MEMO

To: Obstetrical care providers, BCW MAP US reporting MDs, sonographers and clerical staff

RE: **Referral to BCW Ob Ultrasound department for small fetal head biometry**

From: Dr Chantal Mayer, Medical lead BCW Ultrasound

Date: November 30, 2022

The objective of this communication is to clarify the BCW Obstetrical Ultrasound department's practice regarding referral for ultrasound assessment of the fetus with small biometric parameters of the fetal head.

1. **Referral for small head circumference (HC) <10th %ile for GA:**
   - **HC < 1% ile for GA**: referral to the Fetal diagnostic service (FDS) is indicated for evaluation and counselling for *possible* microcephaly. See notes below.
   - **HC between the 1st and the 10th %ile for GA –small HC**:
     - If *isolated* finding, a follow up to assess HC interval growth in 3-4 weeks is appropriate locally
       - Referral to BCW MFM is suggested if HC interval growth is reduced (ie less than 2 weeks growth over 4 weeks interval).
     - A referral to BCW FDS clinic is recommended for all non-isolated cases
     - Image and case review can be requested from BCW MFM when care provider is *uncertain if there is isolated small HC*
   - **Small HC** is considered an *isolated* finding when:
     - Routine fetal anatomical survey, including intracranial anatomy and amniotic fluid are reported as normal
     - Other biometric parameters measure within normal range:
       - AC > 10th %ile for GA
       - FL >1st %ile for GA

2. **Referral for small biparietal diameter (BPD):**
   - A referral for *isolated* small BPD <10th %ile or < 1st%ile for gestational is not clinically indicated. An isolated finding of small BPD is considered a normal variant and

specifically in the context of a normal HC, typically reflects moulding of the fetal head related to fetal position.
    - If small BPD is not an isolated finding, then referral pathway is informed by other ultrasound findings.
- Small BPD is considered an *isolated* finding when:
    - Routine fetal anatomical survey, including intracranial anatomy, and amniotic fluid volume measures within normal range
    - Other biometric parameters measure within normal range:
        - AC = or > 10th %ile for GA
        - HC = or > 10^{th} %ile for GA
        - FL >1^{st} %ile for GA

Referral for possible microcephaly: What does this mean?

A finding of a small head circumference of ultrasound does not necessarily mean that a diagnosis of microcephaly will be made or imply adverse neonatal or long term outcomes; an isolated small fetal head can be a normal variant. Microcephaly can have genetic, structural, metabolic or environmental cause due to teratogenic exposures including infectious causes (6). In the majority or cases, microcephaly is not diagnosed at birth but evolves during infancy and childhood (3).

Antenatal diagnosis of microcephaly is based on cut off values for HC percentiles or Standard deviations below the mean for a given gestational age. The greater the deviation, the higher the chance for adverse outcome (11). Various diagnostic cut offs have been proposed but microcephaly is most commonly defined as HC measuring less than or equal to 3 SD of the mean for gestational age (1,2). Using this cut off is associated with an approximate 50% -60% positive predictive value for a post-natal diagnosis of microcephaly (4,9). Positive predictive value approaches 100% when an antenatal cut off for HC of minus 4 SD of the mean or less is used (9). While standard fetal growth charts have different sensitivities, specificities and positive predictive values, none appears clearly superior to others in terms of accuracy (7,8,9). The incidence of microcephaly ranges between 0.5-20/10,000 live births (5).

Accuracy of antenatal diagnosis for microcephaly can be improved through a careful and thorough assessment in a specialized unit including detailed anatomical assessment including neurosonology assessment and features of congenital infections. Use of sex-specific chart (11), HC interval growth over time, assessment of fetal profile for frontal sloping (10), and for acrocephaly (pointed skull) due to cranial molding (12) are also helpful. In select cases, fetal MRI may also be indicated.

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