

INCIDENCE AND CLINICAL CHARACTERISTICS OF PLACENTA ACCRETA SPECTRUM AT A TERTIARY REFERRAL HOSPITAL IN GUATEMALA: A RETROSPECTIVE OBSERVATIONAL STUDY

INCIDENCIA Y CARACTERÍSTICAS CLÍNICAS DEL ESPECTRO DE PLACENTA ACCRETA EN UN HOSPITAL DE REFERENCIA DE TERCER NIVEL EN GUATEMALA: UN ESTUDIO OBSERVACIONAL RETROSPECTIVO

David Fernando Dávila Cisneros ¹

Filiation:

¹ Hospital General San Juan de Dios, Medical Service, Department of Gynecology and Obstetrics, Guatemala, Guatemala

How to cite the article: Dávila-Cisneros DF. Incidence and clinical characteristics of placenta accreta spectrum at a tertiary referral hospital in Guatemala: A retrospective observational study. International Journal of Maternal and Fetal Health. 2026; 11 (1): o7-o13. DOI: 10.47784/rismf.2026.11.1.478

Funding: No external funding was received

Conflicts of interest: The author declares no conflicts of interest related to this manuscript

Correspondence:

David Dávila
email: dfdavila@ufm.edu

Received: 20-11-2025

Review: 01-12-2025

Approved: 07-02-2026

Early access: 11-03-2026

Published: 11-03-2026



ABSTRACT

Objective: To estimate the institutional incidence of placenta accreta spectrum (PAS) and describe the sociodemographic, obstetric, surgical, histopathological, and maternal outcome characteristics of affected patients managed at Hospital General San Juan de Dios, Guatemala, between 2016 and 2019. **Materials and Methods:** A retrospective observational descriptive study was conducted using clinical records and pathology reports from pregnant patients diagnosed with PAS and managed in the Department of Gynecology and Obstetrics between 2016 and 2019. Cases confirmed by histopathology were included in the final analysis. **Results:** Among 11,548 initial obstetric surgical cases, 108 suspected PAS cases were audited and 46 were confirmed by pathology, yielding an institutional incidence of 0.4%, equivalent to approximately 1 case per 251 surgically managed pregnant patients. Placenta accreta accounted for 34 cases (74%), placenta increta for 9 (20%), and placenta percreta for 3 (6%). Placenta previa was present in 31 patients (67%), and 37 patients (81%) had at least one previous cesarean delivery. Preoperative PAS diagnosis was negative or not documented in 72% of cases. Cesarean delivery was the route of pregnancy resolution in 44 patients (96%). Maternal mortality was 7%. **Conclusions:** PAS represented a clinically significant burden in this tertiary referral hospital. The high frequency of previous cesarean delivery, placenta previa, absent preoperative diagnosis, severe postoperative morbidity, and maternal mortality supports the need for systematic prenatal screening, standardized ultrasound reporting, multidisciplinary surgical planning, blood bank readiness, and an institutional PAS pathway.

Keywords: Placenta accreta spectrum, Placenta accreta, Placenta increta, Placenta percreta, Placenta previa, Cesarean delivery, Obstetric hemorrhage, Obstetric hysterectomy (Source: MeSH, NLM)

INTRODUCTION

Placenta accreta spectrum (PAS) encompasses abnormal placental adherence and invasion disorders caused by deficient decidualization at the endometrial-myometrial interface. The traditional histopathological categories include placenta accreta, in which chorionic villi adhere directly to the myometrium; placenta increta, in which villi invade the myometrium; and placenta percreta, in which invasion extends through the uterine serosa and may involve adjacent pelvic organs, particularly the bladder (1,2).

PAS is clinically important because it is strongly associated with severe obstetric hemorrhage, transfusion, peripartum hysterectomy, genitourinary injury, intensive care admission, and maternal death (1,3). Although relatively uncommon in population terms, PAS has become increasingly relevant because the number of women entering pregnancy with a uterine scar has risen substantially with increasing cesarean delivery rates (1,4,5).

The most important clinical phenotype is the combination of placenta previa or low-lying placenta over a previous uterine scar. In women with placenta previa, the risk of PAS rises progressively with the number of prior cesarean deliveries, a dose-response relationship that has been consistently described in large cohorts and guidelines (1,5). Early prenatal suspicion is essential because planned multidisciplinary management improves preparation for hemorrhage, surgical decision-making, and avoidance of unanticipated emergencies (1,3,6).

Over the last decade, multiple international and national organizations—including the Society of Obstetricians and Gynecologists of Canada, the International Society for Abnormally Invasive Placenta, the Royal Australian and New Zealand College of Obstetricians and Gynecologists, and the National Institute for Health and Care Excellence—have published consensus guidelines to standardize PAS care (7-10). Recent systematic reviews and comparative analyses of these guidelines reaffirm that multidisciplinary preparation is the cornerstone of reducing morbidity worldwide (11,12).

In Guatemala, institutional data remain limited. The postgraduate thesis that generated the dataset for this manuscript analyzed PAS cases at Hospital

General San Juan de Dios during 2016-2019 and reported a local institutional incidence of 0.4% (13). Presenting these data as an original research article allows the findings to be reported through a standard IMRaD structure and compared with international evidence. Therefore, the objective of the present study was to estimate the incidence of placenta accreta spectrum and describe the clinical, obstetric, surgical, histopathological, and maternal outcome characteristics of patients managed at Hospital General San Juan de Dios, Guatemala, between 2016 and 2019.

MATERIAL AND METHODS

Study design and setting

This was a retrospective, observational, and descriptive study conducted at the Department of Gynecology and Obstetrics of Hospital General San Juan de Dios, a major tertiary-level care and national referral center in Guatemala City, Guatemala. The study period encompassed a 48-month timeframe from January 2016 to December 2019. The institutional data utilized for this manuscript were originally compiled as part of a postgraduate thesis evaluating the local incidence of placenta accreta spectrum (13).

Population and sample

The source population comprised all pregnant patients who underwent obstetric surgical management at the institution during the study period. To determine the institutional incidence and establish the analytic cohort, a total of 11,548 consecutive obstetric surgical cases were initially screened. Among these, 108 cases presented clinical, surgical, or ultrasonographic suspicion of placenta accreta spectrum and were selected for in-depth chart review.

Eligibility criteria

Inclusion criteria were strictly defined as pregnant patients managed within the designated study period who had a definitive diagnosis of placenta accreta spectrum confirmed by histopathological examination, along with complete and accessible clinical and surgical records. Patients managed outside the 2016-2019 timeframe, those diagnosed solely on clinical or ultrasonographic grounds without

subsequent pathological confirmation (n=62), and those with missing critical documentation were excluded from the final descriptive analysis to ensure diagnostic accuracy and avoid overestimation.

Variables

The study evaluated a comprehensive set of variables categorized into four main domains. Sociodemographic variables included maternal age, place of origin, and literacy status. The obstetric and surgical history domain captured the number of previous pregnancies, deliveries, abortions, and specifically, the exact number of prior cesarean sections. Clinical and diagnostic variables encompassed placental location (e.g., placenta previa) and the presence or absence of a positive preoperative diagnosis. Finally, intraoperative and maternal outcome variables included the specific histopathological PAS subtype (accreta, increta, percreta), route of pregnancy resolution, estimated blood loss, specific severe postoperative morbidities (e.g., bladder injury, hypovolemic shock, damage-control surgery, disseminated intravascular coagulation), and maternal mortality.

Data collection

Data extraction was conducted systematically to ensure accuracy and completeness. Information was cross-referenced and triangulated from multiple institutional data sources, including physical and electronic clinical records, obstetric admission charts, detailed surgical operative reports, and official pathology reports. The extracted data were transcribed into a standardized electronic data collection form and consolidated into a structured database designed specifically for this research project (13).

Statistical analysis

Data analysis was purely descriptive, reflecting the observational nature of the study design. Categorical variables were summarized using absolute frequencies and relative percentages. The institutional incidence of PAS was calculated utilizing the number of histopathologically confirmed cases as the numerator and the total number of initial obstetric surgical cases reviewed during the study period as the denominator. Given the descriptive design and

the available sample size, no inferential statistical tests or causal modeling were performed.

Ethical considerations

This study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki for medical research involving human subjects. Given the retrospective nature of the study and the use of anonymized secondary data from medical records, the requirement for direct patient informed consent was waived. Institutional authorization was secured for the review of clinical charts and pathology reports, ensuring strict confidentiality and protection of patient data throughout the research process.

RESULTS

During the 2016-2019 study period, 11548 initial obstetric surgical cases were identified. Of these, 11440 were excluded because they did not meet clinical criteria for suspected PAS. The remaining 108 suspected cases were audited. Pathology confirmation was unavailable in 62 cases, leaving 46 histopathologically confirmed PAS cases for the final analysis. The institutional incidence of confirmed PAS was therefore 0.4%, equivalent to approximately 1 case per 251 surgically managed pregnant patients. (Table 1)

Table 1. Case selection and institutional incidence

Selection step	Value	Interpretation
Initial obstetric surgical cases reviewed	11548	Institutional denominator
Cases excluded	11440	Did not meet clinical criteria for suspected PAS
Suspected PAS cases audited	108	Clinical records reviewed
Cases without pathology confirmation	62	Excluded from final confirmed sample
Histopathologically confirmed PAS cases	46	Final analytic sample
Institutional incidence	0.4%	Approximately 1 case per 251 surgically managed pregnant patients

Table 2. Sociodemographic characteristics of patients with confirmed PAS (n=46)

Variable	Category	n (%)
Age group, years	20-25	12 (26%)
	26-30	15 (33%)
	31-35	9 (19%)
	36-40	6 (13%)
	41-45	4 (9%)
Place of origin	Guatemala City	34 (74%)
	Other departments	12 (26%)
Literacy status	Literate	38 (83%)
	Illiterate	7 (15%)
	Not documented	1 (2%)

Placenta accreta was the most frequent subtype, accounting for 34 cases (74%). Placenta increta was identified in 9 cases (20%), and placenta percreta in 3 cases (6%).

Table 3. Obstetric, surgical, and placental characteristics (n=46)

Variable	Category	n (%)
Previous cesarean deliveries	0	9 (19%)
	1	16 (35%)
	2	15 (33%)
	3	6 (13%)
Previous abortions	0	28 (61%)
	1	12 (26%)
	2	5 (11%)
	4	1 (2%)
Placental location	Previa	31 (67%)
	Lateral	3 (7%)
	Fundic	3 (7%)
	Posterior	2 (4%)
	Marginal	4 (8%)
	Unknown	3 (7%)
PAS subtype	Accreta	34 (74%)
	Increta	9 (20%)
	Percreta	3 (6%)

PAS: placenta accreta spectrum

The most frequent age group was 26-30 years, representing 15 patients (33%), followed by 20-25 years in 12 patients (26%). Most patients were from Guatemala City, with 34 cases (74%), while 12 (26%) came from other departments. Literacy was documented in 83% of patients, while 15% were reported as illiterate and 2% had no available record. (**Table 2**)

Previous cesarean delivery was documented in 37 patients (81%). The distribution of previous cesarean deliveries was none in 9 patients (19%), one in 16 (35%), two in 15 (33%), and three in 6 (13%). Previous abortions were absent in 28 patients (61%), while 12 (26%) had one, 5 (11%) had two, and 1 (2%) had four. Placenta previa was present in 31 patients (67%). (**Table 3**)

Preoperative PAS diagnosis was negative or not documented in 72% of cases and positive in 28%. Cesarean delivery was the route of pregnancy resolution in 44 patients (96%); one patient was resolved by vaginal delivery and one by curettage. Estimated blood loss was not documented in 19 cases (41%). Among documented cases, 3 patients (7%) had blood loss greater than 5,000 mL. Postoperative morbidity included bladder injury, severe hypovolemic shock, damage-control surgery, disseminated intravascular coagulation, ventilatory failure, sepsis, acute kidney injury, and cardiac arrest. Maternal death occurred in 3 patients, corresponding to a mortality of approximately 7%. (**Table 4**)

DISCUSSION

This retrospective observational study revealed an institutional PAS incidence of 0.4%, equivalent to approximately 1 case per 251 surgically managed pregnant patients. This finding holds substantial clinical significance, as PAS remains a low-frequency, but high-impact obstetric complication associated with profound maternal morbidity and mortality (1-3). The incidence observed in this tertiary hospital may be higher than general population estimates, which is expected given that national referral centers disproportionately concentrate complicated pregnancies, including patients with complex placental locations, multiple prior cesarean deliveries, and acute obstetric hemorrhage.

Table 4. Diagnosis, management, hemorrhage, and maternal outcomes (n=46)

Outcome variable	Category	n (%)
Preoperative PAS diagnosis	Positive	13 (28%)
	Negative/not documented	33 (72%)
Route of pregnancy resolution	Cesarean delivery	44 (96%)
	Vaginal delivery	1 (2%)
	Curettage	1 (2%)
Estimated blood loss	500-1500 mL	5 (11%)
	1501-2000 mL	6 (13%)
	2001-3000 mL	8 (17%)
	3001-5000 mL	5 (11%)
	>5000 mL	3 (7%)
	Not documented	19 (41%)
Postoperative morbidity	None documented	15 (33%)
	No data available	14 (32%)
	At least one severe complication	17 (37%)
Maternal mortality	Death	3 (7%)
	Survival	43 (93%)

The predominance of previous cesarean delivery in this cohort is highly consistent with the international literature. In the present study, 81% of patients had at least one prior uterine scar. Major international guidelines identify the cesarean scar as the principal modifiable risk factor for PAS, particularly when the placenta implants over the lower uterine segment or in the presence of placenta previa (1,4). This aligns with the landmark cohort by Silver et al., which demonstrated a clear dose-response relationship between the number of repeat cesarean deliveries and placenta accreta risk (5).

Furthermore, placenta previa was documented in 67% of the confirmed cases, reinforcing the recognized classic clinical phenotype of PAS: a low-lying placenta or placenta previa situated over a previous uterine scar. In clinical practice, the coexistence of these two factors must trigger an immediate and targeted evaluation for PAS, regardless of maternal parity or age (1,3,6).

Histopathologically, the distribution in our cohort mirrored classic descriptions: placenta accreta was the most prevalent subtype (74%), followed by increta (20%) and percreta (6%). However, it is essential to emphasize that clinical severity is not determined exclusively by the microscopic depth of trophoblastic invasion. Maternal outcomes are equally driven by the topographical extent of the involved area, abnormal pelvic vascularity, proximity to adjacent organs like the bladder, timing of diagnosis, blood bank readiness, and the surgical expertise of the operative team (3,6,14-16).

A critical area for institutional improvement identified in this study was the significant diagnostic gap. In 72% of patients, PAS was either not documented or considered negative prior to delivery. While prenatal suspicion cannot prevent abnormal placentation, it is the cornerstone for morbidity reduction; it enables scheduled delivery, multidisciplinary coordination, proactive blood product preparation, and the strategic avoidance of forced placental removal (1,3,6).

To bridge this diagnostic gap, targeted ultrasound with color Doppler remains the first-line diagnostic tool in at-risk pregnancies (6). Evaluating signs such as placental lacunae, loss of the retroplacental clear zone, myometrial thinning, and disruption of the uterovesical interface is essential (6,14). While magnetic resonance imaging can offer adjunct value in complex cases—particularly when ultrasound is inconclusive or parametrial invasion is suspected (17,18)—advanced imaging only translates to improved outcomes when integrated into a clear, institutional referral and management pathway.

The severity of PAS in this setting is starkly reflected in the 7% maternal mortality rate. Reported deaths in PAS are predominantly driven by massive hemorrhage, shock, coagulopathy, pelvic organ injury, and multiorgan failure (1,3,19). Accordingly, the severe postoperative morbidities observed in this cohort—including bladder injury, damage-control surgery, and acute kidney injury—reinforce the paradigm that PAS must be approached as a high-risk complex pelvic surgery rather than a routine difficult cesarean section.

Interestingly, the age distribution in our cohort differed from conventional studies that strongly link PAS to advanced maternal age; most of our patients were between 26 and 30 years old. This likely reflects local demographic patterns, earlier reproductive onset, and the rapid accumulation of cesarean scars at a younger age. Therefore, within the Guatemalan context, young maternal age should not diminish diagnostic suspicion when primary risk factors are present.

This study presents several limitations. Its retrospective design inherently relies on the completeness of existing clinical records, leading to missing documentation regarding estimated blood loss and postoperative morbidity in some cases. Additionally, pathological confirmation was unavailable for 62 clinically suspected cases, which may have led to an underestimation of the true disease burden. Finally, the descriptive nature of the analysis precludes any formal causal inferences. Despite these limitations, the study provides valuable epidemiological data and highlights actionable gaps in prenatal detection. Regional adaptations of international guidelines, such as the Colombian Consensus on the Treatment of PAS, emphasize that in Latin American contexts, the creation of standardized multidisciplinary pathways is a highly effective intervention to reduce maternal morbidity despite resource limitations (20).

CONCLUSION

Placenta accreta spectrum represents a clinically significant burden at Hospital General San Juan de Dios, with an institutional incidence of 0.4% and a severe impact on maternal health, reflected by high rates of surgical morbidity and a 7% maternal mortality rate. The strong association of PAS with prior cesarean deliveries and placenta previa observed in this cohort aligns with global risk profiles. However, the critical finding that the vast majority of patients lacked a positive preoperative diagnosis underscores an urgent need to transition from reactive emergency management to proactive, organized care.

To achieve this, it is highly recommended to implement an institutional PAS pathway that mandates systematic risk screening for all pregnant patients presenting with placenta previa or a low-lying

placenta, particularly those with a history of cesarean deliveries. This proactive approach must be supported by the adoption of standardized ultrasound reporting criteria and the establishment of a multidisciplinary care committee comprising obstetrics, anesthesia, blood bank, intensive care, and specialized surgical teams. Clinically, intraoperative protocols must strictly advise against forced placental removal when PAS is suspected. Finally, maintaining a prospective institutional registry will be fundamental to conduct ongoing audits, ensure continuous quality improvement, and generate further evidence to optimize PAS management in resource-constrained environments.

BIBLIOGRAPHIC REFERENCES

1. American College of Obstetricians and Gynecologists; Society for Maternal-Fetal Medicine. Obstetric Care Consensus No. 7: Placenta Accreta Spectrum. *Obstet Gynecol.* 2018;132(6):e259-e275.
2. Jauniaux E, Ayres-de-Campos D; FIGO Placenta Accreta Diagnosis and Management Expert Consensus Panel. FIGO consensus guidelines on placenta accreta spectrum disorders: introduction. *Int J Gynaecol Obstet.* 2018;140(3):261-264.
3. Jauniaux E, Alfirevic Z, Bhide AG, Belfort MA, Burton GJ, Collins SL, et al.; Royal College of Obstetricians and Gynaecologists. Placenta praevia and placenta accreta: diagnosis and management: Green-top Guideline No. 27a. *BJOG.* 2019;126(1):e1-e48.
4. Jauniaux E, Chantraine F, Silver RM, Langhoff-Roos J; FIGO Placenta Accreta Diagnosis and Management Expert Consensus Panel. FIGO consensus guidelines on placenta accreta spectrum disorders: epidemiology. *Int J Gynaecol Obstet.* 2018;140(3):265-273.
5. Silver RM, Landon MB, Rouse DJ, Leveno KJ, Spong CY, Thom EA, et al. Maternal morbidity associated with multiple repeat cesarean deliveries. *Obstet Gynecol.* 2006;107(6):1226-1232.
6. Shainker SA, Coleman B, Timor-Tritsch IE, Bhide A, Bromley B, Cahill AG, et al. Special Report of the Society for Maternal-Fetal Medicine Placenta Accreta Spectrum Ultrasound Marker Task Force: consensus on definition of markers and approach to the ultrasound examination in pregnancies at risk for placenta accreta spectrum. *Am J Obstet Gynecol.* 2021;224(1):B2-B14.
7. Hobson SR, Kingdom JC, Murji A, Windrim RC, Carvalho JCA, Singh SS, et al. No. 383 - Screening, diagnosis, and management of placenta accreta spectrum disorders. *J Obstet Gynaecol Can.* 2019;41(7):1035-1049.

8. International Society for Abnormally Invasive Placenta. Evidence-based guidelines for the management of abnormally invasive placenta. 2019.
9. Royal Australian and New Zealand College of Obstetricians and Gynaecologists. Placenta Accreta Spectrum (PAS) (C-Obs 20). RANZCOG; 2023.
10. National Institute for Health and Care Excellence. Caesarean birth. NICE guideline. London: NICE; 2024.
11. Bonanni G, Lopez-Giron MC, Shamshirsaz AA, et al. Guidelines on Placenta Accreta Spectrum Disorders: A Systematic Review. *JAMA Netw Open*. 2025;8(7):e2521909. doi:10.1001/jamanetworkopen.2025.21909.
12. Jauniaux E, Kingdom JC, Silver RM. A comparison of recent guidelines in the diagnosis and management of placenta accreta spectrum disorders. *Best Pract Res Clin Obstet Gynaecol*. 2021;72:102-116.
13. Dávila Cisneros DF. Incidencia de acretismo placentario. Tesis de Maestría en Ciencias Médicas con Especialidad en Ginecología y Obstetricia. Universidad de San Carlos de Guatemala, Escuela de Estudios de Postgrado; 2024.
14. Jauniaux E, Bhide A, Kennedy A, Woodward P, Hubinont C, Collins S; FIGO Placenta Accreta Diagnosis and Management Expert Consensus Panel. FIGO consensus guidelines on placenta accreta spectrum disorders: prenatal diagnosis and screening. *Int J Gynaecol Obstet*. 2018;140(3):274-280.
15. Allen L, Jauniaux E, Hobson S, Papillon-Smith J, Belfort MA; FIGO Placenta Accreta Diagnosis and Management Expert Consensus Panel. FIGO consensus guidelines on placenta accreta spectrum disorders: nonconservative surgical management. *Int J Gynaecol Obstet*. 2018;140(3):281-290.
16. Sentilhes L, Kayem G, Chandraran E, Palacios-Jaraquemada J, Jauniaux E; FIGO Placenta Accreta Diagnosis and Management Expert Consensus Panel. FIGO consensus guidelines on placenta accreta spectrum disorders: conservative management. *Int J Gynaecol Obstet*. 2018;140(3):291-298.
17. Hong S, Le Y, Lio KU, Zhang T, Zhang Y, Zhang N. Performance comparison of ultrasonography and magnetic resonance imaging in their diagnostic accuracy of placenta accreta spectrum disorders: a systematic review and meta-analysis. *Insights Imaging*. 2022;13(1):50. doi:10.1186/s13244-022-01192-w.
18. De Oliveira Carniello M, de Oliveira Brito LG, Sarian LO, Bennini JR. Diagnosis of placenta accreta spectrum in high-risk women using ultrasonography or magnetic resonance imaging: systematic review and meta-analysis. *Ultrasound Obstet Gynecol*. 2022;59(4):428-436.
19. Fitzgerald GD, Newton JM, Atasi L, Buniak CM, Burgos-Luna JM, Burnett BA, et al. Placenta accreta spectrum care infrastructure: an evidence-based review of needed resources supporting placenta accreta spectrum care. *Am J Obstet Gynecol MFM*. 2024;6(1):101229.
20. Nieto-Calvache AJ, Sanín-Blair JE, Buitrago-Leal HM, et al. Colombian Consensus on the Treatment of Placenta Accreta Spectrum (PAS). *Rev Colomb Obstet Ginecol*. 2022;73(3):283-316.

Contributions:

David Fernando Dávila Cisneros contributed to study conception, data source development, clinical interpretation, manuscript drafting, and critical revision.