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Cardiovascular *Student's Corner*

Student's Corner 7

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Quick Response Code:

1. Why atrial septal defect (ASD) does not develop heart failure in childhood?

Answer:

Prof. Anita Saxena

The development of heart failure is secondary to left to right shunt, depends on a number of factors, and as we know that in ventricular septal defect (VSD) and patent ductus arteriosus (PDA) large, there is usually presented in infancy with heart failure; however, (ASD) atrial septal defect differs from VSD and PDA in that there is only volume overload of the right ventricle and not pressure overload and right ventricle can withstand volume overload very well, that is, the reason why ASDs do not go into failure even if left to right shunt is large. It also must be known that about 3–5% of the ASDs are to develop failure in infancy but that is usually because of association with one of the conditions like a mitral valve disease or left ventricular (LV) inflow obstruction sometimes caused by large coronary sinus.

Prof. Vijayalaxmi

The patient with ASD does not develop heart failure in childhood because the right ventricular (RV) compliance is more and also pulmonary artery pressure is low and as a result easily whatever the left to right shunt occurs at the atrial level passes through the pulmonary arteries and as a result, there are no impedance and no congestive cardiac failure in children. Only when they grow up and they become adult, pulmonary arterial hypertension increases and then atrial fibrillation occurs then only they develop congestive cardiac failure otherwise in children, we do not get a congestive cardiac failure.

2. Mechanism of RTI in shunt lesions

Answer:

Prof. Anita Saxena

The recurrence of pneumonia or lower respiratory infections in shunt lesions with a left to right shunt with large VSD and PDA is related to multiple factors. These factors include increased pulmonary blood flow or pulmonary overcirculation, pulmonary edema in some cases then they could also be associated with conditions like primary lung pathology sometimes, it is associated with shunt lesions and it could be because of malnutrition associated with large shunts and in some cases, it could be because of immunodeficiency.

Prof. Vijayalaxmi

The repeated respiratory infection is an important symptom especially in large post-tricuspid left to right shunts. Due to increased pulmonary blood flow in large left to right shunt, the pulmonary arteries get engorged and these engorged pulmonary arteries, they compress the adjacent bronchi and bronchioles causing the microatelectasis and stasis of the secretion. On the other hand, increased blood flow leads to hypertrophy of the goblet cells causing increased mucous secretion. Apart from increased secretion of mucus and stasis due to atelectasis, there is abnormal ciliary movement that does not clear the secretions adequately. Hence, these stagnant mucous form a nidus for infection and this infection is the in the form of bronchopneumonia. These are the mechanism for repeated respiratory infections. These children with increased catabolism have the low body immunity and as a result, they repeatedly get lower respiratory tract infections.

3. Clinically should be say significant L to R shunt as 1.5:1 or 2:1

Answer:

Prof. Anita Saxena

Conventionally, shunt more than 1.5:1 is considered significant and more than 2:1 is considered as large. This is possible at the bedside, and therefore, this cutoff of 2:1 or 1.5:1 has been taken whenever the shunt is more than 2:1, one is likely to see flow murmurs, for example, a mid-diastolic murmur at the apex in a VSD or PDA and tricuspid flow murmur at the lower left sternal border in ASD. Shunt between 1.5:1 and 2:1 will only give third heart sound like an RV or LV third heart sound but will not give mid-diastolic murmur anything <1.5:1 is considered insignificant.

Prof. Vijayalaxmi

Whenever there is a large left to right shunt if there is a MDM that is the flow MDM in the mitral area that means the VSD is large and the shunt is more than 1.5:1 and if the MDM is there on the tricuspid area in a case of ASD then the ASD is more than 1.5 or 2:1 and this explains that there is a large shunt and apart from that in case of VSD, the murmur which is crescendo decrescendo becomes a decrescendo when the murmur becomes soft decrescendo and shorter that means there is a large VSD with 2:1 shunt. Hemodynamically, significant shunt is 1.5:1 and >2:1 shunt is a large shunt.

4. Carvallo Sign in ASD

Answer:

Prof. Anita Saxena

Carvallo sign refers to an increase in the murmur of tricuspid regurgitation with inspiration and this has been well described in patients with ASD also, especially those who have LV inflow obstruction like mitral stenosis and Lutembacher's syndrome.

Prof. Vijayalaxmi

Carvallo sign is the tricuspid regurgitation murmur which becomes accentuated during inspiration. During inspiration, the venous return to the right atrium increases and as a result, the right ventricle has to pump more blood and the TR becomes accentuated. If the pansystolic murmur gets accentuated during inspiration and this murmur is not conducting to the axilla that means this pansystolic murmur due to the TR and not due to MR. The TR murmur accentuating during inspiration is called as Carabello sign.

5. In ASD what leg raising causes the effect on the murmur which did not occur due to respiration?

Prof. Vijayalaxmi

The passive leg raising increases the venous return to the right atrium and, hence, the right ventricle pumps more blood through the pulmonary valve and as a result along with the left to right shunt in ASD also the increase venous return leads to increase in the flow across the normal pulmonary valve. Hence, the functional flow murmur across the pulmonary valve gets accentuated during the passive leg raising test.

Declaration of patient consent

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Conflicts of interest

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