Intrauterine Temporomandibular Joint Dislocation: Prenatal Sonographic Evaluation

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Running Title: Intrauterine TMJ dislocation

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Received: January 16, 2013
Revised: April 17, 2013
Accepted: May 1, 2013

doi:10.3121/cmr.2013.1148
ABSTRACT

Congenital temporomandibular joint (TMJ) diseases are very rare disorders and usually diagnosed in the childhood. Developmental disorders of the TMJ such as hypoplasia, hyperplasia and aplasia of the TMJ compartments are characterized TMJ dysfunction. In the childhood, these patients have a recurrent dislocation, pain and malocclusion. We present a 25-week fetus with unilateral TMJ dislocation with fluid retention in the joint diagnosed by ultrasonography. To the best of our knowledge, this is the first case of the TMJ dislocation diagnosed by ultrasonographic evaluation during the prenatal period.

Key Words: Prenatal diagnosis, Temporomandibular joint dislocation, Prenatal ultrasonography, Mandibular condylar hypoplasia

INTRODUCTION

The temporomandibular joint (TMJ) is typically completely differentiated in the 25–26 gestational week. About the TMJ development, several studies have been reported via the gross specimen or microscopic examinations of the post-mortem embryos. There are no scientific studies about the sonographic prenatal evaluation of the TMJ development and disorders.

We searched the MEDLINE database using a combination of keywords including ‘temporomandibular joint’, ‘prenatal diagnosis’ and ‘ultrasound’; however, no study or case
report was retrieved. Further, there are a few case reports have been reported regarding to the childhood TMJ dislocation\(^2\).\(^3\).

We report the first case of the TMJ dislocation which diagnosed incidentally by the real-time ultrasonographic evolution during the prenatal period.

**CASE REPORT**

A healthy 27-year-old woman within the 25\(^{th}\) week of her first pregnancy was referred to our clinic for a genetic sonogram, which was performed using a LOGIQ 9 ultrasound system (GE Healthcare) with linear (7.5–5 MHz) and convex (3.5 MHz) transducers.

In the right TMJ, fluid retention was observed in the joint capsule and mandibular condyle was in the normal position when the mouth is closed (Figure 1). As the jaw open, mandibular condyle displaced anterolateral position and was not reduced in the articular fossa during the examination (Figure 2A). The articular disk was not clearly visible with sonographic examination. The left mandibular condyle was in the normal position without fluid retention inside the joint (Figure 2B). We also measured the anterior/posterior (AP) and lateral diameters of the bilateral mandibular condyles. The right AP diameter of the mandibular condyle was measured 3 mm and the lateral diameter was measured 4.2 mm, whereas the left AP diameter of the mandibular condyle was measured was 3.6 mm and the lateral diameter was measured 4.6 mm. Furthermore, we
observed that the right mandibular condyle was smaller than the left side, and the right articular fossa was smaller than left side. This situation led us to believe that the dislocation could be due to hypoplasia. During the 35th weeks of gestation, we again evaluated the fetus with sonographic examination. Although the right condyle was normally positioned, fluid retention was observed in the right TMJ and the joint capsule appearance was seen thick and edematous. Mandibular condyle was seen hypoechoic with irregular contour (Figure 3). These findings, have showed that the deformation of the joint structure may be caused by repetitive dislocation of the right TMJ. During the examination, we couldn't evaluate the left TMJ because of the fetal position.

Three months after the birth we evaluated the fetus again. On the physical examination, minimal facial asymmetry and malocclusion was observed (Figure 4). Other systemic physical examination and laboratory findings were in normal limits. The mother not describe any problem about TMJ dislocation during breast feeding or locking of the jaw. The father of the fetus has a history of recurrent TMJ dislocation and locking of the jaw especially occurred after the yawning. The baby and father were referred to the oral and maxillofacial surgery department of another hospital for detailed examination and treatment therefore this unit is not established in our hospital yet.
DISCUSSION

Primary TMJ diseases comprise congenital and developmental alterations of TMJ which include hyperplasia, hypoplasia and aplasia of the joint structures.² During the TMJ development, the articular fossa is the first structure to become involved, usually in the 7-8 gestational weeks. The articular fossa begins to ossify between the 10 and 11th gestational weeks. The development process of the condylar cartilage occurred between the 10 and 11th gestational weeks from the accumulation of the mesenchymal cells laterally to Meckel's cartilage. During development, apikal endochondral ossification proceeds and creating a bony fusion with the body of the mandible. After the 7.5th week of gestation, the articular disk can be identified as a horizontal concentration of mesenchymal cells. Between the 19 and 20 weeks of gestation, typical fibrocartilaginous structure is already evident⁴-⁵. After the 25-26th weeks of gestation, all of the cellular and synovial components of the TMJ are completely differentiated. The jaw muscles, including the lateral pterygoid, masseter and temporal muscles were observed during the 9–10 gestational weeks, ¹⁻⁴ thereby allowing fetal jaw movements. It is known that forced jaw movements, such as yawning, may cause TMJ dislocation so fetal jaw movements could be the cause of TMJ dislocation after the 25-26th weeks of gestation,
Several hereditary musculoskeletal and connective tissue disorders, such as Ehlers-Danlos, may involve the TMJ and cause TMJ dislocation. In our case, the father of the fetus has recurrent TMJ dislocation but there is no history of other joints dislocation or hyper mobility which could be compatible with Ehlers Danlos syndrome.

Diagnoses of the TMJ disorders are largely based on the detailed images; however, a general clinical examination and patient inspection should be conducted before arranging for imaging procedures. Nevertheless, there is insufficient information and research regarding to the prenatal TMJ ultrasonography; for example, the lengths and masses of condyle or coronoid process still remain largely unknown. We observed that the most important physical factor of intrauterine TMJ evaluation was fetal position. In our case, the fetus was in the breech presentation; hence, TMJ could be easily evaluated.

Although the prenatal diagnosis of the TMJ disorders could be important for the early treatment, the evaluation of the TMJ in the prenatal period may not be necessary in the routine sonographic examinations. In conclusion, antenatal evaluation of the TMJ and diagnosis of the dislocation with real-time sonographic examination is feasible. We presented a case with a developmental disorder of the TMJ include condylar hypoplasia causing dislocation. The TMJ dislocation begins in the prenatal
period and repetitive dislocations may lead to any deformation of the joint structure.

REFERENCES

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Figure 1: The sagittal view of the right TMJ, mouth was closed and right mandibular condyle was in the normal position (large white arrow) with fluid retention in the joint (black arrow).

Figure 2: (A) Coronal oblique view of the right TMJ, mandibular condyle was dislocated to the anterolateral (thin white arrow) position, the temporal bone border (black arrows) is not continuous with the mandibular ramus. The temporal fossa viewed shallow (large white arrow). (B) Transverse oblique view of the left TMJ, the mandibular condyle (large white arrow) is normally positioned in a relation with the articular
fossa (thin white arrow). The temporal bone border (black arrow) is continuous with the mandibular ramus.

**Figure 3:** The right mandibular condyle seen hypoechoic with irregular contour (large white arrow). Fluid retention was seen in the TMJ. The appearance of the joint capsule was thick and edematous (open arrows).

**Figure 4:** After three months of the birth, frontal view of the infant mount was opened secondary to malocclusion and mild facial asymmetry was seen.