

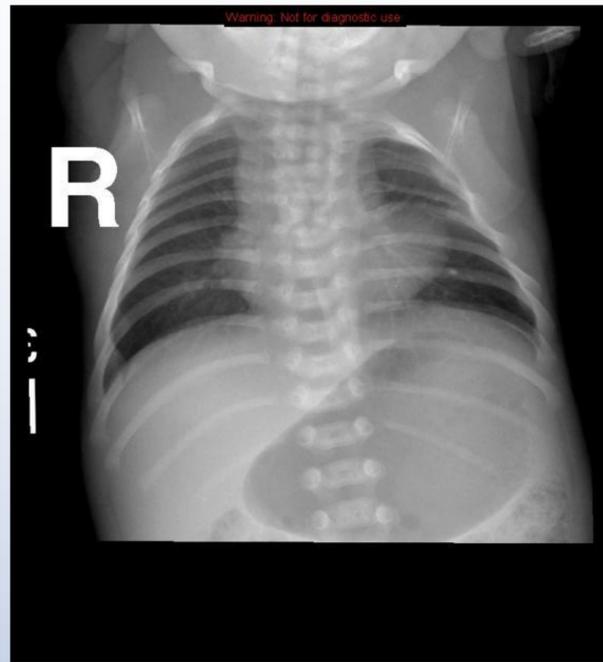
## Methods of Imaging

The congenital heart disease Tetralogy of Fallot (TOF) includes four heart defects: a ventricular septal defect, an overriding aorta, pulmonary stenosis, and right ventricular hypertrophy. Diagnosis can occur through a variety of imaging procedures. Once an individual exhibits clinical manifestations that suggest the presence of TOF, a chest radiograph and electrocardiogram will be performed.<sup>1</sup> Other methods of imaging, such as echocardiography, magnetic resonance imaging, computed tomography, or computed tomography angiography, will be utilized to determine anatomical details and the degree of severity of the defects present.<sup>2</sup>

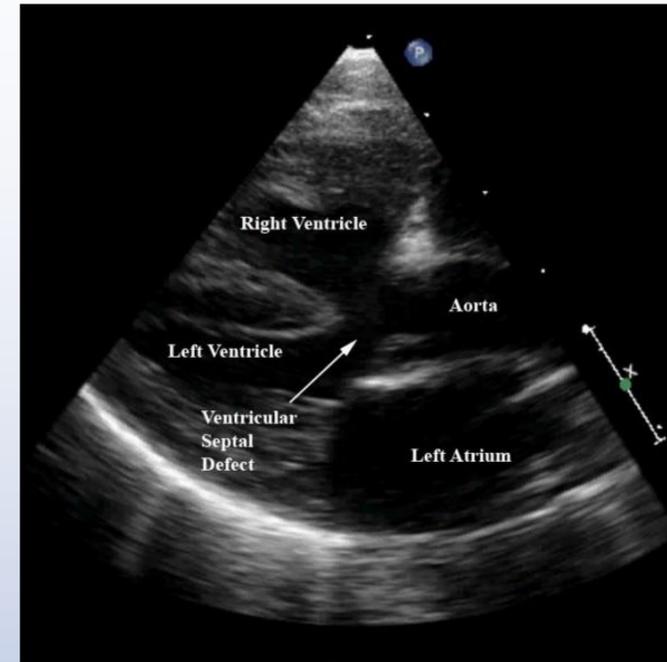
Echocardiography is typically the exam that will confirm a TOF diagnosis.<sup>1</sup> Each method of imaging has different benefits, and multiple modalities may be required to properly plan for surgical intervention.

## Imaging Findings

- A chest radiograph will demonstrate a “boot-shaped heart,” although this finding is more common in adults than infants (see Figure 1). It is also possible to visualize pulmonary oligoemia or a right-sided aortic arch.<sup>2</sup>
- Echocardiography is the primary method of diagnosis and is used to demonstrate each of the four abnormal anatomical defects (see Figure 2).<sup>2</sup>
- MRI is advantageous because of the lack of ionizing radiation and the ability to demonstrate anatomy in high detail. In particular, the degree of pulmonary artery stenosis and size of the pulmonary artery compared to the ascending aorta can be determined using MRI.<sup>2</sup>
- CT/CTA scans will demonstrate the degree of coronary artery involvement, as well as the anatomy of the aortopulmonary coronary vessels. CT can be used to assess anatomy following surgical intervention.<sup>2</sup>



**Figure 1.** Boot-shaped heart demonstrated on a chest radiograph of an infant.<sup>2</sup>



**Figure 2.** Ventricular septal defect demonstrated on an echocardiogram.<sup>1</sup>

## Imaging Steps in Diagnosis of TOF

Lesion is suspected due to clinical manifestations

Chest radiograph and electrocardiogram are performed<sup>1</sup>

Other imaging modalities used; diagnosis is confirmed with echocardiography<sup>1</sup>

Corrective or palliative surgery is performed

## Role of Echocardiography

Since hand-held echocardiography was introduced in 2010, various studies have been conducted to evaluate its accuracy and efficiency in diagnosing congenital heart defects. As a result of the positive results from such studies, echocardiography is now considered the “gold standard” in the process of imaging and diagnosing Tetralogy of Fallot. This procedure is less expensive than other modalities, such as cardiac MRI, and it can demonstrate highly accurate images of each defect, as well as details of blood flow through the heart.<sup>3</sup>

The absence of ionizing radiation is also a benefit to utilizing echocardiography, especially in infants. Pulmonary valve regurgitation, right ventricle size, and function of the heart after surgical intervention can all be accurately evaluated using echocardiography.<sup>3</sup> Additionally, the pulmonary arteries and degree of obstruction can be visualized. Doppler can be used to assess blood flow, flow rate, and regurgitation of the valves.<sup>4</sup> Limitations of echocardiography include the assessment of the associated anomalies of TOF that are outside of the heart, such as pulmonary atresia or peripheral pulmonary stenosis.<sup>2</sup>

## References

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