Placenta accreta spectrum: maternal near miss

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ABSTRACT

Design:
A randomized prospective surgical case series study

Setting: antenatal and labor wards and operative theater at AL-Zahra maternity and pediatric teaching hospital at Al-Najaf city, Iraq (tertiary referral center). Participants: patients admitted through the reception room or outpatient clinic, 198 multiparous women in the third trimester ≥30 wk., all patients had a history of prior cesarean section and all cases with a diagnosis of placenta accreta by Doppler ultrasound and at the surgery.

Aims and objectives:
The present study was to find out maternal near miss inpatient with PAS which is the most dangerous complication of cesarean potentially leading to massive intrapartum hemorrhage and death especially in developing countries and to evaluate the relationship between repeated cesarean deliveries and subsequent development of placenta accrete spectrum and to compare different management strategies, the aim to reduce maternal mortality and morbidity associated with placenta accrete spectrum.

Methods:
The present prospective research was performed in the Department of Obstetrics and Gynaecology at AL-Zahraa maternity and pediatric teaching hospital in Al Najaf, Iraq, from 1 January 2016 to 1 July 2020. This study involved 198 pregnant women with multiple cesarean sections 30 weeks who were prenatally diagnosed by Doppler ultrasound with placenta accrete spectrum and during surgery. The assessment also included if the cesarean section was performed electively or as an emergency, if there was need for hysterectomy was also considered, estimated blood loss during surgery, blood transfusion units provided and procedures used to reduce bleeding, and reported information on intraoperative and postoperative events. Maternal morbidity was also reported, including injuries to the urinary tract, ureteric injury, cesarean hysterectomy, and admission to the intensive care unit. Postoperative complications and hospital stay period was noted.

Results:
In these 4 years and 7 months period, among (104760) deliveries, (76550) Vaginal delivery and (28210) Caesarean Section only 198 cases classified as a near miss and met the diagnostic criteria of PAS. In total, 198 patients found Cesarean Hysterectomy performed in 67 cases out of 198 (33.8%). The rate of successful uterine preservation was high (66.2%), in uterine artery ligation 69 cases and internal iliac artery ligation in 8 cases, and 78 cases overseeing of the implantation site, and segmental uterine resection method in 41 cases and B-Lynch or other brace suturing 27 cases, The maternal mortality rate was 0.5%(one case), 86 patients were scheduled for cesarean section and 113 patients were emergency
cesarean cases owing to active bleeding or labor. The majority of patients presenting with placenta accreta belonged to age group more than 30 years (73.2%) and Most of the patients were para 3-5 (59.6%). placenta accreta was the commonest of all(85.4%) and placenta percreta only in 4% but required a maximum number of blood transfusions (>8 units of blood on an average)bladder injury 66 cases, ureteric injury in 3 cases, all cases received intraoperative blood transfusion(198) postoperative blood transfusion in 129 cases, and ICU admission 2 cases, maternal deaths 1 case. In 5 (7.5%) patients total abdominal hysterectomy was performed while 62(92.5%) patients required a subtotal hysterectomy.

**Conclusion:** The most common cause of maternal near miss was hemorrhage, mostly, intrapartum and post-partum hemorrhage incidence of PAS is increasing in recent years due to a higher cesarean section rate. It is increasing maternal morbidity such as excessive blood loss, massive transfusion, and hysterectomy, as well as perinatal morbidity. Antenatal diagnosis of PAS, preoperative counseling, planning, and multidisciplinary approach is necessary to reduce morbidity and mortality associated with PAS.

**Keywords:** Peripartum, hysterectomy, maternal near miss Placenta accreta, prior cesarean section, (maternal morbidity and mortality), surgical techniques

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**INTRODUCTION**

Placenta Accreta Spectrum [PAS] is a rare but dreaded complication due to intrapartum and postpartum hemorrhage associated with severe maternal morbidity and mortality. The present terminology recommended by the International Federation of Obstetrics and Gynecology (FIGO) is[103]placenta accreta spectrum disorder (PASD) and should replace terms such as abnormally adherent / invasive placenta or morbidly adherent placenta. [1] PAS disorders are defined as the abnormal placental invasion of the uterine myometrium [1, 2] and /or surrounding organs such as the bladder and rectum [3]. The first case of placenta accreta was described in 1937 [104], this term has been used to describe placenta accreta, increta, and percreta. Placenta accreta occurs when the placental villi adhere directly to the myometrium., increta involves placental villi invading into the myometrium, and percreta reach the serosa and adjacent organs. [4,5]. About 75% of PAS disorders are placenta accretas, 18% are placenta incretas, and 7% are placenta percretas.[6]The incidence of PAS is increased from 0.12 to 0.31% in the last 30 years.[7]The prevalence of accreta in the national inpatient sample was 3.7 per 1000 births-1 per 270 (Mogos, 2016). [49] This rise was correlated with the growing trend in Caesarian delivery. [62,23]While uncommon, placenta accreta contributes substantially to major maternal morbidity. [12]So maternal morbidity rate of 9.5%. [10]A maternal mortality rate of 7 - 10% has been quoted by a number of reviews, which is alarmingly high. [13, 14, 5, 15, 16, 17] The most recent confidential inquiry into maternal mortality in the United Kingdom (MMBRACE-UK, 2017)
highlighted the continued high maternal mortality associated with the condition. [18] PAS is associated with a grave complication of pregnancy and it's becoming an emerging cause of increased maternal morbidity which includes massive blood transfusion after attempted placental extraction, hemorrhage from the placental bed will lead to severe maternal morbidity and eventually maternal death. [1] Urinary tract injury, peripartum hysterectomy, blood transfusion, multiple organ failure,[19] Intensive care unit (ICU) admission, sepsis, and a lengthy hospital stay. [20] Significant causes of maternal morbidity are often complications resulting from the procedures used to treat PAS disorders. [21] In women with Placenta previa and a history of previous cesarean delivery, the risk of PAS seems to be increased. [22, 6] The Combination of two is more likely (Klar, 2014). [50] The higher the number of repeated Caesarian delivery, the higher the risk of PASD. This risk increases from 0.2% in patients with 1 previous CD to 2.1% in patients with 4 previous CD. [8, 23] And Placenta Previa is associated with a 1%–4% risk of developing any of the PASD.[8] Other risk factors have been less consistently established like maternal age (≥ 35 years).[24] In addition to the Caesarian Section, myometrial damage such as prior dilation and curettage or endometrial ablation of the uterus and prior myomectomy or other uterine surgery].[25,104-106] Complications of placenta accreta are many and include damage to local organs, postoperative bleeding, amniotic fluid embolism, coagulopathy, transfusion-related complications, acute respiratory distress syndrome, postoperative thromboembolism, infectious morbidities, multisystem organ failure, and maternal death. [14] So it needs ideal management and a team approach in which an obstetrician, anesthetist, urologist, pediatrician are needed. [26] The World Health Organization (WHO) defines maternal near miss as “any health condition attributed to and/or aggravated by pregnancy and childbirth that has a negative impact on the females wellbeing and/or functioning”. [27, 29] Maternal morbidity, as well as socioeconomic status, can affect the physical, psychological, and sexual health of women. Maternal morbidity and mortality are higher among poor women in low- and middle-income nations, according to literature. [28] The term “near miss” denotes a condition of “a female that nearly died, but survived.” [29,30] Since maternal near miss could act as a surrogate of maternal death. [31] Placental invasion of the lower uterine segment, posterior bladder, and parametria was established by a systematic analysis of 'near misses' in PAS disorders as the highest risk factors for maternal morbidity. [21] It has been documented that estimated blood loss in PAS disorders ranges from 2000 mL to 7800 mL [32,33] (In certain cases, as much as 20 L or more) [33,115,116] 5-10 units of packed red blood cells in an average transfusion requirement and (pRBCs) [33,83,117] blood transfusions may be life-saving, but that may be associated with substantial maternal morbidity. [34] After birth, attempts to separate the placenta typically lead to significant bleeding from the uteroplacental circulation and destruction of the deep uterine vasculature that spreads to other organs. [1] Inadvertent surgical injury and coagulopathy can cause additional blood loss. [34] Implementation of maternal near miss audit at the hospital level can provide an opportunity to study maternal morbidity on a wide scale. [35] There are limited studies investigating maternal near miss in Iraq Najaf. Accurate prenatal diagnosis of placenta accreta spectrum is crucial in planning its management and has been shown a maternal morbidity and mortality reduction. (New 2018). [1] Placenta accrete spectrum antenatal diagnosis; referral for imaging and delivery to centers of excellence; The use of committed, multidisciplinary teams and meticulous surgical procedures can
reduce blood loss and [117,107,118,119,40] maternal peripartum hemorrhage and blood transfusion requirements and morbidity and improve outcomes [36,37–41] Placenta Accreta diagnosis begins with clinical suspicion in at-risk patients.. Ideally, sonography is used to detect irregular placental in growth in the antepartum. [38,108–110] Ultrasound and Doppler Ultrasound has become the primary screening tool for women at risk of PAS Due to their easy availability and is highly sensitive.[42] the most common sonographic finding associated with PAis the loss of myometrial interface with enlargement of the underlying uterine vasculature.[43]Sonographic features of abnormal placenta invasion include the presence of lacunae or venous lakes, loss or disruption of the retroplacental hypoechoic (sonolucent) zone, exophytic mass extending through the serosa, and bulging of the placenta into the posterior wall of the bladder [100].Delivery control is variable; the American Congress of Obstetricians and Gynecologists (ACOG) and FIGO and depending on the suspected severity of PASD, scheduled cesarean delivery with or without hysterectomy is recommended for about 34 to 38 weeks. Conservative management of PAS disorders includes all strategies aimed at maintaining the uterus, conservative or expectant management aimed at minimizing extreme maternal morbidity during CS for PAS disorders[44–47] and can be taken into account when fertility preservation is required.[45] Conservative surgical care includes uteroplacental tissue removal, but uterus protection, forcible manual placenta removal[48] raises the likelihood of serious haemorrhage, hysterectomy, coagulopathy, and damage to the surrounding organs. [44–47]. Over the last few decades, numerous conservative surgical techniques have been described.[88,112] The morbidity evaluation associated with these techniques is still limited.

MATERIALS AND METHODS:
The study was a prospective study in Al-Najaf Region, Iraq, including all cases admitted to Al-Zahra maternity and pediatric teaching hospital. (This facility is the only tertiary teaching hospital in the province. This hospital also accepts referrals from other hospitals in the same city). This research included 198 pregnant women with recurrent cesarean sections ≥30 wk, diagnosed with placenta accrete spectrum by Doppler ultrasound and surgery, from 1 January 2016 to 1 July 2020. The gestational age was determined on the first day of the last cycle of menstruation, or calculated by the first obstetric ultrasound test. Most PAS cases were hospitalized, and informed consent was obtained before surgery from females participating in the study and from all participants. Using Doppler ultrasound, patients were tested for Accreta, Percreta, and Increta. All patients were managed by surgery. For all participants, history, general, abdominal, laboratory, and radiological exams were performed. With booking six units of cross-matched blood. For all cases of cesarean hysterectomy, histopathological testing was performed. A multidisciplinary approach was adopted. At 35 and 36 weeks or earlier in an emergency, the protocol was to operate such cases electively. In all cases of Placenta increta and Percerta, cesarean hysterectomy has begun. Most Placenta Accreta cases have been treated by conservative steps such as segmental uterine resection and ligation of the uterine artery, and hemostatic sutures on the Placental bed. Failure to take such steps resulted in a cesarean hysterectomy. Blood loss was described in terms of vaginal loss, blood in drains, intra-operative, and post-operative.

Inclusion criteria include:

1-Diagnosis: This study included all pregnant women which have previous caesarian section with PAS disorders diagnosed prenatally by Color Doppler ultrasound.

2-Gestational age: ≥ 30 weeks at start of the study management modalities were seen in our cases: In cases of absolute invasion (diffuse accreta or percreta), either hysterectomy or conservative surgery was performed according to the patient's parity and her ability to maintain or not maintain the uterus.

The research enrolled a total of 198 patients with PAS. Total Placenta Previa was confirmed in 122 cases according to ultrasonography and operative findings, partial PP in 59 cases, marginal PP in 10 cases, and low lying PP in 7 cases. Cesarean Hysterectomy performed in all cases of increta and perecreta, bladder injury in 66 (33.3%) cases and ureteric injury in 3 cases (1.5%), and all cases received intraoperative blood transfusion, postoperative blood transfusion in 129 (65.2%) cases and ICU admission in 2 (1%) cases.

We have alternative different surgical techniques for the treatment of PA in all cases. For pregnant women with a deep desire to maintain their potential fertility as well as hemodynamic stability, normal coagulation status, partial placental separation spontaneously. The remaining part is removed, and Bleeding is handled by ligation of the bilateral uterine artery, local resection of placental implantation site (segmental uterine resection method, compression sutures, modified Blynch sutures, internal iliac artery ligation or over sewing of the implantation site. In cases of complete invasion, a cesarean hysterectomy was performed if bleeding continued (increta or percreta).

RESULTS:

In this 4 year and 7 months period, among 104760 deliveries, 76550 vaginal delivery, and 28210 caesarian section only 198 patients met placenta accreta's diagnostic criteria. The diagnosis of Placenta accreta was already suspected by Doppler ultrasound findings in the majority of the women before surgery and at the surgery and we found that 169 (85.4%) females had Accreta, 21 (10.6%) had Increta and only 8 (4.0%) females had Percreta. All cases were multiparous In total, 198 patients with PAS found Cesarean Hysterectomy performed in all cases of placenta percreta and increta, hysterectomy was required in 67 cases out of 198 (33.8%). The rate of successful uterine preservation was high (66.2%) multiple procedures are done to preserve the uterus included, uterine artery ligation 69 cases and internal iliac artery ligation in 8 cases, and 78 cases overseeing the implantation site, and segmental uterine resection method in 41 cases and B-Lynch or other brace suturing 27 cases, the maternal mortality rate was 0.5%, 86 patients were scheduled for cesarean section and 113 patients were emergency cesarean due to uterine contraction or active bleeding (table 5). The majority of patients presenting with placenta accrete belonged to age group more than 30 (73.2%) and must patent multiparous had 3-5 baby 118 cases (59.6%) and Most of the patients were had 3-5 caesarian section 156 cases (78.9%). 20 patients had two cesarean sections, 15 patients had one cesarean section, and 7 patients had six caesarian sections (Table 3). placenta accrete was the commonest of all (85.4%) (Table 4). Bladder injury 66 cases, ureteric injury in 3 cases, all women with PAS needed a blood transfusion and all cases received intraoperative blood transfusion (198) postoperative blood transfusion in 129 cases and ICU admission 2 cases. Maternal deaths 1 case. In 5 (7.5%) patients total
abdominal hysterectomy was performed while 62(92.5%) patients required subtotal hysterectomy (table 5) estimated blood loss intraoperatively ranged from less than 1500ml in 145 cases and more than 1500ml in 53 cases. In 146 cases; give packed RBC and in 162 cases transfused fresh frozen plasma intraoperatively and postoperatively and whole blood had given in 63 cases. Duration of stay in ICU ranged from 5 to 8 days, vesicouterine fistula occurred in one patient who underwent uterine preservation, 6 cases wound infections treated with proper antibiotic regimens, and one maternal death due to cardiac asystole.

Table 1: Socio-demographic data of pregnant women

<table>
<thead>
<tr>
<th>Age</th>
<th>No.</th>
<th>percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;18</td>
<td>7</td>
<td>3.5%</td>
</tr>
<tr>
<td>18-24</td>
<td>14</td>
<td>7%</td>
</tr>
<tr>
<td>25-30</td>
<td>32</td>
<td>16.2%</td>
</tr>
<tr>
<td>31-35</td>
<td>94</td>
<td>47.5%</td>
</tr>
<tr>
<td>&gt;36</td>
<td>51</td>
<td>25.8%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parity</th>
<th>No.</th>
<th>percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>8</td>
<td>4.0%</td>
</tr>
<tr>
<td>3-5</td>
<td>118</td>
<td>59.6%</td>
</tr>
<tr>
<td>6-8</td>
<td>50</td>
<td>25.3%</td>
</tr>
<tr>
<td>&gt;8</td>
<td>22</td>
<td>11.1%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gestational age</th>
<th>No.</th>
<th>percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 30 - 33</td>
<td>5</td>
<td>2.5%</td>
</tr>
<tr>
<td>34–36</td>
<td>128</td>
<td>64.7%</td>
</tr>
<tr>
<td>&gt; 36</td>
<td>65</td>
<td>32.8%</td>
</tr>
</tbody>
</table>
Figure 1: No. of the patient with PASD in relation to age at presentation.

Table 2: Types of placenta previa according to Ultrasonography + Intraoperative finding

<table>
<thead>
<tr>
<th>Types of placenta previa</th>
<th>No. of patient</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>complete PP</td>
<td>122</td>
<td>61.6</td>
</tr>
<tr>
<td>partial PP</td>
<td>59</td>
<td>29.8</td>
</tr>
<tr>
<td>marginal PP</td>
<td>10</td>
<td>5.1</td>
</tr>
<tr>
<td>low lying PP</td>
<td>7</td>
<td>3.5</td>
</tr>
<tr>
<td>Total</td>
<td>198</td>
<td>100%</td>
</tr>
</tbody>
</table>

Figure 2: Types of placenta previa in women had PASD.

Table 3: Outlines the previous cesarean delivery.

<table>
<thead>
<tr>
<th>Previous cesarean</th>
<th>No. of patient</th>
<th>percent</th>
<th>Number of hysterectomy</th>
<th>Percent</th>
</tr>
</thead>
</table>

This table shows that the relationship between the number of prior cesarean sections and the definitive diagnosis of the defective placenta was highly important in all the cases examined.

<table>
<thead>
<tr>
<th>delivery.</th>
<th>1</th>
<th>15</th>
<th>7.6%</th>
<th>3</th>
<th>4.5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>20</td>
<td>10.1%</td>
<td>2</td>
<td>2.9%</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>42</td>
<td>21.2%</td>
<td>6</td>
<td>9.0%</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>56</td>
<td>28.3%</td>
<td>21</td>
<td>31.3%</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>58</td>
<td>29.3%</td>
<td>29</td>
<td>43.3%</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>3.5%</td>
<td>6</td>
<td>9.0%</td>
<td></td>
</tr>
<tr>
<td>total</td>
<td>198</td>
<td>100%</td>
<td>67</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

Figure 3: Peripartum hysterectomy in relation to No. of previous CS

Table 4: types of abnormal placentation in the patients. The diagnoses were verified by histopathologic observation of placental invasion into the myometrium,

<table>
<thead>
<tr>
<th>Abnormal placentation</th>
<th>Number</th>
<th>percent</th>
<th>Number of hysterectomy</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accreta</td>
<td>169</td>
<td>85.4%</td>
<td>38</td>
<td>56.7%</td>
</tr>
</tbody>
</table>
Figure 4 No. of peripartum hysterectomy according to types of abnormal placentation

Table 5: Maternal outcomes and management (Intraoperative and Postoperative complications)

<table>
<thead>
<tr>
<th>Morbidity</th>
<th>No. of Patient</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hysterectomy</td>
<td>67</td>
<td>33.8%</td>
</tr>
<tr>
<td>Total</td>
<td>5</td>
<td>7.5%</td>
</tr>
<tr>
<td>subtotal</td>
<td>62</td>
<td>92.5%</td>
</tr>
<tr>
<td>ICU admission</td>
<td>2</td>
<td>1%</td>
</tr>
<tr>
<td>Length of postnatal stay (days)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 5</td>
<td>11</td>
<td>5.6%</td>
</tr>
<tr>
<td>&lt; 5</td>
<td>187</td>
<td>94.4%</td>
</tr>
<tr>
<td>Procedure</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>Blood transfusion</td>
<td>198</td>
<td>100%</td>
</tr>
<tr>
<td>units of whole red cells transfused</td>
<td>63</td>
<td>31.8%</td>
</tr>
<tr>
<td>packed red cells transfused</td>
<td>146</td>
<td>73.7%</td>
</tr>
<tr>
<td>FFP transfusion</td>
<td>162</td>
<td>81.8%</td>
</tr>
<tr>
<td>platelets transfused</td>
<td>4</td>
<td>2%</td>
</tr>
<tr>
<td>cryoprecipitate transfused</td>
<td>9</td>
<td>4.5%</td>
</tr>
<tr>
<td>Bladder repair</td>
<td>66</td>
<td>33.3%</td>
</tr>
<tr>
<td>Vescicouterine fistula</td>
<td>1</td>
<td>0.5%</td>
</tr>
<tr>
<td>Ureteric injury</td>
<td>3</td>
<td>1.5%</td>
</tr>
<tr>
<td>acute renal failure</td>
<td>2</td>
<td>1%</td>
</tr>
<tr>
<td>postpartum hemorrhage</td>
<td>5</td>
<td>2.5%</td>
</tr>
<tr>
<td>Wound Infection</td>
<td>6</td>
<td>3%</td>
</tr>
<tr>
<td>Deep vein thrombophlebitis</td>
<td>3</td>
<td>1.5%</td>
</tr>
<tr>
<td>Internal iliac artery ligation</td>
<td>8</td>
<td>6%</td>
</tr>
<tr>
<td>Bilateral uterine artery ligation</td>
<td>69</td>
<td>52.7%</td>
</tr>
<tr>
<td>placental bed sutures (oversewing of the implantation site)</td>
<td>78</td>
<td>59.5%</td>
</tr>
<tr>
<td>Local resection of placental implantation site( segmental uterine resection method)</td>
<td>41</td>
<td>31.3%</td>
</tr>
<tr>
<td>B-Lynch or other brace suture</td>
<td>27</td>
<td>20.6%</td>
</tr>
<tr>
<td>Emergency surgery (n, %)</td>
<td>113</td>
<td>57%</td>
</tr>
<tr>
<td>Elective surgery (n, %)</td>
<td>86</td>
<td>43%</td>
</tr>
<tr>
<td>Intraoperative blood transfusion hematocrit</td>
<td>145</td>
<td>73.2%</td>
</tr>
<tr>
<td>&lt;1500 ml</td>
<td>145</td>
<td>73.2%</td>
</tr>
<tr>
<td>&gt;1500 ml</td>
<td>53</td>
<td>26.8%</td>
</tr>
<tr>
<td>Postoperative blood transfusion</td>
<td>129</td>
<td>65.2%</td>
</tr>
</tbody>
</table>
Table 6: Age distribution among patients who underwent a peripartum hysterectomy.

<table>
<thead>
<tr>
<th>Maternal age</th>
<th>Hysterectomies</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;18</td>
<td>2</td>
<td>3%</td>
</tr>
<tr>
<td>18-24</td>
<td>6</td>
<td>9%</td>
</tr>
<tr>
<td>25-30</td>
<td>8</td>
<td>11.9%</td>
</tr>
<tr>
<td>31-36</td>
<td>20</td>
<td>29.8%</td>
</tr>
<tr>
<td>&gt;36</td>
<td>31</td>
<td>46.3%</td>
</tr>
<tr>
<td>total</td>
<td>67</td>
<td>100%</td>
</tr>
</tbody>
</table>

**DISCUSSION**

Cesarean section incidence is growing, with a simultaneous increase in maternal mortality and morbidity globally. A big problem for obstetricians is maternal morbidity and mortality from PAS disorders. The incidence of PAS has increased with the increase in the cesarean delivery rate [51] The aim of the present study was to evaluate maternal near miss in cases PAS over 4 years and 7 months period in a tertiary referral center. During the study period, 28210 caesarian section done, only 198 patients met the diagnostic criteria of placenta accrete. In this study, the prevalence of PAS disorders was 0.7 percent. which is comparable to the study by Eliza and Alfred [52] and recently, Carusi (2018) [55] Studies show that Placenta accreta occurs in approximately 1:1000 deliveries, this incidence increases along with rising risk factors, and our incidence is also comparable to the last decade's.
The marked increase in the incidence has been attributed to the increasing prevalence of cesarean delivery in recent years. In our city, the caesarian rate increased from 36.50% in 2016 to 43.50% in 2019 and until the end of this study in July 2020, the incidence was 45%. Plus, as many authors have recorded, rising maternal age at delivery.

In this study, the risk factors for PAS were found to be maternal age (>31 years) as shown in Table 1, and have higher parity (>3) and previous cesarean sections (>3) and this agreement with Esakoff et al. [57,54]. These findings also agreed with the risk factors for PAS disorders examined by Fitzpatrick et al. and found that high maternal age, previous cesarean delivery, and placenta previa were regarded as important risk factors. Another research in 2017 also indicated that independent risk factors for PAS disorders were older maternal age, previous cesarean section, placenta previa, and high parity [59]. Similar findings were also recorded by other investigators, [7, 60]. Others found no association with age when limiting the analysis to previa and controlling for prior cesarean section, [22]. The risk of PAS increases with increasing numbers of repeat cesarean sections, as shown in Table 3. And this an agreement with [54, 11, 55-56]. In contrast, a larger, multinational study showed that prior cesarean was associated with accreta after controlling for other risk factors, including previa. [61] As previously mentioned, the rising rate of cesarean section is often implicated in the rising observed accreta incidence. [5, 62, 16]

The risk of massive hemorrhage at delivery or during pregnancy among women with previa and accrete is thought to increase with advancing gestation, [63, 14, 64-65]. In the current study, at diagnosis and surgery, the gestational age was 32-36 weeks and >36 weeks respectively. Table 1. A study reported 95% of cases found to have parity 1–5. [66]

We also found that a total of 8 (4%) had 1-2 parity, 118 (59.6%) females had 2nd to 5th parity, and 72 (36.4%) females had ≥ 6 parity. Previa is the dominant modern risk factor for placenta accreta, with reported odds ratios greater than 50. [67, 61, 58]. Up to 88% of the women with PAS have concomitant placenta previa [53]. In the present study, major PP (complete or partial PP) occurred in 183 women [91.4%], and minor PP (marginal PP or low-lying placenta) in 17 women (8.6%) table 2. Women with major PP this is similar to other studies [68, 69] showed a significantly higher incidence of antepartum hemorrhage placenta accreta and hysterectomy, this is in agreement with most other recent studies. [70-72]

Keeping a probable Prenatal diagnosis of MAP helps in saving maternal life. It is therefore important to use Doppler Ultrasound to reduce both maternal morbidity and mortality. And This helps in counseling and monitoring of high-risk patients for MAP. [73, 74] A research showed that 70% of women had placental localization, which was approximately equal to our diagnosis. The most common form of irregular adherence in the present study was Accreta 169 (85.4%) females, 21 (10.6%) had Increta and only 8 (4.0%) females had Percreta, table 4. [76] Our study was similar to study found that About 79% of morbidly adherent placentas are placenta accretas, 14% are placenta accretas, and 7% are placenta...
percretas. [6] In another analysis, these figures are also verified. Scarred uteri with Placenta Previa were registered (64.7%). [77]. Table 3 We found that 65 (32.8%) of the patients in this study had more than 4 previous C-sections, 56 (28.3%) had 4 previous C-sections, 42 (21.2%) had 3 previous C-sections and rests of 35 (17.8%) had 1 and 2 C-section. which is also comparable to the study reported that 82.35% of patients had a previous Cesarean section. [77, 78]

Significant complications of pregnancy are associated with PAS, including Life-threatening maternal bleeding, large-volume transfusion of blood. New research in 2018 confirmed that 94.7% of cases with PAS disorders received a blood transfusion, supporting this outcome. [79] A recent study in 2018, confirmed this result, and reported that 94.7 percent of cases with PAS disorders received a blood transfusion. [80] Average blood loss at delivery among women with placenta accreta with previa is estimated at 2,000–3,000 mL. [81, 82, 33] Ninety to ninety-five percent of women undergoing hysterectomy for placenta accreta receive a blood transfusion. [14, 83] Five to forty percent of cases require massive transfusion of 10 units of red blood cells or more, [14, 64, 83]. Most women in our study needed more than a single unit of blood. So we found the amount of blood loss intraoperative was <1500 ml in 145 cases (73.2%) and more than 1500 ml in 53 cases (26.8%) which is almost similar to the above study. The estimated total blood loss as a result of PAS in our study was 1-3 L in 120 cases, and a loss of 4-7 L in 52 cases and 8-1 L in 17 cases and > 10 L in 9 patient. In our study both placenta increta and placenta percreta with massive hemorrhage and receive a maximum unit of blood transfusion.

Peripartum Cesarean Hysterectomy was performed in 33.8% of women in our study group, in all cases of placenta increta and percreta (53.3%) and 38 (56.7) cases of placenta accreta. If possible to minimize blood loss, our procedure was cesarean hysterectomy with the placenta in place. The key downside of Cesarean hysterectomy for PAS conditions is heavy blood loss. [84] The morbidities of cesarean hysterectomy for accreta are high, and early delivery is intended to avoid the added morbidities of emergent hysterectomy and suboptimal location. Early, scheduled delivery is advocated for maternal safety. [14, 65, 80, 20, 85]. Wright et al. (2011) The mean blood loss for cases of PAS disorders undergoing cesarean hysterectomy were 3 L, whereas the mean required transfusion units of packed red blood cells (PRBC) were 5 units. In about 41.7 percent of women with a confirmed diagnosis of PAS disorders, an average blood loss of about 5000 mL was observed in. [33]

In our study, complications were statistically significant so a scheduled delivery. Shorter operating times and a reduced incidence of transfusions, complications, and admissions to the intensive care unit have been related. In a study conducted by Anjum Ara and colleagues Subtotal Cesarean Hysterectomy (87%) and total Cesarean Hysterectomy (13%). [86] This rate of Cesarean Hysterectomy was SAME that of our study in which 92.5% subtotal and rest 7.5% total caesarian hysterectomy and Compared to other research, our analysis revealed an increased pattern of using conservative steps. In this study, Conservative management of placenta accreta is defined as all procedures or strategies aiming to avoid a peripartum hysterectomy and its related morbidity and consequences. the success rate of different surgical procedures was effective and safe in conservative treatment of PAS was 111 case (56.1%). many scholars have stated that the treatment of PAS disorders is conservatively associated with
hysterectomy reduction and subsequently fertility preservation. [87–89]

There are many alternative conservative surgical techniques to preserve the uterus, stopping the substantial loss of blood due to PAS disorders, including the B-Lynch maneuvers [90], compression sutures [91], internal iliac artery ligation [92]. But the performance of these strategies is variable. [6, 93], bilateral uterine artery ligation [113,114], local resection of the placental implantation site, and uterine compression future various success rates have been identified to reduce the morbidity of peripartum hysterectomy and allow for potential fertility. [94, 84] Some patients had more than one such procedure.

Very experienced surgical team and our different surgical procedures alternative to hysterectomy with adequate tissue hemostasis were effective and safe in conservative treatment of PAS and reducing maternal morbidity and mortality. In present study Varying success rates were described for different approaches including, bilateral uterine artery ligation 69 cases (52.7%) and internal iliac artery ligation in 8 cases(6%), and 78 cases(59.5%) over sewing of the implantation site, and segmental uterine resection method in 41 cases(31.3%) and B-Lynch or other brace suturing 27 cases(20.6%) Table 5. The reported success rate of double UAL in PAS varied from 80 to 96% up to 100% in Tanta University Hospital [95], but in our study, the success rate was 52.7%. The difference in result may be owing to applying multiple procedures like compression suture and sewing placental bed and local resection of placental implantation site. Our study agreed with El Shazly et al and another study. (96,113,114,111). In the current study 198 cases of PAS 2 of them (1%) admitted in ICU. No cases in our study complicated with DIC.

The maternal outcome is unpredictable in PAS length of ICU stay was 5–8 days in all cases which is similar to Walker et al. [97] Moreover, 3 U of packed red blood cell given in 146 cases and three to sex fresh frozen plasma in 162 cases and platelet and cryoprecipitate in [4, 9] cases respectively were transfused, which is more than the study of Likis et al. [98] Table 5.

Other causes of early morbidity are also large in PAS patients (coagulopathy, admission to intensive care units, bladder injury & bowel injury), as reported in a previous study. bladder injury during dissection occurred 66 cases(33.3%), which was treated, A research recorded that 5 patients (29.4 %) suffered bladder injury during dissection.[77] That is similar to our findings.; ureteric injury happen in 3 cases only (1.5%) all have an abnormal placenta, vesicouterine fistula (one case) was successfully repaired 6 months later. Our findings have been confirmed by several studies stating that bladder complications are greater and ureteric injuries are the most common injuries reported. [33, 23, 85, 107, 99]

We recommended that Caesarian Hysterectomy is the last treatment of choice for PAS which done in 67 cases with its comorbidities such as acute renal failure (two cases), and wound infection (6 cases), which were treated with proper antibiotics; and pelvic pain, which developed after the operation was managed; deep vein thrombosis (3 cases). These complications are the same as reported in any different surgical methods.
The mortality rate of PAS disorders has been reported to be about 7.0% (7). A high mortality rate is reported in the literature, i.e. six (30%) maternal deaths were reported. [66]. That is lower to our series. The only one (2.04%) case was maternal death in our study after Caesarian Hysterectomy in the second day post-operative due to cardiac asystole and this less than figures reported by Guleria et al. [10].

In a national study in the United States, however, a mortality rate of 1.0% was recorded in women who underwent obstetric hysterectomy [84], and this is consistent with our study. Our results demonstrated that postnatal hospital stay duration in the caesarian hysterectomy group was 5 days. Similar to our findings, it has been reported that mean hospital stay ranged from 4 to 8 days after Caesarian hysterectomy. [33, 102]

**CONCLUSION**

PAS disorders have become a potentially life-threatening issue in modern obstetrics, so prevention of massive hemorrhage is an important factor in reducing maternal near miss cases. Most patients presented as obstetric emergencies with vaginal bleeding and post-operative anemia so our study has demonstrated some of the major maternal complications associated with PAS disorder. Thorough antenatal care and Prenatal diagnosis and planned delivery in a well-equipped center is important in optimizing the counseling, treatment and may improve outcomes in the future in women with PASD.

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