

PLACENTA ACCRETA SPECTRUM DISORDERS

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ABSTRACT

Placenta accreta spectrum is a rare pathology, but there is an increase in the incidence of placenta accreta. In the accreta spectrum, abnormal placental adherence to the myometrium stems in part from partial or total absence of the decidua basalis and imperfect development of the fibrinoid or Nitabuch layer. This results in the absence of a physiological line of cleavage, so resulting in failure of separation of the placenta causing significant hemorrhage. This leads to maternal morbidity and mortality. 12 patients of placenta accreta managed at Government Medical College and Rajindra Hospital, Patiala, over 1 year (December 2021–November 2022) were reported. All cases had a histopathologically proven diagnosis of placenta accreta. The major risk factors identified were placenta previa, previous cesarean section, multiparity, advanced maternal age, previous uterine surgeries, or curettage. Ultrasound (USG) color Doppler and magnetic resonance imaging allowed us to strongly suspect the presence of placenta accreta in a pregnant woman with risk factors. Placenta accreta spectrum is associated with life-threatening hemorrhage, urinary bladder injury, intensive care unit admission, massive blood transfusion, and maternal death. The course of action in each and every patient varies according to whether the diagnosis of the placenta is made antenatal or during C-section and the amount of blood loss.

Keywords: Cesarean hysterectomy, Placenta accreta, Placenta increta, Placenta percreta.

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INTRODUCTION

The placenta accreta spectrum disorders are described by the International Federation of Gynecology and Obstetrics 2018 into three categories: first, the adherent placenta accreta when the villi are attached to the myometrium; second, the placenta increta when the villi invade the myometrium; and third, the placenta percreta when villi penetrate through the myometrium, including the uterine serosa and, sometimes, adjacent pelvic organs [1]. In clinical practice, these three variants are encountered in a ratio of 80:15:5 [2].

Its incidence has been rising in recent years, and this appears to correlate with the increase in cesarean section rates. Major risk factors are a history of placenta previa, previous cesarean section (C-section), advanced maternal age, multiparity, previous uterine surgeries, or curettage [3]. Abnormal placental adherence to the myometrium stems in part from partial or total absence of the decidua basalis and imperfect development fibrinoid or Nitabuch layer. If the decidua spongy layer is lacking either partially or totally, then the physiological line of cleavage is absent, and some or all cotyledons are densely anchored. Microscopically, placental villi attach to smooth muscle fibers rather than to decidua cells. This decidua deficiency then prevents normal placental separation after delivery. The surface area of the implantation site involved and the depth of trophoblastic tissue ingrowths are variable between patients; however, all affected placenta can potentially cause significant hemorrhage [4]. The diagnosis may be antenatal based primarily on obstetrical ultrasound (USG), Doppler USG, and magnetic resonance imaging (MRI), but may be discovered after a failed separation of the placenta. The diagnosis of certainty is histological; it is mainly diagnosed during C-section in the form of the absence of a cleavage zone between the placenta and the myometrium, thus making delivery of the placenta difficult or impossible [4]. Antenatal diagnosis of placenta accreta spectrum is highly desirable because the time of delivery is optimized before the onset of labor or bleeding and with avoidance of placental disruption [5]. Patients with risk factors for placenta accreta spectrum, such as placenta previa and previous cesarean delivery, should be evaluated for the diagnosis of placenta accreta spectrum by ultrasonography. On ultrasonography,

the presence of multiple vascular lacunae within the placenta, loss of normal hypoechoic zone between the placenta and myometrium, decreased retroplacental myometrial thickness, abnormalities of the uterine serosa-bladder interface and extension of the placenta into the myometrium, serosa or bladder is highly suggestive of placenta accreta disorders [6]. Cesarean hysterectomy can be challenging but the most practical option and should be performed by the most experienced surgeons. The current advances in surgical and homeostatic techniques have improved the prognosis of postpartum hemorrhage allowing us to experiment a conservative treatment. This conservative treatment must be applied with caution and in a suitable infrastructure and would allow the preservation of subsequent fertility as well as the reduction of morbidity and maternal-fetal mortality [7]. Placenta accreta spectrum disorders are associated with a high risk of severe postpartum hemorrhage, serious comorbidities, and maternal death. According to the World Health Organization, the cause of maternal death is severe bleeding (mostly bleeding after childbirth), which is why these disorders have become a public health problem [8]. It is, therefore, essential that obstetricians be up-to-date to properly manage patients by following the latest recommendations from learned societies.

METHODS

12 cases of placenta accreta managed at Government Medical College and Rajindra Hospital, Patiala, over 1 year (December 2021–November 2022) were reported. All the cases had a histopathologically proven diagnosis of placenta accreta. All cases were delivered at this institute. All 12 cases had a previous history of one or more cesarean sections. 10 cases were diagnosed preoperatively with the help of USG and MRI. The approach to the patient with diagnosed placenta accreta was divided into two groups. In group I, the elective cesarean hysterectomy even before the separation of the placenta was performed. In group II, the C-section was performed and waited for the placenta to separate and watched for bleeding or any hemorrhage. If there was no bleeding or the placenta did not get separated, the placenta was left *in situ*, and an interval hysterectomy was performed. The outcome of the two groups was compared in the form of complications such as intensive care unit (ICU) admissions, bladder injury, sepsis, number of blood and blood products required for

transfusion, average blood transfusion, hospital stay, average duration of surgery, neonatal mortality, and maternal death.

Case 1

A 32-year-old female Gravida 5, para 4 with four living children at 33 weeks 4 days of gestation was referred to this institute with the diagnosis of anterior placenta previa. The patient has got 3 normal deliveries and one C-section due to breech presentation. USG color Doppler and MRI were done in this hospital. The diagnosis of anterior placenta accreta was made. The patient was given steroid coverage, and the patient was taken for an elective cesarean hysterectomy at 34 weeks of pregnancy. The patient was fully prepared for a peripartum hysterectomy. Blood and blood products were already arranged. The surgeon and urologist team was preinformed. The abdomen was opened, and the baby was taken out from the transfundal incision. After the birth of the baby, a rapid hysterectomy was preceded without waiting for the placenta to separate. There were dense adhesions in the lower uterine segment. During dissection, there was an injury to the urinary bladder. A hysterectomy was completed with bladder repair. 6 units of blood, 6 fresh frozen plasmas (FFP), and 6 platelet concentrates (PC) were given peroperatively. During the surgery, spinal anesthesia was converted to general anesthesia due to the long duration of the surgery. The total duration of surgery was 2 h and 40 min. Urethral catheterization was advised for 21 days. The patient recovered satisfactorily. The total hospital stay of the patient was 13 days.

Case 2

A 25-year-old female Gravida 3, para 2 with two living children at 31 weeks 2 days of gestation with 2 C-sections was admitted to this institute with anterior placenta previa. USG color Doppler and MRI of the patient in this hospital showed anterior placenta previa with placenta accreta with thinning of the myometrium. The patient received steroid therapy for the lung maturation of the fetus. However, the patient went into labor and was taken for an emergency C-section with informed consent for a hysterectomy. A premature baby was taken out and handed over to a pediatrician, and there was a massive hemorrhage from the placental site, in spite of no attempt being made to separate the placenta. An emergency hysterectomy was done. Intraoperative 4 blood, 4 FFP, and 4 PC were given to the patient. A hysterectomy was done. Homeostasis was achieved. The total duration of surgery was 2 h and 20 min. The patient was shifted to ICU for close monitoring. Postoperatively 2 blood, 2FFP, and 2Pc were given. The patient recovered satisfactorily. The patient after shifting to the ward discharged on the 18th day. The baby could not be saved due to prematurity.

Case 3

A 27-year-old female with Gravida 3, Para 2 with 2 C-sections with two living children at 35 weeks 6 days of gestation with a major degree of placenta previa was referred to this hospital. In this hospital, the patient had undergone USG color Doppler and MRI which showed a major degree anterior placenta previa with placenta accreta. The patient was posted for an elective cesarean hysterectomy with informed consent for hysterectomy was taken. Blood and blood products were arranged preoperatively. The abdomen was opened in layers, and the uterine incisions were made well above the visible margins of the placenta. The baby was taken out, and a hysterectomy proceeded without waiting for placental separations. The hysterectomy was completed. The total duration of surgery was 2 h and 5 min. 4 blood, 4 FFP, and 4 PC were given to the patient. The patient recovered and was discharged in satisfactory condition in 13 days.

Case 4

A 31-year-old female with Gravida 4, para 1 with one living child with one C-section at 34 weeks 2 days of gestation was referred to this hospital with anterior placenta previa. The patient had undergone two dilatation and curettage (D and Cs). USG color Doppler and MRI from this hospital were done where the diagnosis of placenta accreta was confirmed. After the corticosteroid administration, the patient was posted for an elective cesarean hysterectomy with informed consent for a hysterectomy. Blood

and blood products were arranged. The abdomen was opened in layers. The baby was taken out from the uterine incision, which was well above the visible upper margins of the placenta. The hysterectomy proceeded without waiting for the separation of the placenta. A hysterectomy was completed. 4 blood, 4 FFP, and 4 Pc were given to the patient. The total duration of surgery was 2 h and 30 min. The patient recovered and was discharged in satisfactory condition. The total hospital stay was 14 days.

Case 5

A 35-year-old female Gravida 3, para 2 with two living children with one normal delivery and one C-section with a gestation of 36 weeks 5 days was referred to this hospital with anterior placenta previa. USG color Doppler and MRI were done in this hospital, which ruled out placenta accreta. At 37 weeks, the patient was posted for an elective cesarean section. The baby was taken out. The placental separation waited; however, there were partial separation and profuse bleeding. To save the life, the decision of hysterectomy was taken. During the hysterectomy, there was an injury to the urinary bladder. 6 blood, 6 FFP, and 6 PC were given. Homeostasis achieved. The urethral catheter was kept for 21 days. The total duration of surgery was 2 h and 40 min. The patient was shifted to ICU for close monitoring. The patient recovered fully and was discharged in satisfactory condition on the 17th day. The histopathological report confirmed the diagnosis of placenta accreta.

Case 6

A 29-year-old female Gravida 2, para 1 with one living child with one C-section with 36 weeks 6 days of gestation was referred with a breech presentation with major degree anterior placenta previa. USG color Doppler and MRI were done from this hospital, which confirmed the diagnosis of placenta accreta. With informed consent, the patient was posted for an elective cesarean hysterectomy. The transfundal uterine incision was given, and the baby was taken out. Without waiting for the separation of the placenta, the hysterectomy proceeded. 4 blood, 4 FFP, and 4 PC were given preoperatively. The total duration of surgery was 2 h and 10 min. The patient recovered and was discharged on the 11th day in satisfactory condition.

Case 7

A 31-year-old patient with Gravida 4, para 2 with 2 living children with 2 C-sections with 33 weeks of gestation was referred with a diagnosis of anterior placenta previa with placenta accreta. The patient had undergone D and C 3 years back. USG with color Doppler reconfirmed the findings in this hospital. MRI was done for confirmation. The patient was given steroid coverage. After arranging blood and blood products, the patient was taken for an elective C-section after 7 days. During the C-section, there were no bleeding and no separation of the placenta; hence, the decision of the placenta to leave behind was taken. After a 1-week interval, a hysterectomy was performed. 2 units of blood, 2FFP, and 2 PC were given during the hysterectomy, and 1 blood was given post hysterectomy. The total duration of surgery was 1 h and 5 min. The patient was discharged in satisfactory condition. The total hospital stay was 22 days.

Case 8

A 36-year-old patient, Gravida 4, para 3 with 3 living children with one C-section at 38 weeks of gestation with a diagnosis of anterior placenta previa with placenta accreta was referred to this hospital. The patient had got the first two normal deliveries, and the third was a C-section performed due to a transverse lie. USG with color Doppler was done to reconfirm the diagnosis of placenta accreta. After arranging blood and blood products, the patient was posted for an elective C-section on the very next day. As there was no bleeding, there was no separation of the placenta; hence, the placenta was left *in situ*. Interval hysterectomy was done after a gap of 10 days. 2 blood and 2 FFP were given during hysterectomy. The total duration of surgery was 1 h and 10 minutes. The patient was shifted to ICU for observation. A complication of a burst abdomen was faced by the patient after 8 days; hence, resuturing was done. The patient was discharged in satisfactory condition. The total hospital stay of the patient was 34 days.

Case 9

A 29-year-old female Gravida 4, para 2 with one living child with a gestation of 34 weeks 1 day with 1 C-section with anterior placenta previa was referred to this hospital. The patient had undergone D and C 3 years back. The patient had no bout of bleeding in the present pregnancy. Antenatal diagnosis of placenta accreta was made by USG color Doppler and MRI. The patient was electively posted for cesarean section at POG 35 weeks 1 day. During the C-section, there were no bleeding and no separation of the placenta. Hence, the decision of the placenta to leave *in situ* was taken. Interval hysterectomy was done at the gap of 7 days post hysterectomy. The total duration of surgery was 1 h and 20 min. 1 unit of blood was given during C-section, 1 unit of blood pre-hysterectomy was given, and 1 unit of blood was given during hysterectomy with 3 FFP. The patient was shifted to the ward. Postoperatively, the patient developed high-grade fever and leukocytosis, which were managed by higher antibiotics. The patient was discharged after 26 days.

Case 10

A 34-year-old female Gravida 5, para 4 with 2 living children with a gestation of 36 weeks 4 days with previous 3 C-sections with marginal placenta previa was referred to this hospital. The patient had no episode of bleeding in the antenatal period. On USG anterior myometrium in the lower segment was thinned out, but no obvious evidence of placenta accreta was seen. MRI was done, which also excluded placenta accreta. The patient was posted for an elective C-section. During surgery, the placenta did not separate going against USG; hence, on the spot, the decision of the placenta to be left behind was taken. An interval hysterectomy was done after 7 days. A total of 2 units of blood, 2 FFP, and 2 PC were given. The total duration of surgery was 1 h and 5 min. The total hospital stay was 17 days.

Case 11

A 32-year-old female with Gravida 4, para 3 with 2 living children with a gestation of 34 weeks 4 days with previous 3 C-sections with anterior placenta previa was referred to this hospital. USG color Doppler in this hospital showed anterior placenta previa with placenta accreta. The patient was electively posted for a C-section at 35 weeks 1 day. During surgery, the baby was taken out; however, the placenta did not expel spontaneously, and there was no bleeding; however, the placenta was left *in situ*, and interval hysterectomy was performed after 7 days. A total of two units of blood, 2 FFP, and 2 PC were transfused. The total duration of surgery was 1 h and 20 min. Postoperatively, the patient developed high-grade fever and leukocytosis, which were managed by higher antibiotics. The total hospital stay was 28 days.

Case 12

A 32-year-old female Gravida 7, para 4 with 1 living child with a gestation of 34 weeks 1 day with previous 1 C-section was referred to this hospital with anterior placenta previa with placenta accreta. The patient had undergone 2D and Cs. The patient had 2 bouts of bleeding in the 3rd month of pregnancy. Placenta accreta was confirmed by USG at this hospital. The patient was electively posted for a C-section after 1 week. The placenta did not separate, and there was no bleeding. Hence, the decision of the placenta to leave behind was taken. The patient was prepared for an interval hysterectomy. On the postoperative day 2, the patient had postpartum hemorrhage. An emergency hysterectomy was done. Such a catastrophic condition raised that the patient's life could not be saved because of a sudden decompensatory irreversible condition due to massive blood loss in such a short interval of time.

DISCUSSION

The patients were divided into two groups.

- Group I: Patients undergoing a cesarean hysterectomy without waiting for the placenta to separate. Total number of patients six.
- Group II: Patients undergoing an elective C-section and then interval hysterectomy. Total number of patients six.

Incidence

The incidence of placenta accreta was 1 in 2500 births in the 1980s; however, it was 1/731(0.15%) births in the report from the maternal-fetal medicine units network, comprising 115, 502 patients [9]. An incidence of 1 in 700 deliveries (0.14%) was found in 570,000 births in a study conducted in Canada [10]. An incidence of 0.0442% was found in a study conducted in Australia and New Zealand [11]. The incidence of placenta accreta spectrum is increasing due to an increase in cesarean sections, uterine surgeries, and increased use of USG and MRI for making its diagnosis [12]. In the present study of 1 year (December 2021–November 2022), there were 12 histopathologically proven cases of placenta accreta. The total number of birth was 3620; hence, our incidence comes out to be 0.3315%.

Risk factors

The most important risk factors are an associated previa, a prior cesarean delivery, and a more likely combination of two [13]. The rate of placenta accreta spectrum increased from 0.3% in patients with one previous cesarean delivery to 6.74% for patients with three or more cesarean deliveries [14]. For patients with placenta previa, the risk of placenta accreta is 3%, 11%, 40%, and 61% for the first, second, third, and fourth cesarean section, respectively [13]. There is a 0.0015% risk of placenta accreta in the upper segment placenta compared to a 10% rate of placenta accreta in the low-lying placenta [13]. Dysfunctional decidua formation resulting from myometrial trauma such as curettage or endometrial ablation results in the placenta accreta spectrum [15]. Other risk factors are advanced, maternal age and multiparity. In the prior history of placenta previa, 15% of patients develop placenta accreta in the next pregnancy [14].

In this study, the major risk factors of placenta accreta were placenta previa in 100% of cases, previous cesarean section in 100% of cases, and history of dilation and curettage in 33% of cases. 11 out of 12 patients were third or more gravid with one patient as second gravid (Table 1).

Diagnosis

Antenatal diagnosis of placenta accreta spectrum is highly desirable because the time of delivery is optimized before the onset of labor or bleeding and with avoidance of placental disruption [5]. Patients with risk factors for placenta accreta spectrum such as placenta previa and previous cesarean delivery should be evaluated for the diagnosis of placenta accrete spectrum by ultrasonography. On ultrasonography, the presence of multiple vascular lacunae within the placenta, loss of normal hypoechoic zone between the placenta and myometrium, decreased retroplacental myometrial thickness, abnormalities of the uterine serosa-bladder interface and extension of the placenta into the myometrium, serosa or bladder is highly suggestive of placenta accreta disorders [6]. On color flow Doppler imaging, turbulent lacunar blood flow, increased subplacental vascularity, gaps in myometrial blood flow and vessels bridging the placenta to the uterine margin indicates high possibility of placenta accreta disorders [16]. In a high-risk population, ultrasonography has 96.8% specificity and 90.72% sensitivity in diagnosing placenta accreta spectrum [16]. The accuracy of MRI for the prediction of the placenta accreta spectrum has got a sensitivity of 94.4% and specificity of 84.0% [17]. In this study, color Doppler USG and MRI made diagnosis of placenta accreta possible in 10 out of 12 cases.

Complications

Placenta accreta spectrum disorders are a high-risk situation for severe postpartum bleeding and its complications such as hysterectomy, surgical injury to the urinary bladder and multiorgan failure, sepsis, massive blood transfusion, maternal death, and perinatal death. The choice of management depends on the anatomical type of the placenta encountered and the subsequent desire for the fertility of the patient. Obstetricians, radiologists, anesthetists, and urologists work concomitantly [15].

The outcome in the form of complications such as ICU admission, urinary bladder injury, sepsis, burst abdomen, hospital stay, duration

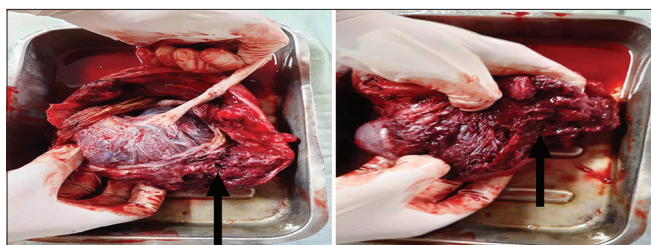


Fig. 1: No cleavage plane between the placenta and uterus

Table 1: Risk factors associated with placenta accreta

Risk factors	Number of patients (%)
Placenta previa	12 (100)
Previous C-section	12 (100)
Dilatation and curettage (Dand C)	4 (33.3)
Multiparity	
G ₃ or More	11 (92)
G ₂	1 (8)

Table 2: Fetomaternal complications

Complications	Number of patients	
	Group I	Group II
Peripartum hysterectomy	6 (100%)	6 (100%)
Urinary bladder injury	2 (16.7%)	Nil
Sepsis	Nil	2 (16.7%)
ICU admission	2 (16.7%)	1 (8.3%)
Burst abdomen	Nil	1 (8.3%)
Average blood loss	2.6 L	1.0 L
Average blood transfusion (Blood, FFP, PC)	5 units each	2 units each
Hospital stay	12.2 days	25.4 days
Average duration of surgery	2 h 5 min	1 h 10 min
Neonatal mortality	1 (8.3%)	Nil
Maternal mortality	Nil	1 (8.3%)

of surgery, blood loss and number of blood transfusions, neonatal death, and maternal death were studied and compared between two groups. In group I, 16.7% of patients suffered urinary bladder injury as compared to none in group II. In group I, no patient developed sepsis; however, 16.7% of patients in group II developed sepsis, and 8.3% of patients had got burst abdomen. 16.7% of patients from group I were admitted to ICU compared to one in group II. Average blood loss was 2.6 L in group I compared to 1.0 L in group II. Intraoperative blood loss was obtained from the anesthesia record and was based on the amount of blood in the suction reservoir plus the estimated blood in surgical pads (100 ml for each soaked surgical pad and 10 ml for each soaked gauze). The average blood transfusion of blood and blood products (FFP and PC) was 5 units each in group I and 2 units each in group II. The number of blood units and type of blood components (FFP or PC) used intraoperatively and 48 postoperatively were also recorded (Fig. 1). The average hospital stay in group I was 12.2 days compared to 25.4 days in group II. The average duration of surgery was 2.0 h 5 min in group I and 1 h 10 min in group II. There was 8.3% neonatal mortality in group I due to prematurity compared to none in group II. There was 8.3% maternal mortality in group II compared to none in group I (Table 2).

Cesarean hysterectomy was associated with increased blood loss and more number of blood transfusions. The incidence of urinary bladder injury was more in cesarean hysterectomy patients. The duration of surgery was more in these patients. The interval hysterectomy is associated with the need for very close monitoring of patients in post-C-section days as a massive life-threatening hemorrhage can occur. However, the vascularity of the placental site decreased, and the

chances of bladder injury and other difficulties faced due to surgery decreased. The incidence of sepsis was also more in group II.

CONCLUSION

Placenta accreta spectrum is becoming increasingly common and is associated with significant morbidity and mortality. Knowledge of risk factors and antenatal imaging expertise can help guide the diagnosis. Preparation for delivery and postpartum care should involve a multidisciplinary team and early antepartum consultations guided by the levels of maternal care. Cesarean hysterectomy can be challenging but the most practical option and should be performed by the most experienced surgeons.

AUTHORS' CONTRIBUTION

All the authors were involved in collecting and organizing the data and editing the manuscript.

CONFLICTS OF INTEREST

Nil.

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Nil.

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