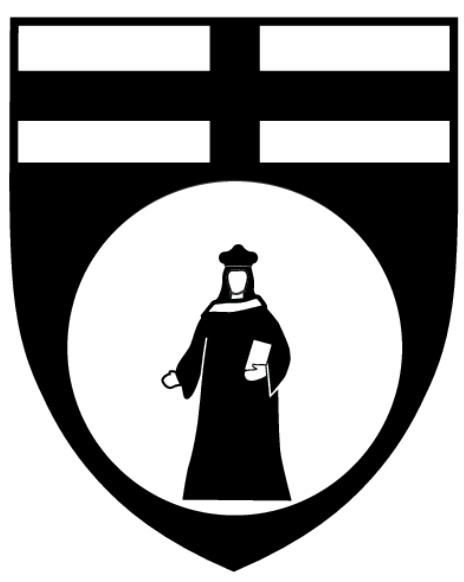




Quantitative analysis of devascularization trends in placenta accreta spectrum managed with placenta left in situ

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Objectives

To quantify devascularization and involution trends in placenta accreta spectrum (PAS) cases managed conservatively with the placenta left in situ, utilizing automated Doppler pixel quantification alongside serial ultrasound assessments.

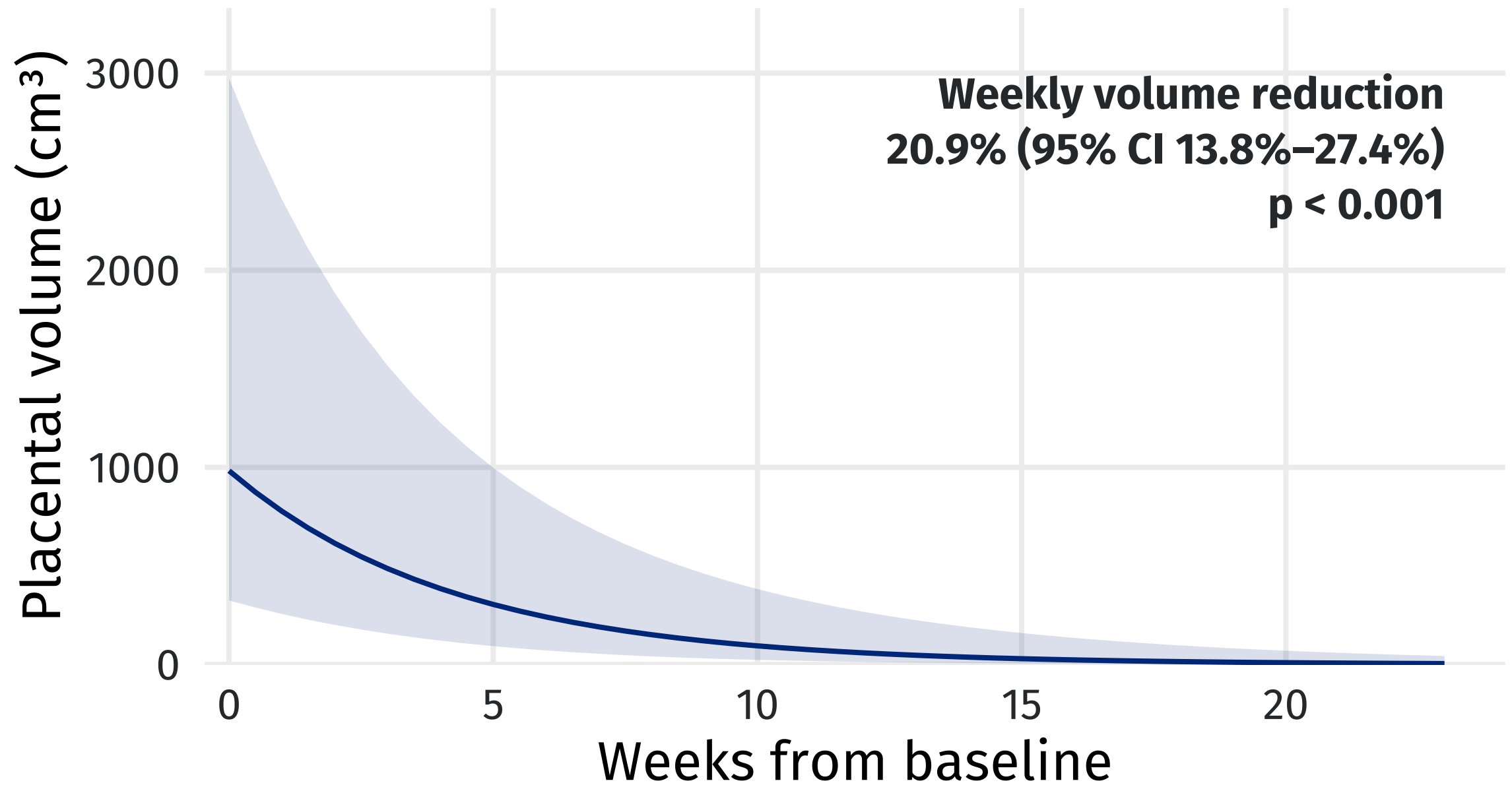


Figure 1. Modelled placental volume over time (fit with 95% CI); 20.9% weekly reduction.

Methods

A retrospective analysis was performed on consecutive cases of PAS managed with the placenta left in situ (n=8). Post-cesarean follow-up involved serial transvaginal ultrasound recording placental volume, subjective colour scores and qualitative features (lacunae, hyperechoic pattern). Placental vascularization was quantified via automated HSV-space pixel classification of colour Doppler frames to compute the Doppler fraction (coloured pixels/standardized ROI). Temporal trends were assessed using mixed-effects regression models.

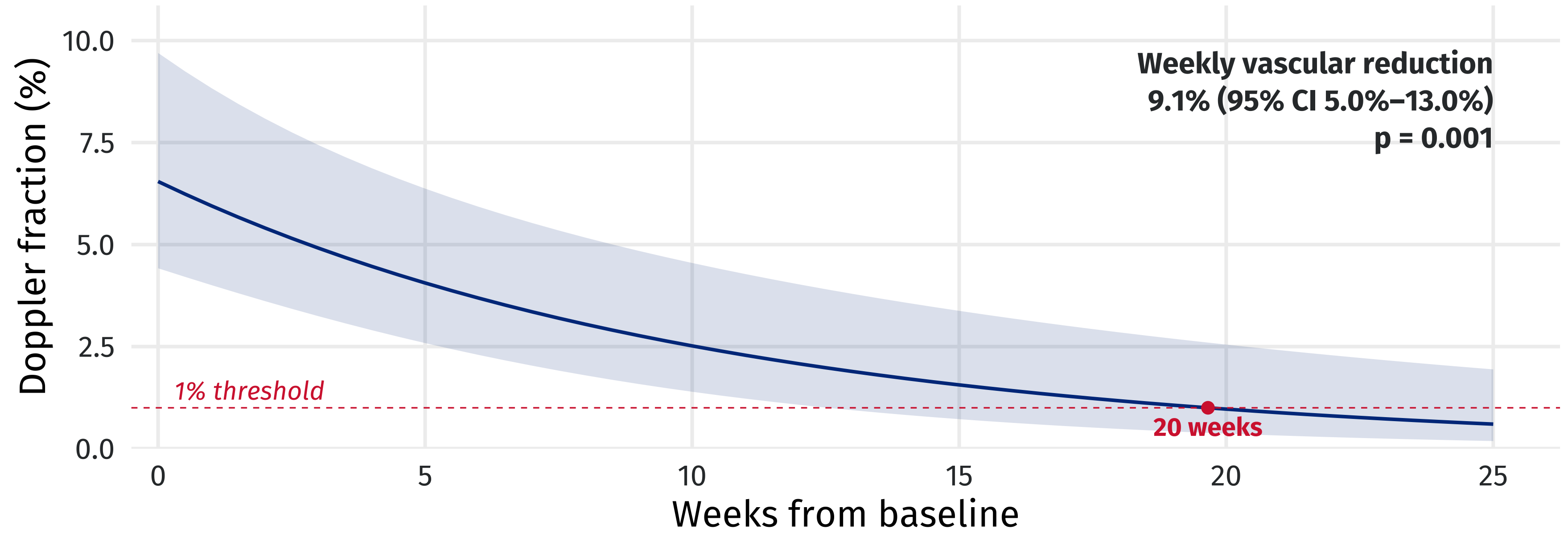


Figure 2. Modelled Doppler fraction over time (fit with 95% CI); 9.1% weekly reduction, 1% threshold at 20 weeks.

Results

A total of eight women were included (mean age 38.0 ± 5.0 years; median gestational age 35+5 weeks). Embolization was performed in 88% of cases. Median intraoperative blood loss was 650 mL (IQR 275–1250 mL). Serial follow-up (23 assessments) showed significant involution: placental volume decreased by 20.9% per week (p = 0.0001) and subjective colour scores declined (β = −0.090/week, p = 0.004). A hyperechoic pattern, absent in 86% of assessments before 5 weeks, was present in 100% of scans performed after 12 weeks. Automated Doppler quantification revealed a significant vascularization reduction of 9.1% per week (95% CI: 5.0–13.0%; p = 0.001). The projected time to reach a Doppler fraction <1% was 20 weeks (138 days).

Conclusion

The management of PAS with the placenta left in situ shows a consistent devascularization rate of approximately 9% per week, as evidenced by quantitative Doppler assessment. Qualitative markers, such as declining colour score and emerging hyperechoic pattern, support the observation of progressive involution. In contrast, automated pixel-based Doppler provides a precise, reproducible metric for monitoring conservative PAS management.