

Antenatal ultrasound diagnosis of fetal micrognathia: which is the most reproducible method?

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Objective

To evaluate intra and interobserver reproducibility of ultrasound methods proposed to diagnose fetal micrognathia.

Methods

This is a retrospective study on profile images of fetuses with suspected micrognathia diagnosed antenatally, between 18 and 28 weeks, at University College London Hospital from 2000 to 2018. We identified four quantitative methods previously reported to assess micrognathia: inferior facial angle (IFA), the fronto nasomental angle (FNMA), the maxilla-nasion-mandible angle (MNMA) and the facial maxillary angle (FMA). Two sonographers, blinded to each other, measured each angle twice. Intra- and interoperator reproducibility were calculated using Bland Altman plots. Values were expressed as angles degree or percentage of angles degree to account for increased variability with advancing gestation.

Results

Out of 132 fetuses identified with suspected antenatal micrognathia, 84 cases had a known outcome (56: terminations of pregnancy; 11: fetal demises; 4: neonatal deaths; 13: alive babies) and 48 were lost to follow up. Profile picture was stored in 49 cases where reproducibility was assessed (22: terminations; 5: fetal demises; 3: neonatal deaths; 6 alive babies; 13: lost to follow up). FNMA was the most reproducible and FMA was the least reproducible measurement. Intraoperator and interoperator reproducibility 95% confidence intervals were 3.5% and 9.5% for FNMA and 11.6% and 45% for FMA respectively.

Conclusion

Quantitative methods to assess micrognathia antenatally are not consistently reproducible, and this can lead to over or missed diagnosis. If to be used, FNMA should be the preferred method to support subjective assessment.

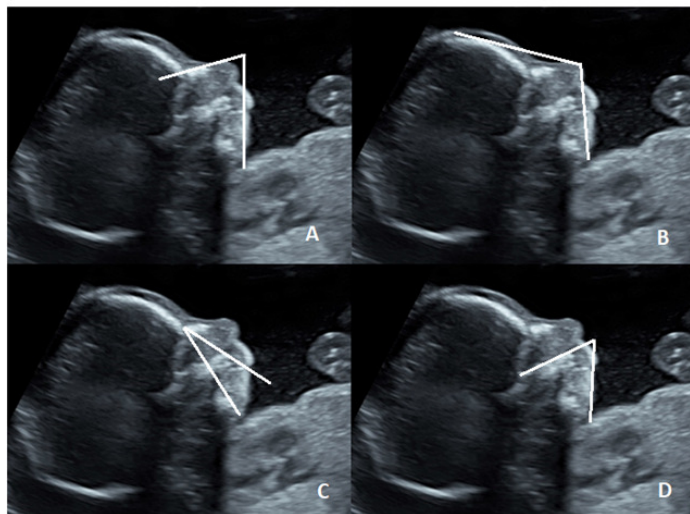


Figure 2: Two dimension of fetal profile diagnosed with prenatal diagnose of micrognathia. quantitative angle assessments for micrognathia. **A) IFA** (Inferior Facial Angle) Angle between a line vertical to the forehead and a line joining the mentum and protrusive lip. Diagnostic criteria $<49.2^{\circ}$. **B) FNMA** (Fronto-naso-mental Angle) The angle between a line from nasal tip tangible to the frontal bone and a line cross nasal tip and the mentum. Diagnostic criteria $<142^{\circ}$. **C) MNMA** (Maxila nasion mandible Angle) The angle between the intersection of the maxilla-nasion and mandible nasion lines. Diagnostic criteria $>16.91^{\circ}$. **D) FMA** (Facial Maxillary Angle) The angle between the line overlying the maxilla and the line across the mentum tip and upper lip. Diagnostic criteria $<66^{\circ}$.

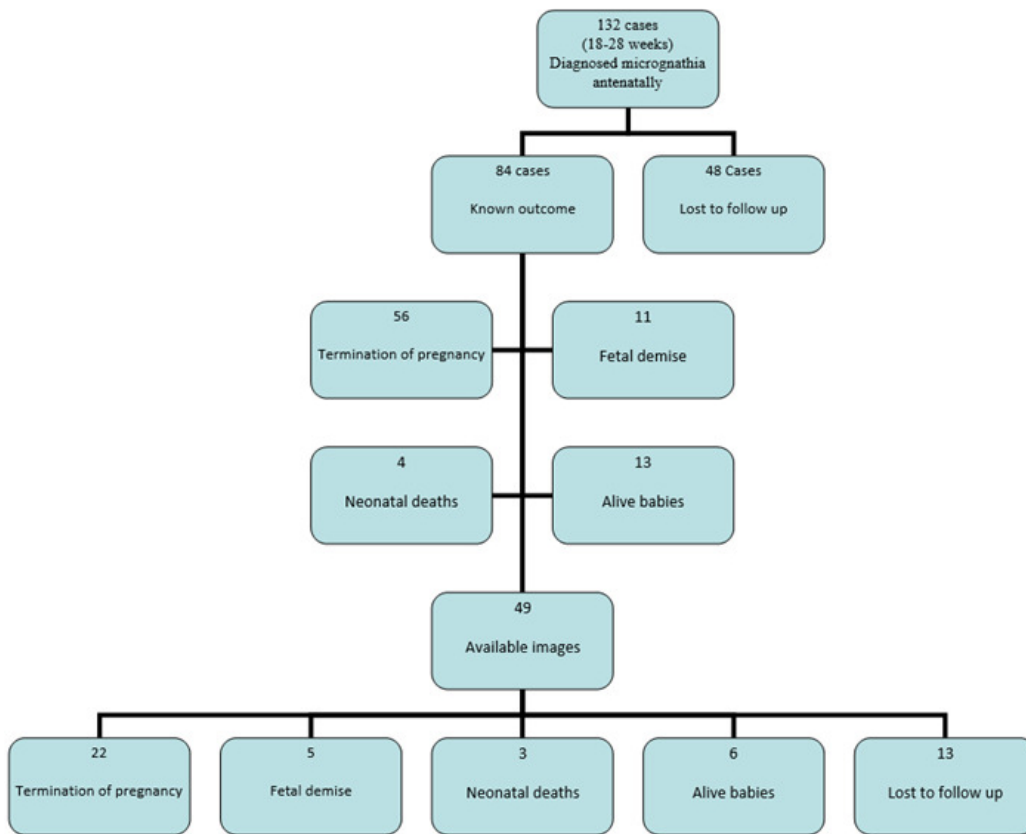


Figure 3: Flow chart

Table 1: reproducibility of 4 angles measurements

		Mean difference, degrees ± 95% Confidence Interval,	
		(%)	degrees (%)
IFA	intraoperator	0.45 (0.8)	5.35 (9.84)
	interoperator	9.04 (15.49)	20.4 (34.78)
FNMA	intraoperator	-0.12 (-0.09)	4.21 (3.47)
	interoperator	-3.84 (-3.17)	11.39 (9.46)
MNMA	intraoperator	0 (0.06)	3.04 (14.59)
	interoperator	2.87 (13.23)	6.31 (30.13)
FMA	intraoperator	0.4 (0.59)	5.21 (11.57)
	interoperator	3.93 (8.29)	20.91 (44.97)