Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

# Surgical Management and Perinatal Outcomes in Placenta Accreta Spectrum: A Five-Year Single-Center Retrospective Cohort from Kayseri City Hospital

**Merve Genco**

mervedogan93@windowslive.com

Kayseri Devlet Hastanesi

**Mehmet Genco**

Kayseri City Hospital

**Hüseyin Aksoy**

Kayseri City Hospital

**Harika Göçer**

Kayseri City Hospital

**Emrah Göçer**

Kayseri City Hospital

**Koray Kaya**

Kayseri City Hospital

**Beyza Aslım**

Kayseri City Hospital

**Research Article**

**Keywords:** Placenta accreta spectrum, percreta, cesarean hysterectomy, antenatal diagnosis, NICU

**Posted Date:** April 27th, 2026

**DOI:** https://doi.org/10.21203/rs.3.rs-9011421/v1

**License:** This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

**Additional Declarations:** No competing interests reported.

# Abstract

### Background

Placenta accreta spectrum (PAS) is a leading cause of life-threatening obstetric haemorrhage. Whether planned versus emergency delivery alters outcomes once care is centralised and protocolised remains uncertain.

### Aims

To compare maternal and neonatal outcomes by delivery timing (emergency vs planned) and by depth of invasion (accreta, increta, percreta) in a single-centre cohort.

### Materials and Methods

Retrospective observational study of consecutive PAS cases ≥ 24 weeks managed at a tertiary referral centre (2021–2025). Antenatal diagnosis, operative metrics, transfusion surrogates, ICU/NICU admission, complications, and perinatal outcomes were abstracted from standardised records.

### Results

Forty-three patients: 15 (34.9%) emergency, 28 (65.1%) planned. Percreta 23 (53.5%), increta 8 (18.6%), accreta 12 (27.9%). Antenatal suspicion 93% overall (100% planned; 80% emergency). Hysterectomy in 33/43 (76.7%); prophylactic double-J stents 8/43 (18.6%), all planned. Maternal haemorrhage surrogates, ICU admission (30.2%), and maternal/neonatal death (7.0%; 1 maternal, 2 neonatal) were similar between groups (all $p \geq 0.525$). NICU admission in 17/43 (39.5%), largely gestational-age related. Postoperative complications 6/43 (14.0%): 4 bladder and 2 ureteral injuries, all recognised intraoperatively and repaired without reoperation.

### Conclusion

In a multidisciplinary pathway with > 90% antenatal detection, maternal haemorrhage outcomes were similar for emergency and planned deliveries. Surgical risk rose with invasion depth not timing while urologic injuries clustered in deep invasion yet were manageable. Targeting later gestation in stable patients at experienced centres may improve neonatal outcomes without compromising maternal safety


# Introduction

Placental invasion anomalies are currently classified under the Placenta Accreta Spectrum (PAS). They are characterized by insufficient development of the decidual layer (decidua basalis), allowing trophoblasts to invade the myometrium (accreta–increta) and, in severe cases, traverse the uterine serosa to involve adjacent organs (percreta). PAS is among the leading causes of life-threatening obstetric hemorrhage (1).

The rapid global rise in cesarean delivery has markedly increased the frequency of PAS; between 1990 and 2014, the approximately threefold increase in cesarean rates has been associated with a significant rise in morbidity attributable to the accreta spectrum (2). This trend is corroborated by large U.S. cohort studies reporting that PAS accounts for a growing share of cesarean-related complications (3). In national, population-based studies, the prevalence of PAS has been reported as 0.017% in the United Kingdom and up to 0.034% in the Nordic countries (4, 5).

The fundamental mechanism in PAS pathogenesis is absence or defect of the decidua basalis at the utero-placental interface, which facilitates trophoblastic invasion beyond normal limits (6). The strongest risk factor is prior cesarean delivery: after two previous cesareans the risk increases by roughly eightfold, and with placenta previa plus a history of three or more cesareans the risk reaches 67% (7). Additional risk factors include placenta previa, prior uterine surgery, higher parity, and advanced maternal age. Morbidity is determined by the depth of invasion; in a multicenter study, severe maternal morbidity was approximately threefold higher in percreta than in accreta (8). Massive transfusion, complex pelvic surgery, and peripartum hysterectomy are frequently required.

Antenatal diagnosis primarily by ultrasound (USG) and, when indicated, magnetic resonance imaging (MRI) reduces peripartum hemorrhage and the need for emergent hysterectomy (9). Current FIGO guidance recommends planned delivery at 34–36 weeks of gestation, a multidisciplinary team approach, and individualized conservative (leaving the placenta in situ) or radical (cesarean hysterectomy) strategies (10). Even in resource-limited settings, antenatal diagnosis and standardized surgical protocols have been shown to improve maternal and neonatal outcomes (11).

Turkey has the highest cesarean rates among OECD (Organisation for Economic Co-operation and Development) countries. This high rate increases the population-level burden of obstetric complications such as PAS (12). Protocols for the diagnosis and management of PAS vary substantially across the country: while high-volume referral centers can implement multidisciplinary care and planned surgery, access to antenatal diagnosis and systematic planning may be limited in resource-constrained provinces. Cases referred from surrounding provinces to tertiary centers such as Kayseri City Hospital increase the clinical load at these facilities, underscoring the importance of ensuring that experience with PAS management is adequately represented in national datasets. As most publications on PAS from Turkey are single-center with limited sample sizes, comprehensive series with detailed clinical outcomes remain scarce. This study aims to report maternal and neonatal outcomes of PAS surgeries performed at Kayseri City Hospital in detail, to compare them with the current international evidence, and to provide data-informed contributions to national health policy.

# Materials and Methods

This retrospective observational study included all consecutive women with a diagnosis of placenta accreta spectrum (PAS) managed at the Department of Obstetrics and Gynecology, Kayseri City Hospital, between 01/01/2021 and 01/08/2025 .

**Ethics approval**

was obtained from the Kayseri City Hospital Non-Interventional Clinical Research Ethics Committee (decision no: 556, dated: 26.08.2025). Informed consent to participate was waived due to the retrospective design and the use of anonymized data.

**Human Ethics and Consent to Participate**

Ethical approval was obtained from the above ethics committee. Informed consent was waived due to the retrospective design and anonymized data.

**Consent to Publish:**

Not applicable.

All procedures involving human participants complied with the ethical standards of the institutional research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. Due to the retrospective nature of the study, informed consent was waived. Personal data were anonymized prior to analysis to maintain confidentiality.

# Study population

Consecutive cases with a diagnosis of placenta accreta spectrum (accreta/increta/percreta) who delivered at our institution were included if gestational age was ≥ 24 weeks. To ensure comparability of neonatal outcomes, previable pregnancies (< 24 weeks) were excluded. In cases managed with hysterectomy, PAS was confirmed histopathologically; in those managed without hysterectomy or with a conservative approach, the diagnosis was established intraoperatively/clinically.

Data were collected using a standardized case report form that captured demographic indicators (e.g., age) and risk factors (gravidity, prior cesarean delivery, myomectomy, antenatal diagnosis before the operation); operative characteristics (estimated blood loss, transfusion of blood products, duration of surgery, length of hospital stay, postoperative admission to the intensive care unit (ICU), and surgical complications); and neonatal outcomes, including Apgar scores.

Following pregnancy termination, the excised tissues were submitted for pathological examination, and the postoperative diagnosis was rendered by an experienced pathologist. All patients in this cohort were managed using a multidisciplinary team approach. After admission to the obstetrics and gynecology service, additional specialties were consulted as needed based on imaging or laboratory findings.

# Statistical Analysis

All statistical analyses were performed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA). A 95% confidence interval was applied, and statistical significance was defined as $p < 0.05$. Categorical variables were summarized as frequencies (n) and percentages (%), while continuous variables were

expressed as mean ± standard deviation or median (minimum–maximum), as appropriate. The distribution of continuous variables was assessed using the Shapiro–Wilk test and by evaluating skewness and kurtosis coefficients.

Comparisons of categorical variables were carried out using the Chi-square test, and Fisher's exact test was applied when Chi-square assumptions were not met. For comparisons of continuous variables between two independent groups, the independent samples *t*-test was used when normality assumptions were satisfied, whereas the Mann–Whitney U test was applied otherwise. For comparisons among three independent groups, one-way ANOVA was used for normally distributed variables, while the Kruskal–Wallis H test was employed for non-normally distributed data. When significant differences were observed in multiple group comparisons of non-normally distributed variables, the source of the difference was determined using the Bonferroni-adjusted Mann–Whitney U test ($p = 0.017 = 0.05/3$).

# RESULTS

A total of 43 PAS cases were evaluated; 15 were emergency and 28 were planned deliveries. By depth of invasion, the groups were: percreta 23 (53.5%), increta 8 (18.6%), and accreta 12 (27.9%).

The mean maternal age was 35 ± 6 years; mean height 162 ± 6 cm, weight 78 ± 12 kg, and BMI (body mass index**)** 29 ± 5 kg/m². Median gravidity was 4 (1–10), parity 3 (0–6), and prior cesarean number 2 (0–5). A history of myomectomy was present in 2/43 (4.7%) patients. The median gestational age at delivery was 34 (23–39) weeks. Placenta previa was documented in 39/43 (90.7%) cases. PAS was diagnosed at a median of 27 (0–39) weeks; diagnosis was established by ultrasound in 40/43 (93%), and preoperatively/intraoperatively in 3/43 (7%).

TAH (Total Abdominal Hysterectomy) was performed in 33/43 (76.7%) cases. Prophylactic double-J ureteral stents were used in 8/43 (18.6%). The median operative time was 1 hour 42 minutes (0.8–4.0 h). ICU (Intensive Care Unit) admission was required in 13/43 (30.2%) patients. Pre- and postoperative hemoglobin values were 11 ± 2 and 10 ± 2 g/dL, respectively. Blood product replacement (red cell concentrates and cryoprecipitate) had a median of 2 (1–4) units for each component.

For neonates, median length was 46 cm (26–51) and birthweight 2450 g (510–3580); NICU (Neonatal Intensive Care Unit) admission was required in 17/43 (39.5%). Maternal and/or neonatal death occurred in 3/43 (7.0%) one maternal and two neonatal deaths. Postoperative complications were recorded in 6/43 (14.0%) patients. These included 2 cases of ureteral injury and 4 cases of bladder perforation, all of which were recognized intraoperatively and repaired during the same surgical session. No patient required reoperation for these complications. Apgar scores at 1, 5, and 10 minutes were 7 (1–9), 8 (0–10), and 8 (0–10), respectively.

These data are summarized in Table 1.

Table 1
Baseline characteristics and outcomes of the overall cohort (n = 43)

| Variable | Mean ± SD or n (%) |
|---|---|
| Delivery type | Emergency 15 (34.9%) |
| | Planned 28 (65.1%) |
| PAS depth of invasion | Percreta 23 (53.5%) |
| | Increta 8 (18.6%) |
| | Accreta 12 (27.9%) |
| Age, years | 35 ± 6 |
| BMI, kg/m² | 29 ± 5 |
| Gravidity | 4 (1–10) |
| Parity | 3 (0–6) |
| Prior cesarean, n | 2 (0–5) |
| Prior myomectomy,n | 2 (4.7%) |
| Gestational age at delivery, weeks | 34 (23–39) |
| Birth length, cm | 46 (26–51) |
| Birthweight, g | 2450 (510–3580) |
| Placenta previa | Present 39/43 (90.7%) |
| | Absent 3/43 (7.0%) |
| Gestational week at PAS diagnosis | 27week (0–39) |
| Diagnosis method | Ultrasound 40 (93.0%) |
| | Pre-op/Intra-op 3 (7.0%) |
| TAH performed | Yes: 33 (76.7%) |
| | No:10 (23.3%) |
| Prophylactic double-J stent | Yes: 8 (18.6%) |
| | No: 35 (81.4%) |
| Operative time, hours | 1.7 (0.8–4.0) |
| ICU admission | Yes: 13 (30.2%) |
| | No: 30 (69.8%) |

| Variable | Mean ± SD or n (%) |
|---|---|
| NICU admission | Yes: 17 (39.5%) |
| | No: 26 (60.5%) |
| Preoperative hemoglobin, g/dL | 11 ± 2 |
| Postoperative hemoglobin, g/dL | 10 ± 2 |
| RBC transfusion, units | 2 (1–4) |
| Cryoprecipitate transfusion, units | 2 (1–4) |
| Maternal and/or neonatal death | Yes: 3 (7.0%) |
| | No: 39 (90.7%) |
| Postoperative complications | Yes: 6 (14.0%) |
| | No: 37 (86.0%) |

Table 2
Comparison of emergency vs planned deliveries in PAS cohort.

| Variable | Emergency (n = 15) | Planned (n = 28) | p-value |
|---|---|---|---|
| Age, years | 38 ± 6 | 34 ± 6 | 0.052 |
| Maternal height, cm | 161 ± 7 | 162 ± 4 | 0.583 |
| Maternal weight, kg | 74 ± 11 | 79 ± 12 | 0.213 |
| BMI, kg/m² | 29 ± 4 | 30 ± 5 | 0.609 |
| Gravidity | 5 (2–8) | 4 (1–10) | 0.123 |
| Parity | 3 (1–5) | 3 (0–6) | 0.383 |
| Prior cesarean, n | 3 (1–5) | 2 (0–5) | 0.419 |
| Prior myomectomy, n | 0 (0.0) | 2 (7.1) | 0.289 |
| Gestational age at delivery, weeks | 34w+3d (25.6–39) | 34w+1d (23–39) | 0.407 |
| Birth length, cm | 49 (32–51) | 46 (26–49) | **0.011** |
| Birthweight, g | 2630 (800–3170) | 2290 (510–3580) | 0.460 |
| Placenta previa present, n | 11 (73.3) | 28 (100.0) | **0.011** |
| Gestational week at PAS diagnosis | 31w (0–39) | 27 (9.4–38) | 0.050 |
| Diagnosis by ultrasound, n | 12 (80.0) | 28 (100.0) | 0.200 |
| TAH performed, n | 11 (73.3) | 22 (78.6) | 0.719 |
| Prophylactic double-J ureteral stent,n | 0 (0.0) | 8 (28.6) | **0.036** |
| Operative time, hours | 1.5 (0.8–3.0) | 1.8 (1.0–4.0) | 0.219 |
| ICU admission, n | 5 (33.3) | 8 (28.6) | 0.746 |
| NICU admission, n | 7 (46.7) | 10 (35.7) | 0.528 |
| Preoperative hemoglobin, g/dL | 11 ± 2 | 11 ± 1 | 0.889 |
| Postoperative hemoglobin, g/dL | 9 ± 2 | 10 ± 3 | 0.535 |
| RBC transfusion, units | 2 (1–4) | 2 (1–4) | 0.805 |

Data are presented as mean ± SD, median (min–max), or n (%) as appropriate.

Across PAS depth categories, baseline maternal characteristics, antenatal findings, transfusion requirements, hemoglobin change, ICU/NICU admission, Apgar scores, and postoperative complications were broadly comparable (global $p > 0.05$ for all). Operative time differed significantly among groups (Kruskal–Wallis $p = 0.036$): post-hoc testing showed longer procedures in percreta versus accreta (Bonferroni-adjusted Mann–Whitney $p = 0.016$), whereas percreta versus increta ($p = 0.136$) and increta versus accreta ($p = 0.464$) were not significant. These data are summarized in Table 3.

| Variable | Emergency (n = 15) | Planned (n = 28) | p-value |
|---|---|---|---|
| Cryoprecipitate, units | 2 (1–4) | 2 (1–4) | 0.746 |
| Maternal and/or neonatal death, n | 2 (13.3) | 1 (3.6) | 0.525 |
| Any postoperative complication, n | 2 (13.3) | 4 (14.3) | 1.000 |
| Final pathology, n (%) | | | 0.133 |
| – Accreta | 7 (46.7) | 5 (17.9) | |
| – Increta | 2 (13.3) | 6 (21.4) | |
| – Percreta | 6 (40.0) | 17 (60.7) | |
| Data are presented as mean ± SD, median (min–max), or n (%) as appropriate. | | | |
| Across PAS depth categories, baseline maternal characteristics, antenatal findings, transfusion requirements, hemoglobin change, ICU/NICU admission, Apgar scores, and postoperative complications were broadly comparable (global $p > 0.05$ for all). Operative time differed significantly among groups (Kruskal–Wallis $p = 0.036$): post-hoc testing showed longer procedures in percreta versus accreta (Bonferroni-adjusted Mann–Whitney $p = 0.016$), whereas percreta versus increta ($p = 0.136$) and increta versus accreta ($p = 0.464$) were not significant. These data are summarized in Table 3. | | | |

Table 3
Maternal, operative, and neonatal outcomes stratified by depth of placental invasion (accreta, increta, percreta).

| Variable | Percreta (n = 23) | Increta (n = 8) | Accreta (n = 12) | p-value |
|---|---|---|---|---|
| Age, years | 34 ± 5 | 37 ± 6 | 37 ± 7 | 0.384 |
| Maternal height, cm | 161 ± 5 | 162 ± 4 | 163 ± 7 | 0.777 |
| Maternal weight, kg | 75 ± 9 | 81 ± 11 | 81 ± 16 | 0.272 |

# Discussion

In this single-center PAS series (n = 43), more than half of the cases were percreta (53%), 35% delivered under emergency conditions, and 77% underwent cesarean hysterectomy (TAH). The median gestational age at delivery was ~34 weeks, and NICU admission occurred in 40%. When compared by delivery timing, most maternal metrics were comparable; the only notable difference was the more frequent use of preoperative double-J ureteral stents in the planned group, reflecting greater operative preparedness. In analyses by depth of invasion, only operative time (percreta vs accreta) remained significant after Bonferroni correction; neonatal outcomes did not vary across pathology strata.

Our emergency delivery rate (35%) closely parallels the IS-PAS (International Society for Placenta Accreta Spectrum) multicenter database (33%). Morlando et al. reported that emergency births occurred at lower

gestational ages (mean 34 vs 36 weeks) and were associated with higher ICU admission, yet did not show higher blood loss or transfusion compared with planned delivery when care was provided in experienced centers. In our cohort, the planned–emergency comparison likewise showed no significant differences in hemoglobin change or transfusion surrogates, supporting the view that—with established protocols and experienced teams—emergency delivery does not inevitably increase hemorrhagic morbidity (13).

Diagnosis in our series was predominantly by ultrasound (93% overall); all planned cases had antenatal suspicion, whereas 20% of emergencies did not. A recent three-center cohort reported an “unsuspected” PAS rate of ~35%, with significantly higher 24-hour blood loss and transfusion in unsuspected cases; posterior placentation and the absence of risk factors for intrauterine adhesions were identified as key correlates of missed antenatal diagnosis. In our cohort, the emergency group contained fewer placenta previa cases (0% vs 100% in planned), consistent with the literature that absence of previa can hinder antenatal suspicion and predispose to emergency presentation (14).

The high percreta proportion (53%) suggests tertiary referral bias and is comparable to severe-case series. Even within standardized, multidisciplinary pathways, percreta is associated with substantially higher severe maternal morbidity and hysterectomy rates than accreta/increta; in a large Paris series, severe morbidity was 86% in percreta versus 27% in accreta, with hysterectomy markedly more frequent in percreta (8). In our cohort, the overall TAH rate was 77%; by subgroup it was 91% (21/23) for percreta, 88% (7/8) for increta, and 42% (5/12) for accreta.

Our policy of targeting delivery around 34 weeks yielded median Apgar scores of 7/8/8 at 1, 5, and 10 minutes and a 40% NICU admission rate. The IS-PAS analysis underscores that, when clinically feasible, deferring delivery beyond 36 weeks reduces major neonatal morbidity from ~25% at 34+1–36+0 weeks to ~19% after 36 weeks, which aligns with FIGO-endorsed strategies in stable cases under expert care. Moreover, depth of invasion does not consistently worsen neonatal outcomes once gestational age is accounted for; a classic comparative cohort found similar gestational age at birth, birthweight, NICU admission, and mortality between “deep” (increta/percreta) and “superficial” (accreta) invasion consistent with our lack of neonatal differences across pathology groups (6).

Our antenatal detection rate was high (93%; 100% in planned, 80% in emergency cases), comparing favorably with reports from three academic centers where the “unsuspected” PAS rate was 35.4%. The fact that double-J stents were used only in antenatally detected planned cases (28.6%) illustrates how early diagnosis enables risk-reducing adjuncts. The literature consistently advocates management in tertiary, multidisciplinary centers and considers antenatal detection critical for optimizing outcomes. Finally, a five-year cohort from a resource-limited setting reported antenatal detection of 86.3% and demonstrated that team-based protocols can achieve results comparable to those in high-resource centers (11), supporting the reproducibility of a “high antenatal detection + multidisciplinary” model across contexts.

In our cohort, the overall postoperative complication rate was 14% (6/43), comprising four bladder perforations (9.3%) and two ureteral injuries (4.7%). These figures are broadly consistent with contemporary PAS series. Large database analyses of cesarean hysterectomy for PAS report bladder injury rates of ~18–24% and ureteral injury rates of ~2–4%; our bladder perforation rate falls at the lower end of this range, whereas the ureteral injury rate is near the upper bound (15). Elective preoperative ureteral stenting used only in planned cases in our series has been associated in large datasets with fewer bladder injuries; this may partly account for our relatively low bladder injury rate and overall urologic profile despite a percreta-heavy case mix. Notably, these complication rates remain acceptable despite the high proportion of percreta cases, and no significant differences were observed between emergency and planned deliveries.

Strengths of this study include consecutive case capture at a high-volume tertiary referral center, standardized data abstraction, and prespecified stratified analyses by delivery timing and depth of invasion. Limitations include the retrospective design and modest subgroup sizes; moreover, the referral case-mix with a high proportion of percreta may limit external generalizability, yet it provides clinically relevant insight into the most morbid end of the PAS spectrum. In addition, the statistical power of subgroup analyses, particularly for the increta group (n = 8), was limited, and these comparisons should therefore be interpreted with caution.

In this single-center cohort, a >90% antenatal detection rate and a structured multidisciplinary pathway were linked to comparable hemorrhage-related maternal outcomes between emergency and planned deliveries. The main determinant of risk was surgical complexity, which increased with invasion depth, particularly in percreta. Importantly, urologic complications (bladder and ureter injuries) clustered in deeply invasive cases but were largely preventable when procedures were scheduled and surgical teams were adequately prepared. Neonatal outcomes were primarily influenced by gestational age, underscoring that, in stable patients managed at experienced centers, deferring delivery to later gestational weeks may optimize neonatal prognosis without compromising maternal safety.

## Abbreviations

*PAS*
*placenta accreta spectrum*
*BMI*
*body mass index*
*CS*
*cesarean section*
*USG*
*ultrasonography*
*TAH*
*total abdominal hysterectomy*
*ICU*

*intensive care unit*
*NICU*
*neonatal intensive care unit*
*RBC*
*packed red blood cells*
*DJ stent*
*double-J ureteral stent*
*Hb*
*hemoglobin.*

# Declarations

**Ethics approval and consent to participate:**

Ethics approval was obtained from the Kayseri City Hospital Non-Interventional Clinical Research Ethics Committee (decision no: 556, dated: 26.08.2025). Informed consent to participate was waived due to the retrospective design and the use of anonymized data

**Acknowledgments:**
The authors thank the surgical team and nursing staff of Kayseri City Hospital for their support during the study. We also appreciate the contributions of the ethics committee members for their guidance and approval of the research protocol.

**Funding:**
This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

**Conflict of interest**: none declared

**Competing interests:** The authors declare that they have no competing interests.

**Acknowledgments:** We gratefully acknowledge our colleagues at Kayseri City Hospital including the Departments of Obstetrics and Gynaecology, Anaesthesiology and Reanimation, Urology, Neonatology (NICU), Transfusion Medicine/Blood Bank, and Operating Room Nursing for their contributions to the PAS clinical pathway, data standardisation, and case coordination. All contributors provided permission to be acknowledged and received no compensation. No external financial or material support was received.

**Availability of data and materials:** The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request, subject to institutional and ethical regulations.

**Author Contributions:**

**Merve Genco:** Conceptualization; Methodology; Investigation; Data curation; Formal analysis; Writing – original draft; Writing – review & editing; Visualization; Supervision; Project administration.
**Mehmet Genco:** Conceptualization; Methodology; Investigation; Data curation; Formal analysis; Writing – original draft; Writing – review & editing; Visualization; Supervision; Project administration.
**Hüseyin Aksoy:** Methodology; Formal analysis; Writing – review & editing; Supervision.
**Harika Göçer:** Investigation; Data curation; Writing – review & editing.
**Emrah Göçer:** Investigation; Data curation; Writing – review & editing.
**Koray Kaya:** Data curation; Investigation.
**Beyza Aslım:** Data curation; Investigation.

# References


1. Jauniaux E, Jurkovic D. Placenta accreta: pathogenesis of a 20th-century iatrogenic uterine disease. Placenta. 2012;33:244–51.
2. Betran AP, Ye J, Moller AB et al. The increasing trend in cesarean section rates: global, regional and national estimates 1990–2014. *PLoS One*. 2016;11:e0148343. Creanga AA, Bateman BT, Butwick AJ,. Morbidity associated with cesarean delivery in the United States: is placenta accreta an increasingly important contributor? *Am J Obstet Gynecol*. 2015;213:384.e1-11.
3. Fitzpatrick KE, Sellers S, Spark P, et al. Management and outcomes of placenta accreta, increta, and percreta in the UK: a population-based descriptive study. BJOG. 2014;121:62–71.
4. Thurn L, Lindqvist PG, Jakobsson M, et al. Abnormally invasive placenta—prevalence, risk factors and antenatal suspicion in Nordic countries. BJOG. 2016;123:1348–55.
5. Seet EL, Kay HH, Wu S, Terplan M. Placenta accreta: depth of invasion and neonatal outcomes. J Matern Fetal Neonatal Med. 2012;25:2042–5.
6. Silver RM, Landon MB, Rouse DJ, Leveno KJ, Spong CY, Thom EA, Moawad AH, Caritis SN, Harper M, Wapner RJ, Sorokin Y, Miodovnik M, Carpenter M, Peaceman AM, O'Sullivan MJ, Sibai B, Langer O, Thorp JM, Ramin SM, Mercer BM. National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network. Maternal morbidity associated with multiple repeat cesarean deliveries. Obstet Gynecol. 2006;107(6):1226-32. 10.1097/01.AOG.0000219750.79480.84. PMID: 16738145.
7. Marcellin L, Delorme P, Bonnet MP, et al. Severe maternal morbidity: more frequent in placenta percreta than accreta. Am J Obstet Gynecol. 2018;219:e1931–9.
8. Chantraine F, Braun T, Gonser M, Henrich W, Tutschek B. Prenatal diagnosis of abnormally invasive placenta reduces maternal peripartum hemorrhage and morbidity. Acta Obstet Gynecol Scand. 2013;92:439–44.
9. Sentilhes L, Kayem G, Chandraharan E, et al. FIGO consensus guidelines on placenta accreta spectrum disorders: conservative management. Int J Gynaecol Obstet. 2018;140:291–8.

10. Kasraeian M, Hashemi A, Hessami K, et al. Perinatal outcome of placenta accreta spectrum managed by cesarean hysterectomy in a resource-limited setting. BMC Women's Health. 2021;21:243.
11. OECD. Health at a Glance 2023: OECD Indicators. Paris: OECD Publishing; 2023. 10.1787/7a7afb35-en.
12. Morlando M, Schwickert A, Stefanovic V, Gziri MM, Pateisky P, Chalubinski KM, Nonnenmacher A, Morel O, Braun T, Bertholdt C, Van Beekhuizen HJ, Collins SL, International Society for Placenta Accreta Spectrum (IS-PAS). Maternal and neonatal outcomes in planned versus emergency cesarean delivery for placenta accreta spectrum: A multinational database study. Acta Obstet Gynecol Scand. 2021;100(Suppl 1):41–9. 10.1111/aogs.14120. Epub 2021 Mar 12. PMID: 33713033.
13. Zhao J, Li Q, Liao E, Shi H, Luo X, Zhang L, Qi H, Zhang H, Li J. Incidence, risk factors and maternal outcomes of unsuspected placenta accreta spectrum disorders: a retrospective cohort study. BMC Pregnancy Childbirth. 2024;24(1):76. 10.1186/s12884-024-06254-z. PMID: 38262978; PMCID: PMC10804779.
14. Matsuo K, Huang Y, Matsuzaki S, Vallejo A, Ouzounian JG, Roman LD, Khoury-Collado F, Friedman AM, Wright JD. Cesarean hysterectomy for placenta accreta spectrum: Surgeon specialty-specific assessment. Gynecol Oncol. 2024;186:85–93. doi: 10.1016/j.ygyno.2024.04.004. Epub 2024 Apr 11. PMID: 38603956.