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Innocent Murmur in Babies, Children and Adolescents

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Introduction

Murmurs can be classified as systolic and diastolic murmurs. Some murmurs occur as a result of a restriction of flow across a cardiac valve, narrowed vessel or a hole in the heart. If the restriction of the valve, narrowing, or hole in the heart is severe enough, patients may require surgery to correct the area causing the murmur. Not all murmurs affect the heart, however, as some murmurs are normal variants. These murmurs are also known as innocent or musical murmurs. These murmurs don't cause any problems to the heart as the heart is completely normal. False tendons found in the left ventricle are a frequent cause of these innocent murmurs. The only way to know for sure if a murmur is innocent is to perform cardiac ultrasound also known as an echocardiogram [1]. An echocardiogram will show the left ventricular cavity and demonstrate if there is one or more false tendons across the left ventricular cavity. One is seen running across the LV mid-cavity and two are seen running across the LV apex.

These false tendons tend to stretch and vibrate when the patient has an infection, chest congestion or fever. This is the result of an increase in heart rate and flow velocity inside the left ventricle as the blood is ejected from the left ventricle into the aorta. During this time, the murmur may be more obvious or louder than when the patient is in good health. The term innocent refers to the fact that this type of murmur does not affect the heart at all [2]. Once it is determined that the only reason that the patient has a murmur is related to the presence of these false tendons, no follow up visit is required, and insurance companies would likely approve life insurance as these murmurs are considered a normal variant (Figure 1).

Innocent murmurs are also known as musical murmurs. This name is given due to the similarity between these false tendons inside the left ventricle and the strings of a guitar. As you tighten the guitar strings, the pitch changes and the sound increase similar to the velocity of flow inside the ventricle when the false tendons are tight, causing Many parents are concerned when they are referred to our clinic because their child has an innocent murmur. We take the time to explain to the parents and children (when appropriate according to their age) that a murmur only means a sound, it doesn't really mean that it is good or bad. Parents and patients are relieved when after doing an echocardiogram, we tell them that the reason for the murmur is the false tendons found in the left ventricle, that this is a normal variant and that no follow up visit is required as they have an anatomical normal heart. We performed an echocardiogram on 600 children over a period of two years whose only reason for referral to our clinic was a murmur. These patients ranged from 3 days of age to 17 years of age [3]. Forty-seven percent were male and fifty-three percent were female. We found that 41 children had a ventricular septal defect 37 had an atrial septal defect and related increased flow across the pulmonary valve (without pulmonary valve stenosis), 31 children had small proximal branch pulmonary arteries with at least mild gradient across one or both branch pulmonary arteries and 17 children had a patent ductus arteriosus (Figure 2). Twelve children had other more complex causes for their murmur, among those were coarctation of the aorta, tetralogy of fallot, and significant valvular stenosis or regurgitation [4].

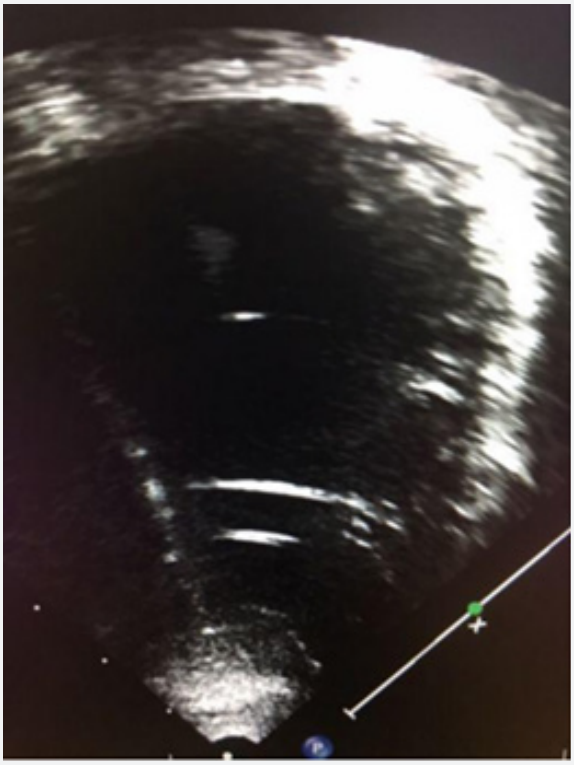

Figure 1: Echocardiographic image demonstrating false tendons in the left ventricle.

Figure 2: Illustration of guitar strings used as an analogy for false tendons causing musical murmurs.

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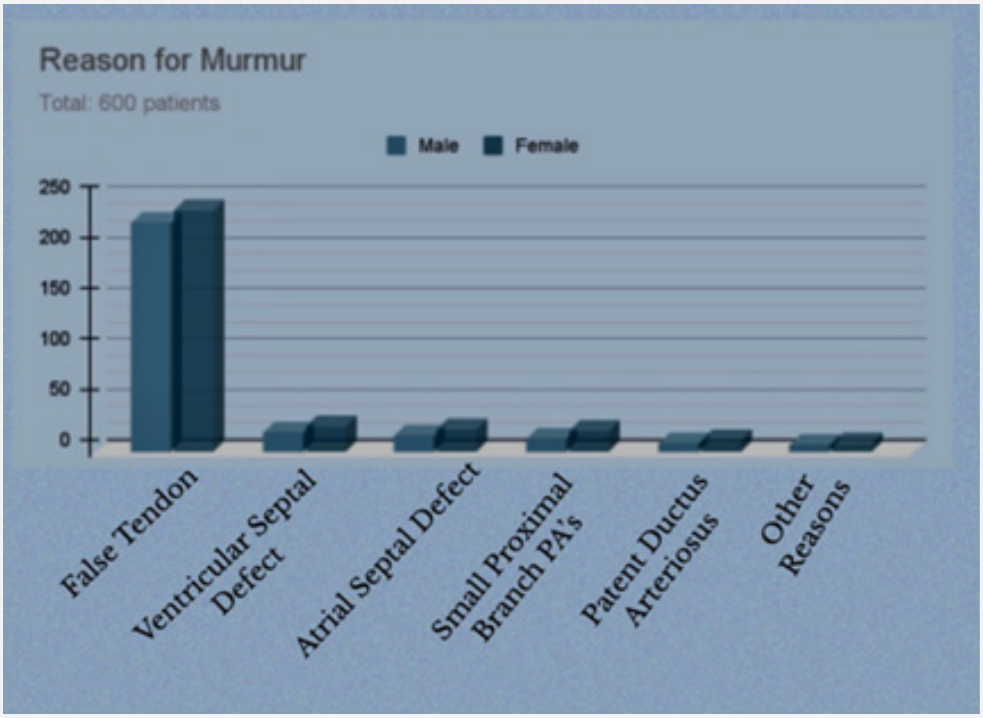

Figure 3: Distribution of echocardiographic findings among children referred for murmur evaluation.

In contrast, 462 patients (77%) who were referred to our clinic for a murmur had an anatomical normal heart and we found no other reason to explain their murmur except for one or more false tendons inside their left ventricles. Approximately 9 percent of these patients were believed to have a murmur at the time of referral, but we could not detect the murmur using a stethoscope at the time that they visited our clinic for our assessment. This also confirms the fact that some of these murmurs are better heard when the child has an infection or congestion at the time when they visit the pediatrician or the walk-in clinic than when the child is feeling well and comes to our clinic for cardiac evaluation and consultation (Figure 3).

It is critical to perform an echocardiogram when trying to determine the cause of a murmur to rule out an actual cardiac problem and to consider or plan for pharmacological, catheterization or surgical intervention in those severe cases where the patient presents with a non-innocent murmur. This also provides caregivers and parents peace of mind when an echocardiogram determines that the murmur is in fact an innocent or musical murmur and no further evaluation, testing or follow up visit may be required. These innocent murmurs tend to become quieter as children reach their later teen years or early twenties likely from the false tendon losing their flexibility with ageing.

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