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Recurrent Episodes of Symptomatic Paroxysmal Atrial Tachycardia in a Patient with Congenitally Repaired Transposition of Great Arteries and Coarctation of the Aorta

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ABSTARCT

Congenital heart disease is one of the leading causes of arrhythmias in the adult population. A structural defect in the heart provides a substrate for abnormal heart rhythms. It is postulated that about one third of the population with congenital heart disease will develop arrhythmias in adulthood with majority of atrial origin. Sudden cardiac death from life threatening ventricular arrhythmias are of uttermost concern. Early repair or correction has been found to ameliorate the risk of future arrhythmias and other complications significantly. Nevertheless, the increased incidence of cardiac procedures such as cardioversions, ablation and device utilization such as ICD speaks volumes which cannot be ignored.

Transposition of the great arteries is one of the congenital cyanotic heart diseases. A disruption of the normal anatomy whereby there is a reversal of heart chamber functions, direction of blood flow and conduit leads to changes in pressure and volume gradient which could be detrimental to the heart. In TGA prior to repair, the aorta which opens into the right ventricle carries oxygen poor blood to the body and the pulmonary artery carries oxygen rich blood to the lungs. These creates a hypoxic state in the infant's heart, compensatory polycythemia with long term consequences such as increased susceptibility to arrhythmias.

CASE PRESENTATION

Patient is a 43 years old male with a history of hypertension, atrial flutter, atrial fibrillation ,4 DCCV, congenital transposition of the great arteries and coarctation of the aorta status post senning procedure repair at 7 month and 11 years respectively who presented with complaints of a fluttering sensation in the chest while in the gym. He had heart rates in the 200, felt dizzy and light headed but no syncopal episode or chest pain. This was followed by a downward trend in heart rate to 57. Patient thus presented in ER for further evaluation. On presentation patient was tachycardic, heart rate 120 bpm, precordial examination unremarkable. EKG showed ectopic atrial tachycardia with RVH, right axis deviation and repolarization abnormalities (Figure 1). Previous

EKG showed atrial flutter with 2:1 block. Urine drug screen, TFT, Troponins were all normal. Echocardiogram showed findings consistent with Senning repair of transposed great arteries, with widely patent baffles, mild Mitral and tricuspid valve regurgitation. We pursued rate control with metoprolol, continued home anticoagulation Eliquis and monitored patient on telemetry with long term plans for future ablation.

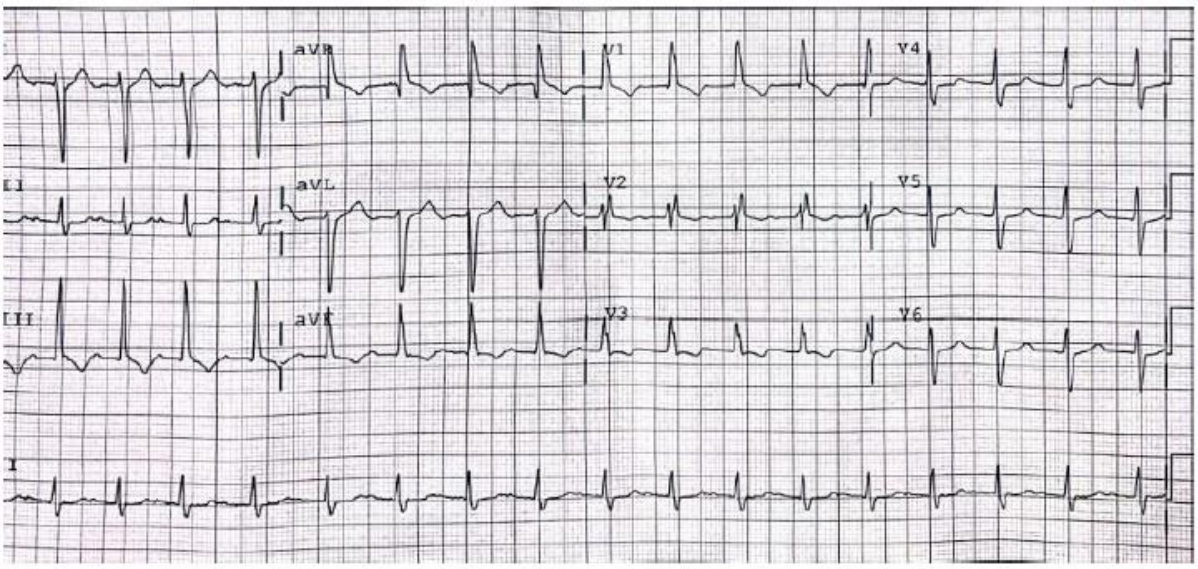

Figure 1: EKG showed ectopic atrial tachycardia with RVH, right axis deviation and repolarization abnormalities.

DISCUSSION

Congenital heart disease is associated with a high burden of arrhythmias with supraventricular being the commonest. The increased risk of life-threatening arrhythmias is of uttermost concern. When compared with other congenital heart diseases, the Cyanotic ones appear to have the highest contribution to this effect. Even when corrected, hypoxic insults created in the neonatal period could have long term consequences in adult life. Hypoxia creates significant scarring and vasoconstriction in vascular beds leading to increased vascular resistance. The discordant connections in TGA whereby the aorta is connected to a low-pressure right ventricle and distributes blood to a high- pressure systemic circulation leads to volume and pressure changes in the ventricle. These pressure changes manifests as Right ventricular hypertrophy with R wave amplitude > 7mm and right axis deviation as noted on the EKG. Cumulatively, this results in structural changes in the heart providing a perfect substrate for conduction abnormalities and increased risk of arrhythmias.

Atrial arrhythmias be it atrial-flutter or fibrillation and intra-atrial reentrant tachycardia are quite common In patients post-repair of TGA with an estimated 25%. Management depends on hemodynamic status, frequency of occurrence and acuity at presentation. Rate control is achieved with beta blockers and calcium channel blockers. Patients with hemodynamic instability usually require cardioversion. Radiofrequency ablation is reserved for patients with recurrent atrial tachycardias.

CONCLUSION

Recurrent atrial tachycardias are more common in patients with congenitally repaired transposition of the great arteries when compared with the general population. This translates to frequent cardiac procedures such as

DCCV, pacemaker insertion and RFA. Recognizing indices for frequent readmissions could help guide early intervention and set long term treatment goals.