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Innocent Murmurs

A Parent's Guide

Thomas Biancaniello, MD

Murmurs are sounds or noises made by blood as it flows through the heart and blood vessels of the body. Murmurs can be caused by abnormal flow patterns that occur when there are abnormalities of the heart valves, holes within the heart, or abnormal communications between blood vessels or between blood vessels and the heart. In infants and children, most murmurs originate through normal flow patterns, however, and are referred to as innocent, physiological, or normal murmurs. By *innocent*, we mean that there are no structural (anatomic) or functional (physiological) abnormalities of the heart and that the murmur comes from normal flow within a normal heart. *Innocent* is the preferred term because it strongly conveys that nothing is wrong, as opposed to the older term *functional*, which is not always clearly understood as being normal by parents and patients. Although murmurs termed innocent may be heard in virtually anyone, they are most often heard in childhood.

Although innocent murmurs may be prevalent mostly in childhood, the presence of murmur does not imply the presence of structural heart disease. Congenital heart defects, which are responsible for most of the heart problems in children in the developed

world, are structural abnormalities caused by errors in the development of the heart while the child is still in the womb. The heart starts out as a single tube and, during the first eight weeks of pregnancy, divides into four chambers and forms four major valves. If an error or errors occur during this process, a congenital heart defect may result. Fortunately, less than 1% of infants are born with heart defects.

Parents are often quite concerned when informed by the pediatrician or family practitioner that a murmur has been detected. The primary care practitioner may be quite comfortable identifying innocent murmurs and explaining them to parents. Referral to a pediatric cardiologist is made either if the practitioner is concerned or unsure of the nature of the murmur or if the parent requires or requests further assurance. The evaluation of the child by the pediatric cardiologist will include a complete assessment of the cardiovascular system, not just listening for murmurs, because there are some serious cardiovascular abnormalities that do not have murmurs.

Looking for clues of heart disease, the pediatric cardiologist will obtain a focused history from the parents. For infants, this will include birth history, feeding patterns, breathing difficulties,

color changes, growth pattern, and activity levels. For children, parents will be asked about activity capacity. For instance, can the child keep up with children of the same age while playing vigorously? Have there been complaints of shortness of breath or extra beats, skipped beats, racing of the heart (palpitations), or chest pain? Chest pain is a common complaint, but a cardiac cause is found in less than 1% of children complaining of chest pain. Has the child ever fainted? Although fainting occurs in about 15% of children before they reach 21 years of age, it is not usually caused by primary heart problems. The pediatric cardiologist will want to know whether fainting has occurred and under what circumstances in order to exclude cardiac causes.

An accurate family history is extremely important in assessing the child because congenital heart defects are 3 to 4 times more frequent in families in which a close relative has been born with a heart defect. In addition, the condition hypertrophic cardiomyopathy, a primary muscle disorder of the heart, is an inherited condition that may cause sudden unexpected death, especially during or after vigorous exercise in young people.

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Physical examination of the child will include an assessment of general appearance, color, respiratory effort, and vital signs, including heart rate, respiratory rate, and blood pressure. The vital signs will be compared with age-established norms. The neck is evaluated for prominence of vessels and abnormal pulsation and is listened to for transmitted murmurs (bruits). The lungs are listened to for abnormalities of the breath sounds. The pulses in the arms and legs are checked. If the pulses are not equal, a narrowing of the main artery to the body (coarctation of the aorta) may be present, causing increased blood pressure in the upper body with lower blood pressure in the lower body. If this serious condition is not diagnosed, it can lead to considerable problems for the infant or child immediately or in the future.

Examination of the heart begins with observation and palpation of the chest for abnormal impulses that signify increased muscle activity of the ventricles or main pumping chambers. The heart is then listened to with the stethoscope—first, for the normal sounds of the valves closing (the lub-dub). Extra sounds may also be present from the filling of the ventricles (gallop sounds), which may signal a heart having difficulty keeping up with the demands placed on it.

Properties of a Murmur (Used in Identification)

- *Timing*—when during the cardiac cycle they occur
- *Location*—where in the heart they may originate
- *Quality or pitch*—how they sound. This is important in differentiating normal flow murmurs from the abnormal.
- *Intensity or loudness*—does not necessarily define the severity, but changes in intensity may help determine the type of murmur being heard.
- *Presence of an extra sound called “a click”*

Innocent or normal murmurs are murmurs produced by normal blood flow. Therefore, changing the flow should change the intensity (loudness) of the murmur. Characteristically, maneuvers that decrease blood flow returning to the heart through the venous system do decrease the intensity of the murmurs, indicating that the murmur is innocent. Changing the child's position during the examination from supine (lying down) to sitting, standing, and squatting will change the flow and is very useful in helping to define innocent murmurs. The child may be

asked to push out the abdomen or bear down. This is termed a Valsalva maneuver, which reduces blood flow to the heart and will reduce the intensity of innocent murmurs.

An electrocardiogram (ECG) is usually part of the evaluation, and further testing is not needed in the overwhelming majority of infants and children to make the diagnosis of an innocent murmur. Because of the characteristics of the sounds and the maneuvers that can be used to identify them as flow-related phenomenon, these murmurs can be correctly identified without further testing.

After concluding that the murmur or murmurs (a child may have more than one kind) are innocent, the pediatric cardiologist explains the findings to the parents and child. Sometimes, parents have been promised that children will outgrow these murmurs, but this is not necessarily true because adults can have such murmurs too. Because the heart is normal, whether or not the murmur disappears or changes is of no consequence. Additionally, because change in blood flow can change the nature of the murmur, with growth and the changing configuration of the chest and heart dynamics, murmurs may change, disappear, and reappear at various times. This, in fact, is further evidence that the murmurs are indeed flow related and innocent.