

Detection of Intracranial Anomalies on *in utero* MRI in Ultrasound Diagnosed Fetal Ventriculomegaly

Earle, S ¹, Cliffe, H ², Craven, I ², Everett, TR ¹

1. Department of Fetal Medicine, Leeds Teaching Hospitals NHS Trust, Leeds, UK 2. Department of Radiology, Leeds Teaching Hospitals NHS Trust, Leeds, UK

Objectives

The MERIDIAN study found *in utero* Magnetic Resonance Imaging (iuMRI) to have greater diagnostic accuracy than specialist ultrasound for fetal brain abnormalities. The MERIDIAN study for ventriculomegaly alone (VM) also found iuMRI to alter prognostic category in nearly 25% of cases.

Establishing whether VM is truly isolated is also important for accurate prognostic counselling. In isolated VM pathogenic copy number variants are found in 10-13% but this is further increased with coexistent CNS anomalies.

This study aimed to establish the incidence of additional findings in fetuses with USS suspected isolated VM diagnosed in by a tertiary fetal medicine centre in a contemporary population .

Study Design & Methods

Study Design:
Retrospective Cohort Study

Methods:
All fetal brain iuMRIs performed for isolated dilatation of the lateral ventricles of $\geq 10\text{mm}$ between January 2018 to end December 2020 at the request of a tertiary Fetal Medicine Unit (Leeds General Infirmary) were included in the study. If additional anomalies were suspected (including agenesis of corpus callosum, dilatation of third ventricle or extracranial anomalies) these studies were excluded. Both unilateral and bilateral VM were included.

Results

105 iuMRI were performed for fetuses with suspected isolated VM on ultrasound. 94 were for mild-moderate VM $<15\text{mm}$; 11 were for severe VM ($\geq 15\text{mm}$). Of the 105 iuMRIs, 5 were repeat scans on fetuses for clinical indications.

Median gestation (completed weeks): 24 weeks (range: 20 - 38) at time of iuMRI
Median maternal age: 31 year (range: 17 - 42) at time of iuMRI

In cases of mild-moderate ($\geq 10\text{mm}$ to $<15\text{mm}$) VM, additional abnormalities were detected on iuMRI in 3/94 cases (3.2%): 1 cortical malformation, 1 possible lacunar infarction, 1 venous sinus thrombosis (figures 1 & 2).

Of the cases with severe VM, additional abnormalities were demonstrated on iuMRI in 7/11 (64%) cases. 3 cases identified aqueductal stenosis including coexisting with heterotopia; 1 case of holoprosencephaly variant with partial absence of the septum pellucidum; 2 cases of arterial infarction; 1 severe VM plus cerebellar hypoplasia (figure 2).

Conclusions

The incidence of additional MRI detected anomalies in isolated mild-moderate VM was low in our cohort. Although lower than reported in the MERIDIAN study, our findings are in keeping with the recent study published by the ESNO Working Group. In our cohort, as in MERIDIAN, there is a higher rate of additional abnormalities not evident on USS but detected by iuMRI in cases of severe VM. Careful neurosonography is important to ensure VM is truly isolated. Women presenting with isolated mild-moderate VM on USS performed by a fetal medicine unit can be largely reassured but should continue to be offered MRI given additional findings being in around 3%.

Figure 1. Isolated VM USS (a). Possible lacunar infarction iuMRI (b)

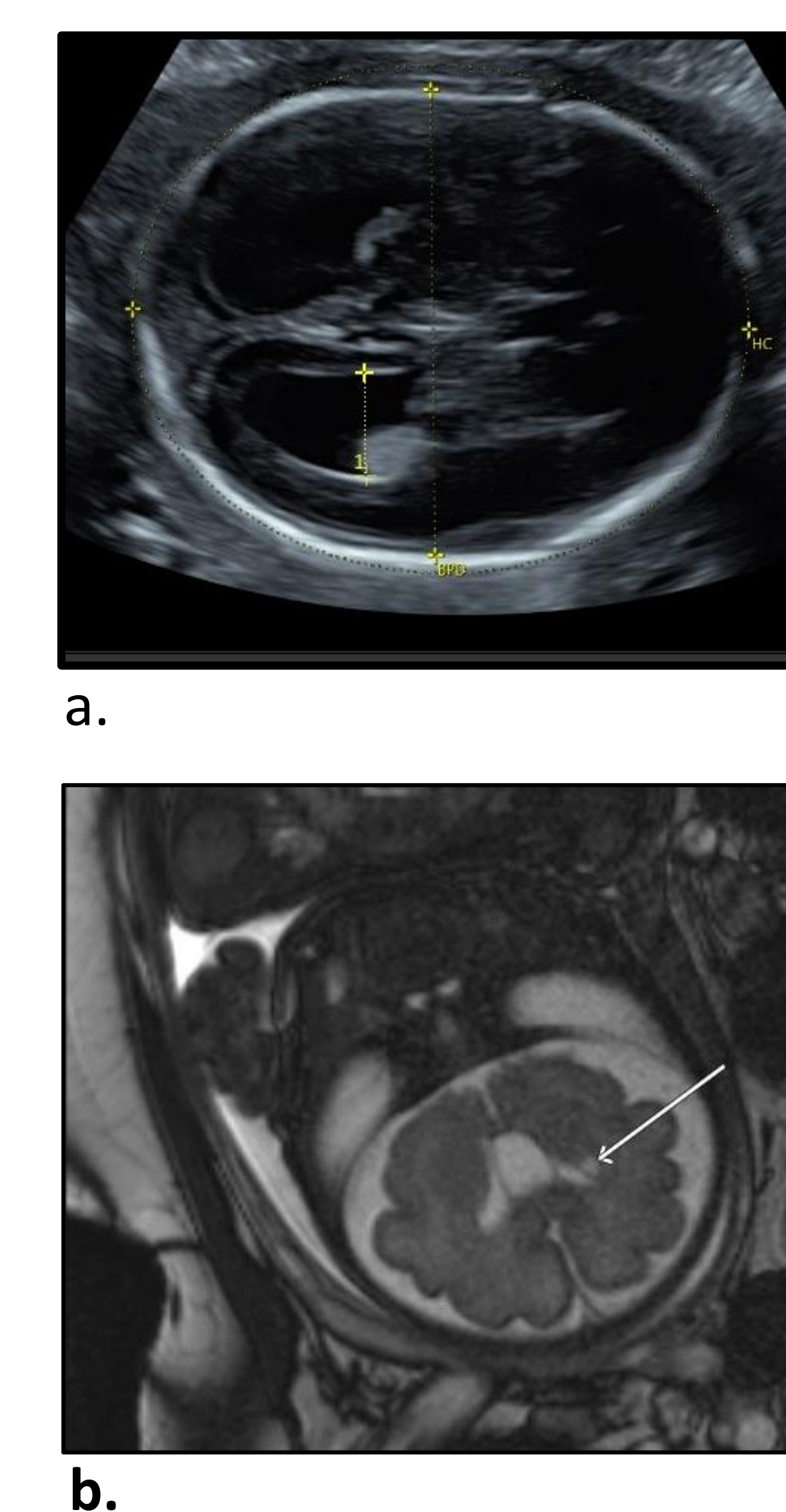


Figure 2. Additional findings identified on iuMRI compared to Fetal Medicine USS

