Amniotic Fluid Volume Assessment Using POCUS

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BACKGROUND

- Amniotic fluid volume (AFV) is a key predictor of fetal well-being, typically assessed using the amniotic fluid index (AFI) or the single deepest pocket (SDP). Abnormal AFV is associated with adverse outcomes such as stillbirth, cesarean delivery, and NICU admission. Point-of-care ultrasound (POCUS) is an accessible, irradiating tool with an established role in obstetrics for AFV assessment. However, its use by emergency physicians (EPs) for evaluating second and third trimester AFV has not been well studied. This study investigates the accuracy and agreement of EP-performed POCUS compared to formal ultrasounds conducted by obstetricians.

OBJECTIVES

- To determine whether emergency physicians can accurately assess AFI and SDP using POCUS, with measurements correlating to those performed by OBGYN providers.

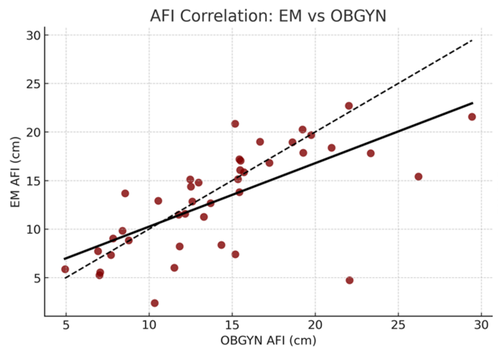
METHODS

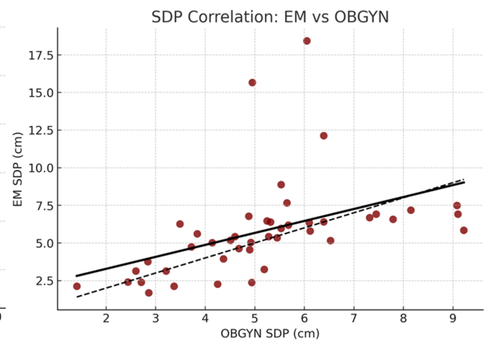
- A prospective observational study conducted between Nov 2024 and Apr 2025 at a tertiary care academic hospital. Pregnant patients >14 weeks GA presenting to the ED were enrolled if they underwent both EP-POCUS and OBGYN ultrasound in the same visit. Exclusions included known complications, prior enrollment, or hemodynamic instability. AFI and SDP were independently measured using a curvilinear probe on the same machine. A blinded OBGYN attending reviewed image quality and accuracy. Statistical analysis included Lin's concordance coefficient and sensitivity/specificity calculations for abnormal fluid detection.

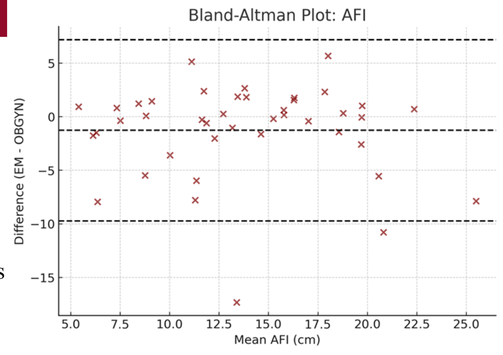
How to Measure AFI (5 minute video)

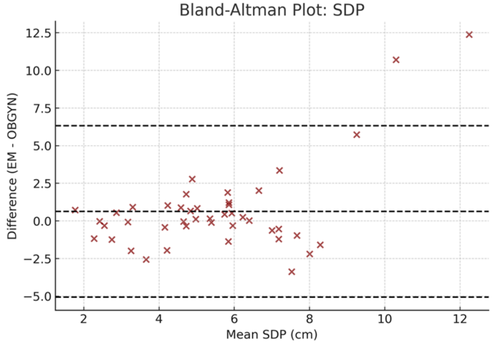
RESULTS

- 45 patients were enrolled. Median maternal age: One twin gestation case included; only SDP was recorded per ACOG guidelines.
- Mean age: 31.8 years (range: 21–45). Mean gravida: 2.87Mean para: 1.00Mean gestational age: 32.7 weeks
- Scan counts by provider type: Resident: 31, Attending: 12, Fellow: 2 scans









Measurement	Statistic	Value	p-value
AFI	Lin's CCC	0.645	—
AFI	Pearson r	0.680	< 0.001
AFI	Paired t-test	-1.92	0.062
SDP	Lin's CCC	0.367	—
SDP	Pearson r	0.450	0.002
SDP	Paired t-test	1.43	0.161

DISCUSSION

- Emergency physicians showed moderate agreement with OBGYNs when measuring AFI and weaker agreement when measuring SDP.
- Both measurement types were statistically similar on average, though AFI had better correlation.
- This suggests that with minimal training, EPs can reliably estimate AFI using POCUS, which may help justify transfers or urgent follow-up in settings without on-site OB coverage.

FUTURE DIRECTIONS

- Further validation studies comparing the utility of AFI vs SDP measurements in ED settings are warranted.
- Additional applications could include extending POCUS to assess other fetal parameters such as biparietal diameter (BPD), femur length, and cardiac morphology.
- These may be particularly useful in identifying complications of TORCH infections, including microcephaly, in high-risk populations or during disease outbreaks like Zika.
- A standardized educational didactic for OBGYN and EM residents on how to acquire accurate AFI and SDP measurements should be developed to ensure consistency and improve inter-specialty reliability.

CONCLUSIONS

- EP-performed POCUS is a reliable method for assessing amniotic fluid volumes and may serve as a valuable diagnostic tool in settings with limited access to obstetric services.
- AFI measurements by emergency physicians demonstrated stronger agreement with OBGYN reference standards than SDP, suggesting AFI may be the more reproducible metric in ED settings.
- These findings support the feasibility of incorporating AFI-focused POCUS training into EM education, particularly in preparation for high-acuity, low-resource scenarios where timely obstetric consultation is unavailable.

Key References

- American Academy of Family Physicians. Point-of-Care Ultrasound Curriculum. AAFP; 2019.
- American College of Emergency Physicians. Point-of-Care Ultrasound in Resource-Limited Settings. ACEP Sonoguide; 2023