



Location, Location: Reassessment of Placental Location and Obstetric Risks

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BACKGROUND

- **Anterior placental location** is widely cited as a risk factor for labor induction, postpartum hemorrhage (PPH), retained placenta, intrapartum cesarean, and pre-eclampsia.
- **Evidence for this association is limited**
- By contrast, **fundal and lateral placental locations** show more consistent links to **PROM, preterm birth, small for gestational age (SGA) neonate**, and **retained placenta** across the broader literature.
- **Proposed mechanism:** fundal implantation is hypothesized to place the membranes' weakest point over the cervical os
- **Knowledge gap:** insufficient evidence exists to counsel patients on placenta-location risk, independent of previa or PAS

WHY IT MATTERS

Placental location is documented at the anatomy ultrasound in each pregnancy and is a cost-free data point for risk stratification and patient counseling if the underlying risk associations can be clarified.

TAKE-HOME

Anterior placentation is not independently associated with increased rates of postpartum hemorrhage, induction of labor, or operative delivery in the absence of placenta previa or accreta spectrum disorders.

In our cohort, fundal placentation had a statistically significant correlation with prelabor rupture of membranes ($p = 0.0003$, meeting Bonferroni-corrected threshold of $p = 0.005$)

OBJECTIVE

To evaluate the relationship between placental location — anterior, posterior, lateral, or fundal — and maternal and neonatal outcomes in the absence of other ultrasound-diagnosed placental implantation disorders (low-lying, previa, accreta)

METHODS

- Retrospective cohort
- N=4145 Patients that delivered at Mayo Clinic (Rochester, MN) 2018 – 2023 at any gestational age, with mean gest. age at delivery: 39w0d (SD: 12 days)
- Inclusion: singleton pregnancies and ultrasound-confirmed placental location between 16 – 22 weeks gestation
- Exclusion: Low-lying placenta, placenta previa, abnormal placentation (suspected PAS), or uterine anomalies
- Placental location described as: Anterior, posterior, lateral, or fundal
- **Maternal outcomes:** PPH, PROM, mode of delivery, induction of labor, duration of third stage, diagnosis of a hypertensive disorder of pregnancy, diagnosis of gestational diabetes, gestational age at delivery
- **Neonatal outcomes:** Apgar scores, birth weight, small for gestational age (SGA), large for gestational age (LGA), and NICU admission.

STATISTICAL ANALYSIS

- Continuous variables: one-way ANOVA. Categorical variables: χ^2 or Fisher's exact test, as appropriate.
- Bonferroni-corrected significance threshold: $p < 0.005$ (10 maternal comparisons); $p < 0.008$ (6 neonatal comparisons).
- Analyses performed in R v4.2.2.

KEY FINDING: FUNDAL PLACENTATION ASSOCIATED WITH PRELABOR RUPTURE OF MEMBRANES (PROM)

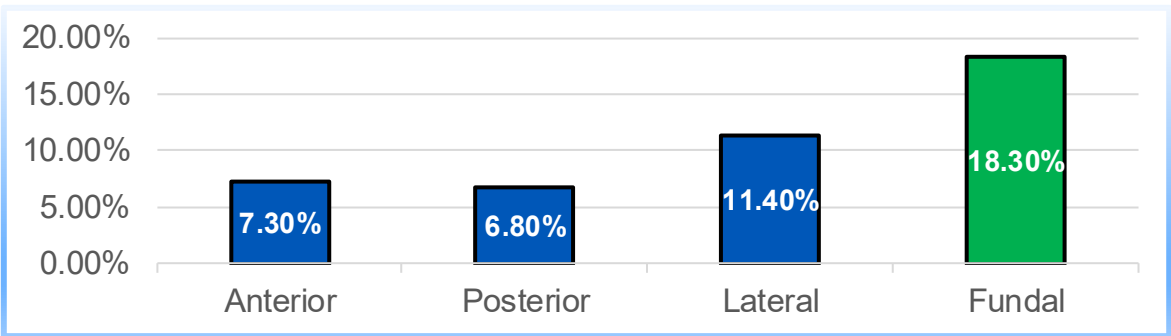


FIGURE 1: PERCENTAGE OF PROM BY PLACENTAL LOCATION

Bonferroni-corrected $p = 0.0003$. PROM was the only maternal or neonatal outcome to reach statistical significance across all four placental locations: highest in fundal (18.3%) and lateral (11.4%) placentas, roughly 2–3× the anterior (7.3%) or posterior (6.8%) rates.

Claim	Strength of Evidence
Fundal placenta → PROM / preterm labor risk	Moderate
Lateral placenta → preeclampsia, small for gestational age, retained placenta	Strong
Anterior placenta alone → PPH, induction (in general population excluding previa, accreta)	Weak

TABLE 1: SYNTHESIS OF CURRENT LITERATURE

Consensus-synthesized literature review, 2026 (100 papers)

Outcome	Anterior	Posterior	Lateral	Fundal	P-value
PPH (%)	11.5	11.7	15.8	13.4	0.4217
Labor induction (%)	46.8	46.2	55.1	46.3	0.20
Third stage, minutes	8.5	7.7	9.7	9.2	0.46
HDP (%)	7.5	6.3	8.9	7.3	0.36
GDM (%)	10.4	10.8	8.2	15.9	0.32

TABLE 2: SELECTED MATERNAL OUTCOMES

None differed significantly by placental location after Bonferroni correction (all $p > 0.005$)

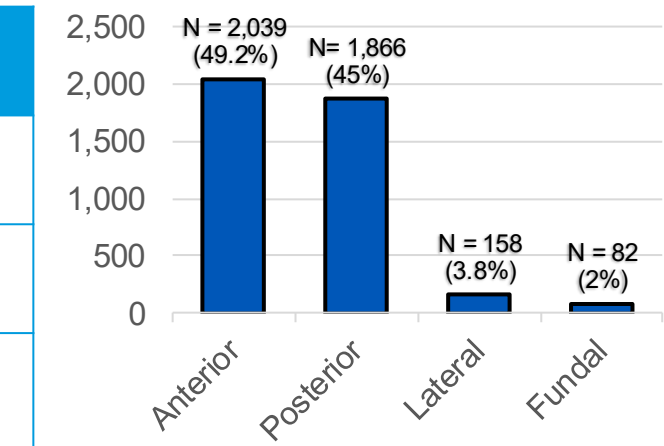


FIGURE 2: COHORT SIZE BY PLACENTA LOCATION

Also not significant: delivery mode, Apgar, birth weight, LGA, NICU admission

A trend toward higher SGA in the lateral placenta group (11.4% vs 5.9% posterior) did not survive correction (unadjusted $p = 0.024$)

LIMITATIONS

- Retrospective, single-center design.
- Small fundal (n=82) and lateral (n=158) subgroups limit statistical power.
- 2nd-trimester placental site may not reflect term location (placental migration).
- No adjusted multivariable model yet performed for PROM.

CONCLUSIONS

Anterior placentation was not associated with increased PPH, induction, or operative delivery - contrary to a prevailing clinical assumption.

Fundal placental location was associated with significantly higher PROM rates, consistent with (and strengthening) an underemphasized signal in the literature (Granfors 2019; Alakonda 2023; Yadav 2023; Faizi & Pai 2014)

FUTURE DIRECTIONS

- Multivariable adjustment for possible confounders impacting PROM (i.e., presence of infection, smoking status, multiple gestation, etc.)

REFERENCES

