler in a pregnancy with a placenta preavia and accreta .....	59
<b>Figure (13):</b>	Transvaginal ultrasound of a sagittal view of the lower uterine segment in gray scale in a normal pregnancy.....	60
<b>Figure (14):</b>	The transpelvic ultrasound is from a pregnant 33-year-old female .....	63
<b>Figure (15):</b>	Sagittal view of the lower uterine segment and cervix in grayscale.....	64
<b>Figure (16):</b>	Note homogeneity of the placental mass, no "bulging" of the placenta toward the bladder, and the well delineated uterine wall .....	66
<b>Figure (17):</b>	Note the placental "bulge", loss of the continuity of the uterine wall, and the dary, intraplacental bands .....	66
<b>Figure (18):</b>	The placenta is characterized as an accreta .....	69

## *List of Figures cont...*

Fig. No.	Title	Page No.
<b>Figure (19):</b>	Panel A) Villi have implanted in scar tissue which replaced the endometrium in an area of thinned myometrium. Placenta accretas often occur at the site of prior cesarian sections. Panel B) Note the layer of dense pink fibrinoid covering the scar. Panel C) Villi are immediately adjacent to underlying myometrium without any intervening decidua. Panel D) Villi in direct contact with myometrium.....	70
<b>Figure (20):</b>	Panel A) Clusters of villi are entirely surrounded by myometrium without intervening decidua. Implantation site trophoblast can be seen scattered throughout the myometrium. Panel B) Higher power of Panel A.....	71
<b>Figure (21):</b>	Step 3 (Holding the cervix).....	84
<b>Figure (22):</b>	Step 6 (M cross double ligation).....	86
<b>Figure (23):</b>	Step 7-1 (Filling the bladder).....	88
<b>Figure (24):</b>	Step 7-2 (Opening the bladder).....	89
<b>Figure (25):</b>	Step 8 (Double distal edge pick up).....	90
<b>Figure (26):</b>	Management in case of prenatal diagnosis of placenta accreta. ....	93
<b>Figure (27):</b>	B-Lynch suture.....	98
<b>Figure (28):</b>	Distal component of tamponade balloons .....	99
<b>Figure (29):</b>	Proximal component of tamponade balloons .....	99
<b>Figure (30):</b>	Prophylactic balloon occlusion of the internal iliac arteries in a patient with abnormal placentation. ....	101

## *List of Figures cont...*

Fig. No.	Title	Page No.
<b>Figure (31):</b>	Prophylactic uterine artery embolization (UAE) in conservatively managed placenta percreta.....	104
<b>Figure (32):</b>	Age (years) distribution of the study group. ....	115
<b>Figure (33):</b>	Parity distribution of the study group.....	115
<b>Figure (34):</b>	History of previous CS of the study group. ....	116
<b>Figure (35):</b>	History obs. & Gyne. Operations of parity distribution of the study group. ....	116
<b>Figure (36):</b>	No of abortions distribution of the study group. ....	117
<b>Figure (37):</b>	Severity of vaginal bleeding distribution of the study group. ....	117
<b>Figure (38):</b>	History of gynecological and obstetric operations distribution of the study group. ....	118
<b>Figure (39):</b>	Medical disorders, general surgical operation and others distribution of the study group. ....	118
<b>Figure (40):</b>	Medical disorders, general surgical operation and others distribution of the study group. ....	119
<b>Figure (41):</b>	Diagnosis imaging of the study group. ....	121
<b>Figure (42):</b>	Complications distribution of the study group. ....	123
<b>Figure (43):</b>	Acquiring hysterectomy after conservation.....	126
<b>Figure (44):</b>	Difference between elective and emergency according to HCT post.....	129
<b>Figure (45):</b>	Difference between elective and emergency according to outcome.....	130

## *List of Figures cont...*

Fig. No.	Title	Page No.
<b>Figure (46):</b>	Elective and emergency distribution of the study group. ....	130
<b>Figure (47):</b>	Difference between LSCS and USCS according to outcome. ....	132
<b>Figure (48):</b>	Difference between LSCS and USCS according to HGB and HCT post operative. ....	132
<b>Figure (49):</b>	Difference between LSCS and USCS according to U.Bladder injury. ....	133
<b>Figure (50):</b>	Difference between LSCS and USCS according to wound complication. ....	133
<b>Figure (51):</b>	Difference between LSCS and USCS according to duration of operation (hr). ....	134
<b>Figure (52):</b>	Difference between LSCS and USCS according to blood loss. ....	134
<b>Figure (53):</b>	Difference between LSCS and USCS according to ICU adm (days). ....	135
<b>Figure (54):</b>	Difference between LSCS and USCS according to hospital stay. ....	135
<b>Figure (55):</b>	Perinatal outcome distribution of the study group. ....	137



## *List of Abbreviations*

<b>Abb.</b>	<b>Full term</b>
<i>β-hCG</i> .....	<i>β Subunit of Human Chorionic Gonadotrophin</i>
<i>2D</i> .....	<i>Two Dimentional</i>
<i>3D</i> .....	<i>Three Dimentional</i>
<i>AFP</i> .....	<i>Alpha Fetal Protein</i>
<i>ASUMH</i> .....	<i>Ain Shams University Maternity Hospital</i>
<i>BL</i> .....	<i>Urinary Bladder</i>
<i>cAMP</i> .....	<i>Cyclic adenosine monophosphate</i>
<i>CEACAM1</i> .....	<i>Carcinoembryonic Antigen-Related Cell Adhesion Molecule 1</i>
<i>CET</i> .....	<i>Cryopreserved Embryo Transfer</i>
<i>col-IV</i> .....	<i>Collagen Type IV</i>
<i>CRH</i> .....	<i>Corticotrophin-Releasing Hormone</i>
<i>CRHR1</i> .....	<i>Corticotrophin-Releasing Hormone Receptor Type 1</i>
<i>EGFR</i> .....	<i>Epidermal Growth Factor Receptor</i>
<i>EVT</i> .....	<i>Extravillous Trophoblast</i>
<i>EVTs</i> .....	<i>Extravillous Tropho-Blasts</i>
<i>fβhCG</i> .....	<i>free-Beta Human Chorionic Gonadotrophin</i>
<i>GS</i> .....	<i>Gestational Sac</i>
<i>hCG</i> .....	<i>Human Chorionic Gonadotropin</i>
<i>HCG</i> .....	<i>Human Chorionic Gonadotropin</i>
<i>IIA</i> .....	<i>Internal Iliac Arteries</i>
<i>IVF</i> .....	<i>In Vitro Fertilization</i>
<i>JZ</i> .....	<i>Junctional Zone</i>

## *List of Abbreviations (cont...)*

Abb.	Full term
<i>MAP</i> .....	<i>Morbidly Adherent Placenta</i>
<i>MMPs</i> .....	<i>Matrix Metalloproteinases</i>
<i>MNGCs</i> .....	<i>Multinucleated Giant Cells</i>
<i>MOMS</i> .....	<i>Multiples of the Median</i>
<i>MS</i> .....	<i>Maternal Serum</i>
<i>PA</i> .....	<i>Placenta Accreta</i>
<i>PAPP-A</i> .....	<i>Pregnancy-Associated Plasma Protein A</i>
<i>PL</i> .....	<i>Placenta</i>
<i>PV</i> .....	<i>Placental Villi</i>
<i>SD</i> .....	<i>Standard Deviation</i>
<i>sFLT-1</i> .....	<i>Soluble Fms-Like Tyrosine Kinase</i>
<i>TIMPs</i> .....	<i>Tissue Inhibitors of Metalloproteinases</i>
<i>UAE</i> .....	<i>Uterine Artery Embolization</i>
<i>UM</i> .....	<i>Uterine Myometrium</i>
<i>uNK</i> .....	<i>Uterine Natural Killer</i>
<i>uPA</i> .....	<i>Urokinase Plasminogen Activator</i>
<i>uPAR</i> .....	<i>Urokinase-Type Plasminogen Activator Receptor</i>
<i>VEGF</i> .....	<i>Vascular Endothelial Growth Factor</i>
<i>X<sup>2</sup></i> .....	<i>Chi-square</i>

## ABSTRACT

**Background:** Morbidly adherent placenta is defined as an abnormal adherence of all or part of the placenta to the underlying uterine wall.

**Objective:** The aim of this study is to evaluate the management of morbidly adherent placenta in Ain Shams Maternity Hospital during the 5-year period from January 2012 to December 2016.

**Study Design:** A Retrospective Study

**Study Setting:** Ain Shams University Maternity Hospital.

**Subjects and Methods:** Records of hospital admissions during the planned time frame with the diagnosis of antepartum haemorrhage or placenta accreta/increta/percreta were reviewed.

**Results:** Ain Shams University Maternity hospital (ASUMH) is a major tertiary referral hospital in Egypt. In evaluation of the management and short term maternal and perinatal outcomes of morbidly adherent placenta offered to women at ASUMH, the hospital archives were examined for hospital records fulfilling the criteria of the study population during the 5-year period from January 2012 to December 2016.

**Conclusion:** Morbidly adherent placenta is highly associated with the existence of placenta previa, especially in cases with previous cesarean section. When morbidly adherent placenta is diagnosed or suspected antenatally, the patient must be referred to a tertiary center. Generally, the recommended management is cesarean hysterectomy. However, this approach might not be considered first-line treatment for women who have a strong desire for future fertility. Therefore surgical management of Morbidly adherent placenta may be individualized.

**Key Words:** *Morbidly Adherent Placenta – In Vitro Fertilization - Alpha Fetal Protein*

## INTRODUCTION

**M**orbidly adherent placenta (MAP) is defined as an abnormal adherence of all or part of the placenta to the underlying uterine wall (*Pinto et al., 2016*).

The morbidly adherent placenta is now a significant obstetric challenge. Morbidly adherent placenta is often used as a general term but is defined by the levels of invasion of chorionic villi into maternal myometrium. Once a rare diagnosis, it is now the leading cause of postpartum hemorrhage and indication for a gravid hysterectomy. Traditionally, abnormal placentation has been classified into accreta, increta and percreta based on the depth of myometrial invasion: superficial, deep, and through the uterine serosa respectively and the greater the invasion, the greater the risks for hemorrhage and maternal morbidity (*Goh et al., 2016*).

Invasive placenta first reviewed by Irving and Herting in 1937. The basic histopathological disorder lies on the absence of both the decidua basalis and the Nitabuch's layer, which result in a direct attachment of the chorionic villi to the myometrium. The most severe manifestations of this process result in placenta increta when chorionic villi invade into myometrium and placenta percreta when chorionic villi invade to or through the uterine serosa (*Garmi et al., 2012; Pinto et al., 2016*). About 75% of morbidly adherent placentas are morbidly adherent placenta s, 18% are placenta incretas, and

7% are placenta percretas. Morbidly adherent placenta s can be subdivided into total morbidly adherent placenta, partial morbidly adherent placenta and focal morbidly adherent placenta based upon the amount of placental tissue involved in their attachment to the myometrium (*Wehrum et al., 2011*).

The incidence of morbidly adherent placenta has been steadily increasing specially during the last two decades, mirroring increased rates of caesarean section (*Miller et al., 2016*). The incidence varies from 1 in 533 to 1 in 2500 (*Miller et al., 1997; ACOG, 2002; Tanimura et al., 2015*).

In the event of morbidly adherent placenta, the third stage of labour may be complicated by severe uterine haemorrhage that may lead to the need of extensive life-saving surgical interventions such as hysterectomy and ligation of major pelvic vessels. The average blood loss volume at delivery is 3, 000-5, 000 ml (*ACOG, 2012*). As a consequence of placental invasion to adjacent organs, reconstruction of the urinary bladder or bowel may be necessary. Massive blood and blood products transfusions are the rule in these dramatic cases, and maternal morbidity is high. Other complications include neonatal death, infection, fistula formation & ureteral damage. A maternal mortality rate of 7% has been quoted previously for this condition (*O'Brien et al., 1996; Abuhamad, 2013; Tanimura et al., 2015*).

The major risk factor is placenta preavia with a previous cesarean section, but other predisposing factors have been identified including: scarred uterus, multiparity, previous uterine surgery, advanced maternal age, Previous uterine curettage, uterine closure with continuous suture after cesarean section and Asherman syndrome (*Jacques et al., 1996; Miller et al., 1997; Jauniaux and Jurkovic, 2012; Sumigama et al., 2014; Pinto et al., 2016*). Furthermore, female fetus gender was also reported more frequently than males in association with morbidly adherent placenta (*Khong et al., 1991; James, 1995*).

Antenatal diagnosis is a key factor in optimizing the maternal and neonatal outcome. Morbidly adherent placenta is diagnosed ideally in the antenatal period by either sonographic or magnetic resonance imaging techniques. Several studies have demonstrated the usefulness of ultrasonography in making this diagnosis, particularly at > 20 weeks' gestation (*Comstock, 2005; Lam et al., 2002; Azour et al., 2016*). Unfortunately, some cases of morbidly adherent placenta are diagnosed at the time of delivery when the mother experiences continued vaginal bleeding, or heavy vaginal bleeding when an attempt is made to remove the placenta or only part of the placenta is able to be removed (*Oyelese and Smulian, 2006*).

There is debate over the ideal therapeutic approach for management of morbidly adherent placenta. The generally held opinion is that the morbidly adherent placenta should be treated by caesarean hysterectomy, without attempts at

removal of the placenta (*Oyelese and Smulian, 2006*). Conservative management, whereby the placenta is left within the uterus, is advocated by some investigators who cite that this approach has the benefits of preservation of fertility, prevention of massive haemorrhage, and protection against damage to adjacent organs (*Kayem et al., 2004*). This conservative approach, however, is not without risks, which include significant bleeding, infection, fistula formation, and failure of placental resorption (*Kayem et al., 2004; Chiang et al., 2006*).