J. Fetal Med. (March 2015) 2:5–7
DOI 10.1007/s40556-015-0034-2

PRACTICE GUIDELINES

"First Things First": Fetal Nasal Bone Imaging in the First Trimester 11–13^{+6} Weeks Scan

Chinmayee Ratha[1] · **Ashok Khurana**[2]

Received: 26 February 2015 / Accepted: 22 April 2015 / Published online: 8 May 2015

Abstract The first trimester scan is an important tool of risk assessment for fetal aneuploidies. The presence or absence of fetal nasal bone is an important secondary marker for risk allocation. This article describes the method of obtaining an ideal image for assessment of fetal nasal bone during the 11–13^{+6} weeks scan.

Keywords First trimester scan · Fetal nasal bone · Absent nasal bone · First trimester aneuploidy scan · Nasal bone imaging

Introduction

The 11–13^{+6} weeks scan has been accepted as a good screening test for fetal aneuploidies. While the nuchal translucency (NT) remains the most sensitive marker for fetal aneuploidies, the addition of other markers like nasal bone evaluation, flow across the tricuspid valve, and ductus venosus flow have helped in improving the performance of the first trimester scan as a screening test [1].

This series of articles entitled "first things first", will elaborate on each important aspect of the imaging and interpretation of the first trimester, 11–13^{+6} weeks scan. This article is the second in the series and will elaborate the ideal method of imaging the nasal bone in this scan.

Paired nasal bones develop from intramembranous ossification of a membrane that covers the cartilaginous nasal capsule by 10 menstrual weeks [2]. At the time of the first trimester 11–13^{+6} weeks scan, the fetal nasal bone is visualized in the mid-sagittal section of the fetal face as an hyperechogenic line parallel to the nasal skin. The presence of well-ossified nasal bone at this stage of gestation is a reassuring feature and helps in reducing the risk of aneuploidies for the fetus while absent or hypoplastic nasal bone is associated with increased risk of fetal aneuploidies. It is, therefore, important that the fetal nasal bone is assessed correctly using the optimal imaging technique.

The protocol for assessing the presence or absence of the nasal bone has been given in detail on the Fetal Medicine Foundation website and is accessible for reference to all interested readers. The important points of this protocol are enumerated as follows [3]:

1. The gestational period must be 11–13 weeks and 6 days.
2. The magnification of the image should be such that the fetal head and thorax occupy the whole image.
3. A mid-sagittal view of the face should be obtained. This is defined by the presence of the echogenic tip of the nose and rectangular shape of the palate anteriorly, the translucent diencephalon in the centre, and the nuchal membrane posteriorly. Minor deviations from the exact mid-line plane would cause nonvisualization of the tip of the nose and visibility of the zygomatic process of the maxilla.
4. The ultrasound transducer should be held parallel to the direction of the nose and should be gently tilted from side to side to ensure that the nasal bone is seen separate from the nasal skin.
5. The echogenicity of the nasal bone should be greater than the skin overlying it. In this respect, the correct view of the nasal bone should demonstrate three

✉ Chinmayee Ratha
chinmayee3@gmail.com

[1] Department of Fetal Medicine, Rainbow Hospitals, Road No. 10, Banjara Hills, Hyderabad 500034, Telangana, India

[2] The Ultrasound Lab, New Delhi, India

distinct lines: the first two lines, which are proximal to the forehead, are horizontal and parallel to each other, resembling equals sign (=). The top line represents the skin and the bottom one, which is thicker and more echogenic than the overlying skin, represents the nasal bone. A third line, almost in continuity with the skin, but at a higher level, represents the tip of the nose.

6. When the nasal bone line appears as a thin line, less echogenic than the overlying skin, it suggests that the nasal bone is not yet ossified, and it is, therefore, classified as being absent.

Practical Tips for Properly Assessing the Nasal Bone in the First Trimester Scan

The process of obtaining the exact mid-sagittal section and optimizing the magnification with the fetal head and neck occupying the entire frame is explained in the first article of this series [4]. Once the fetal head and neck is seen occupying the entire frame, attention is focussed on the region between the forehead and the upper jaw. The nasal protuberance is seen clearly and there are three echogenic areas seen which represent the nasal bone, skin over the bone, and the echogenic tip of the nasal cartilage.

It is important to familiarize oneself with the appearance of the equals sign (=), the lower and more echogenic line representing the nasal bone. Only when these lines are clearly seen, the presence or absence of the nasal bone should be ascertained and incorporated as a marker for risk calculation during the NT scan. The ultrasound probe can be tilted slightly to optimize the visualization of the nasal bone to see the two lines distinctly with the nasal bone appearing definitely more echogenic than the overlying skin (Fig. 1). If an ideal image is obtained, presence or absence of nasal bone can be ascertained (Fig. 2).

Fig. 1 Fetal nasal bone—present

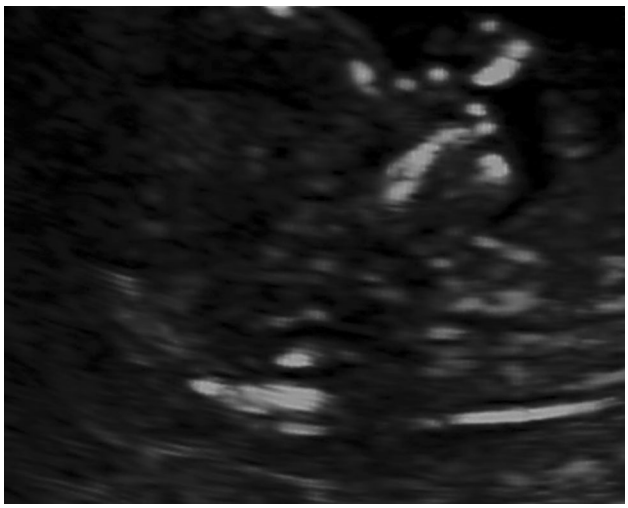

Fig. 2 Absent nasal bone

Fig. 3 Incorrect view for assessing fetal nasal bone—not a true mid-sagittal section

Fig. 4 Incorrect view for assessment of fetal nasal bone—not a perfect mid-sagittal section, gain is too high

In case these lines are not clearly seen or ideal image is not obtained, it is better to accept that the presence or absence of the nasal bone cannot be assessed and hence this factor cannot be used for aneuploidy risk calculation on that scan.

Some examples of unsatisfactory visualization of the nasal bone are shown here in an attempt to clarify the difference between correct and incorrect views (Figs. 3, 4).

The important point to note here is that nonvisualization of the nasal bone due to imperfect imaging should not be classified as "absent/hypoplastic nasal bone". Nasal bone is an important marker for risk calculation and hence assessment of presence or absence of the same is very important in maintaining the validity of the first trimester scan.

Conflict of interest None.

Funding None.

References

1. Cicero S, Curcio P, Papageorghiou A, et al. Absence of nasal bone in fetuses with trisomy 21 at 11–14 weeks' gestation: an observational study. Lancet. 2001;358:1665–7.
2. Sperber GH. Facial skeleton. Craniofacial Development. Hamilton: BC Decker Inc; 2001. p. 104.
3. FMF website https://fetalmedicine.org/nasal-bone. Accessed 10 Feb 2015.
4. Ratha C, Khurana A. First Things First: images for a proper nuchal translucency in the first trimester 11–13^{+6} weeks scan. J Fetal Med. 2014;1(2):55–7. doi:10.1007/s40556-014-0015-x.