

RESEARCH ARTICLE

Placenta accrete spectrum disorders: A single centre experience over four years in the view of international guidelines

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Abstract

Objective: To evaluate the prevalence and management strategies of placenta accreta spectrum disorders at a tertiary teaching hospital.

Methods: The retrospective cross-sectional study was conducted at Al-Yarmouk Teaching Hospital, Baghdad, Iraq, and comprised record of patients diagnosed with placenta accreta spectrum disorders between January 2014 and December 2017. Different management approaches employed were noted and data was analysed using SPSS 22.

Results: Of the 7312 deliveries during the four-year period, there were 102 (1.4%) cases of placenta accreta spectrum disorders. Of them, 83 (81.3%) were managed by definitive surgery and 19 (18.7%) with conservative surgery. The prevalence of placenta accreta spectrum disorders was 162.4 per 100,000 women in 2014, 266.7 in 2015, 382.3 in 2016, and 191.5 per 100,000 women in 2017. All the cases related to multiparous women with previous history of caesarean section.

Conclusions: The incidence of placenta accreta spectrum disorders was high in our centre.

Keywords: Caesarean section, Caesarean hysterectomy, Placenta accreta, Pregnancy outcome. (JPMA 69: S-68 (Suppl. 3); 2019)

Introduction

A placenta accreta spectrum (PAS) disorder is a term used by the International Federation of Gynaecology and Obstetrics (FIGO) consensus and Royal College of Obstetricians and Gynaecologists (RCOG) guidelines to include both adherent (placenta accreta) and invasive placental disorders (placenta increta and percreta).^{1,2} It is associated with significant maternal morbidity and mortality.³ Its incidence has increased substantially from 0.8 per 1000 deliveries in the 1980s to 3 per 1000 deliveries in the past decade; a phenomenon attributed to the rising global caesarean section (CS) rate.⁴

A meta-analysis of five cohorts and 11 case-control studies reported a summary odds ratio (OR) of 1.96 (95% Confidence Interval [CI]: 1.41-2.74) for PAS after a CS and the risk of PAS increases with the number of previous CS.^{5,6} Most PAS cases occur in women with risk factors and can be antenatally diagnosed. The strongest risk factor is placenta praevia, especially when associated with multiple prior CS deliveries.^{7,8}

The primary modality for the antenatal diagnosis of placenta accreta in case of clinical suspicion is grey scale obstetrics onogram with sensitivities for the diagnosis reported to range 77-97%.^{9,10} Magnetic resonance imaging (MRI) may be useful in antenatal diagnosis, but it is not clear whether MRI alone improves the accuracy of diagnosis over ultrasound.⁹

PAS disorder managed by a multidisciplinary team (MDT) and delivered at 34-35 weeks' gestation had a significantly lower rate of emergency surgery. However, many cases progressed to 36 weeks of gestation without complications and the issue remains controversial.^{11,12}

The current study was planned to evaluate the prevalence and management strategies of PAS disorders at a tertiary teaching hospital.

Patients and Methods

The retrospective cross-sectional study was conducted at Al-Yarmouk Teaching Hospital, Baghdad, Iraq, and comprised record of PAS patients between January 2014 and December 2017. After obtaining approval from the institutional ethics committee, records of PAS patients having either adherent or invasive condition were identified from the hospital's database.

Variables noted were maternal age, parity, number of CS, inter-pregnancy interval, scheduled versus non-scheduled operation, MDT versus non-MDT

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management approach, weeks of gestation at the time of diagnosis and at the time of intervention, antenatal versus intraoperative diagnosis, caesarean hysterectomy versus conservative approach surgery, estimated blood loss (EBL), transfusion of blood and blood products, intraoperative complications including vascular, bladder, ureteral and bowel injury, postoperative complications including respiratory distress syndrome (RDS), admission to respiratory care unit (RCU) and wound infection, second operation, maternal postoperative length of hospital stay (LOS), and early neonatal mortality rate.

In all cases the diagnosis depended on trans-abdominal ultrasound with Doppler done antenatally or just before the operation in emergency situation. MRI was used in selective cases only.

The components of MDT were obstetrical anaesthesia consultant with expert theatre team, expert obstetric consultant to discuss surgical choices and to assess the need for involvement of other surgical services, like surgeon, urologist and vascular surgeon, haematologist, neonatologist, radiologist with focussed expertise in

Three-way indwelling catheter was inserted routinely pre-operatively. Blood bank notification was given in all cases and packed red blood cells (RBCs) with thawed fresh frozen plasma (FFP) was prepared in the theatre before surgery.

SPSS 22 was used for statistical analysis.

Anderson darling test was used to see if the continuous variables followed normal distribution which was the case and they were presented as mean and standard deviation (SD). Discrete variables were presented as frequencies and percentages. Chi square test was used to analyse the discrete variables, while independent t-test was used to analyse the differences in mean values. P.0.05 was considered significant.

Results

Of the 7312 deliveries during the four-year period, there were 102(1.4%) PAS cases. Of them, 83(81.3%) were managed by definitive surgery and 19(18.7%) with conservative surgery. PAS prevalence was 162.4 per 100,000 women in 2014, 266.7 in 2015, 382.3 in 2016, and 191.5 per 100 000 women in 2017 (Table-1). The

Table-1: The yearly incidence of placenta accreta spectrum (PAS) disorders.

	2014	2015	2016	2017
Total PAS per year (102)	22	38	28	14
Definite-surgery (83)	18	32	23	10
Conservative-surgery (19)	4	6	5	4
Total deliveries per year	13546	14247	7324	7312
Incidence per year per 100,000	162.4	266.7	382.3	191.5
95% Confidence Interval (CI) of Incidence/year	155.6-169.2	258.3-275.2	368.2-396.4	181.4-201.5

obstetric imaging and abnormal placentation, as well as expert theatre nursing staff.

In general, timing depended on patient condition. The definite and recommended treatment was planned preterm delivery at 36 weeks of gestation by caesarean hysterectomy usually under general anaesthesia while leaving the placenta in situ to overcome the possibility of severe haemorrhage when trying to remove adherent placenta.

Conservative management was resection of that portion of the uterine wall that included the morbidly adherent placenta, followed by uterine reconstruction, over swing, intrauterine packing with or without bilateral uterine arteries ligation. Caesarean delivery and keeping the placenta in without removing the uterus had no place in the practice.

number of elective surgeries was significantly higher in 2015 and 2016 ($p < 0.05$) compared to emergency procedures which was significantly higher in 2014 ($p < 0.05$) and the mean operative time was significantly higher in 2014 as well ($p < 0.05$). History of CS, EBL, FFP and foetal mortality rates were compared on a year-to-year basis (Table-2).

Maternal complications encountered in each year of the four-year study were also noted (Table-3).

Discussion

The incidence of PAS varies across geographic populations and as a result of different definitions of 'placenta accreta'. A review of 34 studies reported an average incidence of 189/100,000¹³ compared to our findings of 162.4 in 2014, 266.7 in 2015, 382.3 in 2016, and 191.5 in 2017. This high incidence may be attributed to

Table-2: Operative details of definitive surgery.

Variables	2014	2015	2016	2017	p-value
Type of Caesarean Section (CS)					
Elective	11(61.1%)	25 (78.12%)	18 (78.26%)	8 (80.0%)	0.062
Emergency	7 (38.88%)	7 (21.87%)	5(21.74%)	2 (20.0%)	
Operation duration (hours)	2.2 ± 0.4	2.1 ± 0.7	2.1 ± 0.6	2.1 ± 0.6	0.004
Team					
MDT	10 (55.6%)	21 (65.62%)	16 (69.56%)	7 (70.0%)	0.793
Non-MDT	8(44.4%)	11 (34.37%)	7 (30.43%)	3 (30.0%)	
Type of accrete					
Accreta	16 (88.88%)	29 (90.6%)	20 (86.95%)	8 (80.0%)	NA
Incrreta	1 (5.55%)	2 (6.25%)	1(4.34%)	1 (10.0%)	
Perccreta	1(5.55%)	1 (3.1%)	2(8.69%)	1 (10.0%)	
Placenta Previa grade					
1	1 (5.6%)	0 (0.0%)	1 (4.34%)	0 (0.0%)	NA
2	1 (5.6%)	1 (3.1%)	1 (4.34%)	1 (10.0%)	
3	6 (33.3%)	8 (25.0%)	5 (21.73%)	2 (20.0%)	
4	10 (55.6%)	23 (71.87%)	16 (69.56%)	7(70.0%)	
Site					
Anterior	7 (38.88%)	7(21.87%)	5(21.73%)	3(30%)	NA
Central	10(55.55%)	23(71.87%)	21(69.56%)	9(70%)	
Posterior	1(5.55%)	2(6.25%)	2(8.69%)	0(0.0%)	
Procedure					
TAH	16 (88.9%)	31 (96.87%)	22(95.65%)	9 (90.0%)	0.639
Sub total	2 (11.1%)	1 (3.23%)	1 (4.34%)	1 (10.0%)	
EBL					
1 - 1.5	3 (16.66%)	7 (21.87%)	5 (21.73%)	3 (30.0%)	NA
1.5 - 2.0	5 (27.8%)	16 (50.0 %)	10 (43.47%)	5 (50.0%)	
2.0 - 2.5	7 (38.89%)	6 (19.2 %)	6 (26.0%)	1 (10.0%)	
>2.5	3 (16.66%)	3 (9.37 %)	2 (8.69%)	1(10.0%)	
Blood unite	6.2 ± 2.3	4.9 ± 2.9	5.5 ± 2.5	5.5 ± 1.6	0.008
Cryoprecipitate	2.3 ± 1.5	2.0 ± 2.1	2.3 ± 3.7	2.6 ± 0.7	<0.001
FFP	2.3 ± 1.5	2.7 ± 2.3	2.1 ± 3.1	2.6 ± 0.7	<0.001
Admission pre-operation (days)	3.8 ± 1.8	5.7 ± 0.7	5.5 ± 0.6	5.8 ± 0.6	<0.001
Post-operation admission	6.8 ± 1.4	5.1 ± 3.0	5.2 ± 1.7	5.3 ± 1.3	0.963
Failed Conservative surgery	2(11.1%)	2(6.2%)	2(8.6%)	1(10%)	0.941
Gender					
Male	11 (61.1%)	19 (59.4%)	14 (60.86%)	6 (60.0%)	0.999
Female	7 (38.88%)	13 (40.6%)	9 (39.13%)	4 (40.0%)	
Foetal mortality	1 (5.55%)	2 (6.25%)	1 (4.34%)	0 (00.0%)	0.995

NA: not applicable; MDT: Multidisciplinary team; TAH: Total abdominal hysterectomy; EBL: estimated blood loss; FFP: Fresh frozen plasma.

higher incidence of CS as well as the study site being a referral centre with standardisation measurement used to manage PAS.

A recent meta-analysis reported an OR of 1.96 (95% CI: 1.41-2.74) for PAS disorders after a CS. The ORs for PAS disorders in a subsequent pregnancy increased from 8.6 (95% CI: 3.5-21.1) after one prior CS to 17.4 (95% CI: 9.0-31.4) after two previous CS, and to 55.9 (95% CI: 25.0-110.3) after three or more prior CS deliveries.^{14,15}

The main method for the diagnosis of PASa the study site was trans-abdominal ultrasound with Doppler study.

Transvaginal ultrasound had not been used despite the fact that it is superior to trans-abdominal ultrasound and is recommended by RCOG guideline.²

In PAS, notification to the blood bank should be given and the availability of blood and blood products should be ensured for the patient. The blood bank also should have a well-established massive transfusion protocol, as the median EBL in 3 well-characterised series of accreta cases was 2.5-3.0 L.¹²

The recommended time to perform elective CS with PAS cases in our centre was 36 weeks of gestation which

Table-3: Severe maternal morbidity associated with definitive surgical treatment.

	2014	2015	2016	2017
Intensive Care Unit (ICU) admission	4 (22.22%)	5 (15.62%)	4 (17.39%)	2 (20.0%)
Blood transfusion >2L	10(55.55%)	9 (28.12 %)	8(34.78%)	3(30%)
DIC	2(11.1%)	3 (9.37%)	2 (8.6%)	1 (10%)
Operative time (>120 min)	11 (61.1%)	10(31.25%)	9(39.13%)	4(40.0%)
Internal iliac artery ligation(IIAL)	2 (11.1%)	4 (12.5%)	3(13.0%)	1 (10%)
Early operative complications				
Bladder injury	2 (11.1%)	4 (12.5%)	3(13.0%)	2 (20.0%)
Ureteric injury	2 (11.1%)	4 (12.5%)	3(13.0%)	1 (10.0%)
Early Second operation				
Failure of conservative surgery	3 (16.6%)	3 (9.37%)	2 (8.6%)	1 (10%)
Damage control second operation	1 (5.55%)	1 (3.1%)	0 (0%)	0 (0%)
Late complications				
Fistulae (vesico or uretrovaginal)	2(11.11%)	2(6.25%)	2(8.7%)	1(10%)
Thromboembolism (Deep Vein Thrombosis)	1(5.55%)	0 (0.0%)	1 (4.34%)	0 (0.00%)
Significant Wound infection	1 (5.55%)	1 (3.1%)	1(4.34%)	0 (0.00%)
Maternal mortality	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)

DIC:Disseminated Intravascular Coagulation

agreed with a study,¹⁶ while the recommendation by the RCOG is 35-36 weeks unless emergency condition arises.² Most other guidelines, including American College of Obstetricians and Gynaecologists (ACOG) and FIGO recommended 34-35 weeks of gestation as a time for an elective operation.^{1,17}

All elective cases were managed by MDT and emergency one by at least consultant and specialist obstetrician and anaesthetist. This team-based assessment is recommended and is likely to improve maternal outcomes and should be encouraged on a regional basis as seen in multiple studies.¹⁸

CS hysterectomy with the placenta left in situ is the recommended operation for PAS cases unless the affected area is feasible for resection and / or over sewing with or without bilateral uterine artery ligation.¹⁹

In the current study the number of elective versus emergency surgeries was higher in 2017 and lower in 2014 (80% versus 61%) and that decline in the number of emergency operations may be attributed to more awareness and early antenatal detection and referral to the tertiary centre. The overall outcome was reasonable in both elective and emergency cases and which is in line with a study which revealed that emergency deliveries still have reasonably good outcomes if performed in a centre of excellence with MDT.²⁰

Failure of conservative surgery after trying to preserve the uterus ranged from 8.6% in 2016 to 16.6% in 2014. This incidence was lower than that seen in a systemic review study in 2015 which reported incidence of failure up to 30%.²¹

PAS is associated with severe maternal morbidity, and in the current study the incidence of admission to ICU was 2-5% due to RDS and delayed recovery from anaesthesia, and the incidence of ureteric injury was 10-13% which was comparable to a study.²⁰

Significant intraoperative bleeding with 30-55% of cases over the study period had blood loss more than 2 litres with disseminated intravascular coagulation (DIC) encountered in around 10% and managed by massive blood transfusion with damage control surgery. A study revealed median blood loss in PAS to be 3000mL, with a median of 5 units of red cells transfused and 41.7% had an estimated blood loss of \geq 5000ml.²²

Foetal death in the current study was around 4-6% which was comparable to a study reporting 3-4%.²³ This can be decreased by using ultrasound Doppler.²⁴

Conclusions

The incidence of PAS was variable over the four years of the study, and it was relatively higher than global data because of high parity and higher number of CS. Maternal and foetal outcomes were comparable.

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Conflict of Interest: None.

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References

1. Jauniaux E, Chantraine F, Silver RM, Langhoff-Roos J. FIGO

- consensus guidelines on placenta accreta spectrum disorders: Epidemiology. *Int J Gynaecol Obstet* 2018;140:265-73.
2. Jauniaux E, Alfirevic Z, Bhide AG, Belfort MA, Burton GJ, Collins SL, et al. Placenta praevia and placenta accreta: diagnosis and management: green-top guideline No. 27a. *BJOG* 2019;126:e1-e48.
 3. Silver RM, Barbour KD. Placenta accreta spectrum: accreta, increta, and percreta. *ObstetGynecol Clin North Am* 2015;42:381-402.
 4. Higgins MF, Monteith C, Foley M, O'Herlihy C. Real increasing incidence of hysterectomy for placenta accreta following previous caesarean section. *Eur J ObstetGynecolReprod Biol* 2013;171:54-6.
 5. Marshall NE, Fu R, Guise JM. Impact of multiple cesarean deliveries on maternal morbidity: a systematic review. *Am J ObstetGynecol* 2011;205:262.e1-8.
 6. Klar M, Michels KB. Cesarean section and placental disorders in subsequent pregnancies--a meta-analysis. *J Perinat Med* 2014;42:571-83.
 7. Silver RM, Landon MB, Rouse DJ, Leveno KJ, Spong CY, Thom EA, et al. Maternal morbidity associated with multiple repeat cesarean deliveries. *ObstetGynecol* 2006;107:1226-32.
 8. Fitzpatrick KE, Sellers S, Spark P, Kurinczuk JJ, Brocklehurst P, Knight M. Incidence and risk factors for placenta accreta/increta/percreta in the UK: a national case-control study. *PLoS One* 2012;7:e52893.
 9. Cali G, Giambanco L, Puccio G, Forlani F. Morbidly adherent placenta: evaluation of ultrasound diagnostic criteria and differentiation of placenta accreta from percreta. *Ultrasound ObstetGynecol* 2013;41:406-12.
 10. Berkley EM, Abuhamad AZ. Prenatal diagnosis of placenta accreta: is sonography all we need? *J Ultrasound Med* 2013;32:1345-50.
 11. Bowman ZS, Manuck TA, Eller AG, Simons M, Silver RM. Risk factors for unscheduled delivery in patients with placenta accreta. *Am J ObstetGynecol* 2014;210:241.e1-6.
 12. Shamshirsaz AA, Fox KA, Salmanian B, Diaz-Arrastia CR, Lee W, Baker BW, et al. Maternal morbidity in patients with morbidly adherent placenta treated with and without a standardized multidisciplinary approach. *Am J ObstetGynecol* 2015;212:218.e1-9.
 13. Balayla J, Bondarenko HD. Placenta accreta and the risk of adverse maternal and neonatal outcomes. *J Perinat Med* 2013;41:141-9.
 14. Thurn L, Lindqvist PG, Jakobsson M, Colmorn LB, Klungsoyr K, Bjarnadóttir RI, et al. Abnormally invasive placenta-prevalence, risk factors and antenatal suspicion: results from a large population-based pregnancy cohort study in the Nordic countries. *BJOG* 2016;123:1348-55.
 15. Sentilhes L, Merlot B, Madar H, Sztark F, Brun S, Deneux-Tharoux C. Postpartum haemorrhage: prevention and treatment. *Expert Rev Hematol* 2016;9:1043-61.
 16. El-Sherifi AZ, Mahmood DJ. Antenatal diagnosis of placenta previa acereta syndrome by transabdominal color doppler ultrasound in comparison with intra operative finding. *Mustansiriya Med J* 2017;16:1-8.
 17. American College of Obstetricians and Gynecologists. Obstetric Care Consensus No. 7: Placenta Accreta Spectrum. *ObstetGynecol* 2018;132:e259-e275.
 18. Walker MG, Allen L, Windrim RC, Kachura J, Pollard L, Pantazi S, et al. Multidisciplinary management of invasive placenta previa. *J ObstetGynaecol Can* 2013;35:417-25.
 19. Committee on Obstetric Practice. Committee opinion no. 529: placenta accreta. *ObstetGynecol* 2012;120:207-11.
 20. Wright JD, Silver RM, Bonanno C, Gaddipati S, Lu YS, Simpson LL, et al. Practice patterns and knowledge of obstetricians and gynecologists regarding placenta accreta. *J Matern Fetal Neonatal Med* 2013;26:1602-9.
 21. Mei J, Wang Y, Zou B, Hou Y, Ma T, Chen M, et al. Systematic review of uterus-preserving treatment modalities for abnormally invasive placenta. *J ObstetGynaecol* 2015;35:777-82.
 22. Wright JD, Pri-Paz S, Herzog TJ, Shah M, Bonanno C, Lewin SN, et al. Predictors of massive blood loss in women with placenta accreta. *Am J ObstetGynecol* 2011;205:38.e1-6.
 23. Farquhar CM, Li Z, Lensen S, McLintock C, Pollock W, Peek MJ, et al. Incidence, risk factors and perinatal outcomes for placenta accreta in Australia and New Zealand: a case-control study. *BMJ Open* 2017;7:e017713.
 24. Alizzi FJ, Ahmad B. Impact of maternal body mass index on umbilical artery indices and neonatal outcome. *Mustansiriya Med J* 2018;17:93-7.
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