

# Prenatal Diagnosis of the False Tendon of Left Ventricle: Mind the Band

Nupur Shah

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## ABSTRACT

The moderator band is seen in the apex of the right ventricle (RV) of the heart, whereas the left ventricle (LV) has a slipper-shaped smooth cavity with a clear apex. This accounts for an important distinguishing feature in fetal echocardiography, especially in assigning the morphology-sidedness. However, when one sees a band in the apex of the left-sided ventricle, the differentials of congenitally corrected transposition (ccTGA), ventricular inversion, and false tendon of the LV are commonly considered. The distinguishing features of these entities are described here, along with the presentation of a prenatally diagnosed case of false tendon of the LV. To my knowledge, this is one of the first articles explaining these differentials.

**Keywords:** Congenitally corrected transposition, False tendon, Fetal echocardiography, Left ventricle, Ventricular inversion.

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The moderator band is seen in the apex of the right ventricle (RV) of the heart, whereas the left ventricle (LV) has a slipper-shaped smooth cavity with a clear apex.<sup>1</sup> This accounts for an important distinguishing feature in fetal echocardiography, especially in assigning the morphology-sidedness. However, when one sees a band in the apex of the left-sided ventricle, the differentials of congenitally corrected transposition (ccTGA), ventricular inversion, echogenic focus in the LV, and false tendon of the LV are commonly considered.<sup>2,3</sup> The distinguishing features of these entities are described here, along with the presentation of a prenatally diagnosed case of false tendon of the LV. To my knowledge, this is one of the first articles explaining these differentials. This manuscript brings to light an important pitfall of prenatal cardiac imaging—the false tendon in the LV, which can commonly mislead to a diagnosis of cardiac defects. The implementation of the knowledge that false tendon of the LV is just a variant with fewer complications can help in avoiding misdiagnosis and unnecessary parental anxiety.

A 31-year-old, 4th gravida, with recurrent pregnancy loss, was referred for a second opinion at 22 weeks for suspicion of abnormal morphology of the left-sided ventricle. The left-sided

Department of Fetal Medicine, Baroda Imaging Centre, Vadodara, Gujarat, India

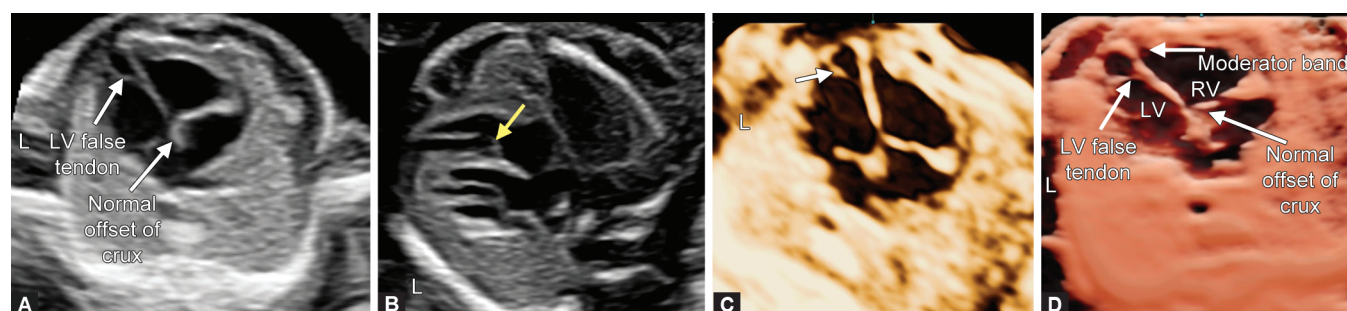
**Corresponding Author:** Nupur Shah, Department of Fetal Medicine, Baroda Imaging Centre, Vadodara, Gujarat, India, Phone: +91 9724768637, e-mail: nupurmshah@gmail.com

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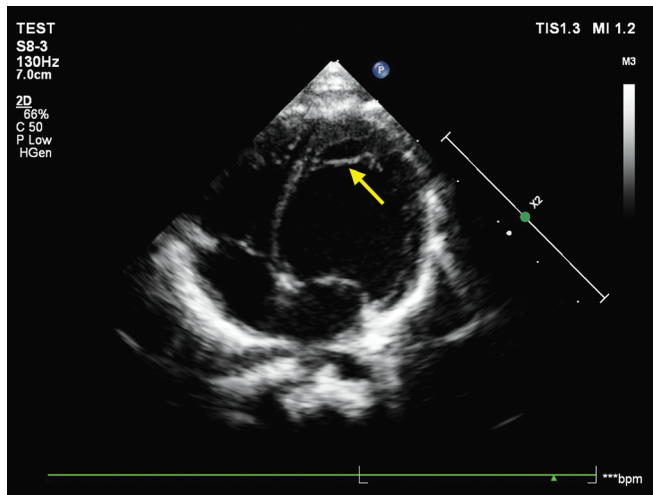
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ventricle in the four-chamber view showed a band at its apex, traversing from the septum to the free wall. The right-sided ventricle showed the moderator band and a trabeculated short cavity. The atrioventricular (AV) offset was normal, with the tricuspid valve apically placed compared to the mitral valve. On the septal view, the right-sided ventricle showed the normal septal wall insertion of papillary muscles, while the left-sided ventricle showed free wall insertion only (Fig. 1, Supplementary Video 1



**Fig. 1A to D:** Prenatal fetal echocardiography images: (A) Gray scale four-chamber view showing a band-like structure in apex of left side ventricle with normal offset of the crux; (B) Normal free wall insertion of the papillary muscles of left sided ventricle versus septal attachment in right-sided ventricle (arrow), establishing normal morphology-sidedness of the ventricles; (C, D) Three-dimensional spatiotemporal imaging correlation of four-chamber view showing the band in apex of left-sided ventricle, moderator band in the RV, and the normal offset of the crux. Above findings along with normal origin and relation of great arteries suffice for a diagnosis of false tendon of LV



**Fig. 2:** Postnatal echocardiography image of four-chamber view confirming false tendon in LV

and 2). Hence, the sidedness and morphology of the ventricles were established as normal.<sup>1–3</sup> The outflow tracts were normal in origin and relation. The diagnosis of false tendon of the LV with AV concordance and ventriculoarterial (VA) concordance was thus established, and the parents were reassured. They were explained about a small possibility of postnatal murmur, arrhythmia, and late-onset ventricular dysfunction (based on pediatric and adult literature).<sup>4–6</sup> The patient was followed up at 28 weeks and 32 weeks, with normal cardiac rhythm and the absence of any evolving cardiac anomaly. A female baby of 2800 gm was delivered at 38 weeks with a normal Apgar. The postnatal echo done by a pediatric cardiologist confirmed the findings of the false tendon in the LV (Fig. 2).

False tendon in the LV is an overlooked entity in prenatal imaging, sometimes leading to false assignment of the morphology and sidedness of the ventricles. The false tendon is a band-like fibrous structure between the interventricular septum (IVS) and the left ventricular free wall or papillary muscles, in the apex of the LV (4). They are usually considered a benign variant, although a few pediatric and adult cardiology research papers describe a minor association with innocent murmurs, arrhythmias, and late-onset ventricular dysfunction.<sup>4–6</sup> These abnormalities can be explained by its histopathologically proven composition, consisting of connective tissue, vessels, elements of the cardiac conduction system (bundle of His), and myocardial tissue.<sup>4,6</sup> Once a band in the apex of the LV is encountered at the time of fetal echocardiography, the next step would be to evaluate the ventricle morphology (based on papillary muscle attachment and search for the normal moderator band in the other ventricle), followed by evaluation of the crux (normal or reverse offset), and AV and VA relationships, so as to differentiate between the LV false tendon, ccTGA, and ventricular inversion. The crux offset is reversed in ccTGA as well as ventricular inversion but normal in the case of

the false tendon of the LV. In both ccTGA and ventricular inversion, the morphological RV is swapped to the left side. In the case of the false tendon of the LV, the normal morphology of the RV (moderator band and the septal attachment of papillary muscles) is retained, along with the normal AV and VA relationships. Associated mesocardia in cases of ccTGA may also be an additional differentiating feature. Also, there is AV as well as VA discordance in ccTGA, whereas there is only AV discordance in ventricular inversion. Knowledge of these important points would prevent false assignment of discordance-related defects and unnecessary referrals or parental anxiety. Another differential diagnosis can be an echogenic focus in the LV, which would appear as a bright echogenic dot in relation to the papillary muscle, whereas the false tendon will appear as a linear band stretching from the IVS to the LV free wall.

This letter thus highlights the possibility of a false tendon in the LV, reiterating the fact that a band in the LV apex should warrant thorough cardiac evaluation, keeping in mind the differentiating features from other entities with abnormal morphology of the left-sided ventricle (ccTGA and ventricular inversion).

## ACKNOWLEDGEMENT

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## SUPPLEMENTARY MATERIALS

The supplementary videos 1 and 2 are available online on the website of [www.ijfcm.com](http://www.ijfcm.com).

Video 1: Axial four chamber view showing band in the LV apex, moderator band in RV, and normal offset of the crux.

Video 2: Axial sweep from four chamber to three vessel view showing AV concordance and VA concordance.

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