

## Title: Maternal Cleidocranial Dysplasia - An Exceptionally Rare Skeletal Syndrome with Clinical Implications

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**Background/Synopsis:** Cleidocranial dysplasia, formerly known as cleidocranial dysostosis (CCD), is an extremely rare form of non-lethal skeletal dysplasia thought to have a prevalence of 1 in 1,000,000 live births.<sup>1</sup> CCD is a wide spectral disorder, and clinical presentations range from mild and isolated dental anomalies to the classic triad of aplastic clavicles, delayed closure of fontanelles and dental abnormalities. Short stature is most common in individuals with CCD, and they often have recurrent sinus and ear infections. CCD is an autosomal dominant disorder associated with variants in the RUNX2 gene. Genetic counseling and prenatal or preimplantation genetic testing are recommended for individuals with a family history of CCD. Due to the high risk of fetal inheritance if a parent has CCD, routine prenatal monitoring should assess for ultrasound findings suggestive of the disorder, and serial growth and anatomy ultrasounds are recommended in the setting of suspected fetal CCD and other skeletal dysplasias.<sup>2</sup> Additional considerations for management of pregnancy include monitoring for cephalopelvic disproportion. Maternal CCD is associated with a 69% higher cesarean rate due to pelvic shape and size.<sup>3</sup> Delivery planning should also include anesthesia considerations, as spinal anesthesia and general anesthesia can be challenging due to spinal abnormalities and airway/dental complexities, respectively.<sup>4</sup>

**Objective/Purpose:** While fetal CCD has been described in a few prenatal diagnosis and ultrasound-related text and journals, there is a paucity of literature describing the management of pregnancy complicated by maternal CCD. This case report presents an opportunity to both characterize CCD and discuss appropriate prenatal care and delivery planning in the context of maternal CCD.

**Case Report:** A 24-year-old G1P0, height 4 ft 11 in, BMI 40 was referred to our high-risk OB Clinic for management of pregnancy in the setting of maternal cleidocranial dysplasia. The patient was diagnosed with CCD at birth and reportedly had no in utero indications of her condition and no known family history of CCD, suggesting a de novo gene mutation for this patient.

Non-invasive prenatal testing (NIPT), maternal gene carrier screening, and MS-AFP screening were negative. Genetic amniocentesis for evaluation of RUNX2 gene mutations was declined. A fetal anatomic survey at 20 weeks EGA and a subsequent fetal growth ultrasound at 28 weeks 5 days did not point toward fetal CCD as the fetal clavicle length, femur and other long bone lengths were in the normal range for gestational age. A subsequent growth and anatomy ultrasound at 32 weeks 5 days

revealed a physiologic pericardial effusion and fetal biometry at the 37th percentile for gestational age. Weekly biophysical profiles (BPP) were recommended to monitor the pericardial effusion, and a final fetal growth evaluation was scheduled for 4 weeks. Ultrasound at 36 weeks was notable for a normal fetal clavicle length, femur length at the 5th percentile and EFW of 2800 g, at the 33rd percentile. Ultimately, a primary cesarean section was recommended due to concern for cephalopelvic disproportion as well as a maternal history of multiple orthopedic surgeries, including numerous pelvic surgeries, and concern for fetal anomaly

The patient was delivered via primary cesarean section at 39 weeks EGA. Spinal anesthesia proved to be inadequate and general anesthesia was subsequently administered without incident. A vigorous neonate was delivered and cord blood was obtained for genetic screening for CCD a neonatal bone survey was obtained and returned normal. Maternal and neonatal courses were uncomplicated and both were discharged home on POD 3. Blood analysis was negative for RUNX2 sequence variants.

Conclusion: This case demonstrated the importance of multidisciplinary care, with genetic counseling, maternal and fetal monitoring, anesthesia and delivery management in an exceedingly rare case of maternal cleidocranial dysplasia.

#### References

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