

## **A RARE CASE OF PULMONARY EMBOLISM WITH DEEP VEIN THROMBOSIS IN A 10 YEAR OLD GIRL WITH A SMALL ASD ON FOLLOW UP**

**DR.ARUN SHRIRAM AMUDHAN<sup>1</sup> , DR. HAMSA V S<sup>2</sup>**

Assistant professor<sup>1</sup> and postgraduate<sup>2</sup>, Department of paediatrics, Sree Balaji medical College and hospital  
Corresponding Author:

**DR.ARUN SHRIRAM AMUDHAN** Department of pediatrics,  
Sree Balaji medical college and hospital, Chromepet, Chennai-600044.

Email id: aruxsxsnsriramamudhan@gmail.com

### **ABSTRACT**

Atrial septal defect is a congenital acyanotic heart disease that can cause increased frequency of thrombotic episodes such as deep venous thrombosis . This can be due to alteration of blood flow ,increase in pro coagulation factors and increased inflammation . Deep venous thrombosis can be a common cause of pulmonary embolism , when a thrombus gets dislodged and blocks the main pulmonary artery or its segmental branches and can cause significant hemodynamic compromise . An acute Pulmonary embolism can have varied presentations ranging from a gradually progressing dyspnea to a significant hemodynamic disturbance presenting with chest pain , severe dyspnea , syncope and palpitations and can have lethal complications . Here , we describe a case report of a 10 year female child with a small ostium secundum atrial septal defect on regular follow up who presented with giddiness, and one episode of syncope. There was a History of Progressive tiredness to physical activity over the past few months . Child had tachycardia , tachypnea and decreased oxygen saturation . Chest X-Ray showed bilateral pulmonary infiltrates , atelectasis , and wedge shaped pulmonary opacities .ECG showed sinus tachycardia , Right Ventricular strain pattern , Right atrial and Right Ventricular enlargement .Echocardiogram with doppler study showed small OS ASD with right atrial and ventricular dilatation and pulmonary artery hypertension . D-Dimer , Hs-TnT levels , CPK-MB levels were elevated . PT/INR levels , Antithrombin III levels , protein C & protein S levels were all within normal limits .There was no factor V leiden mutation detected . CT Pulmonary angiography showed bilateral pulmonary artery thrombus extending to segmental arteries. Doppler study of bilateral lower limbs showed deep vein thrombosis in the left calf . The child was managed on

anticoagulation with low molecular weight heparin and other supportive measures . The child improved and was discharged on oral warfarin .

**KEY WORDS:** PULMONARY THROMBOEMBOLISM ,ATRIAL SEPTAL DEFECT,DEEP VEIN THROMBOSIS,CONGENITAL HEART DISEASE

### **INTRODUCTION**

Pulmonary thromboembolism (PE) is an uncommon disease in the pediatric population.<sup>1</sup>It. can cause significant mortality and morbidity . There is an Imbalance between procoagulant factors and fibrinolysis.<sup>2</sup> It can arise due to Inherited and acquired thrombophilic conditions. Children generally have a good cardiopulmonary reserve so that even a large Pulmonary Embolism in the pediatric patient can be adequately compensated resulting in patients presenting with only subtle clinical signs and symptoms.<sup>3</sup>

Atrial septal defect (ASD) is a common type of congenital heart disease .<sup>4</sup> Pulmonary embolism (PE)is one of the complications that can arise from an ASD. PE is one of the diseases that can cause sudden death . Paediatricians should be aware of this condition for immediate action. Majority of pulmonary embolisms are due to deep venous thrombosis (DVT) in the lower limbs<sup>5</sup>

### **CASE REPORT**

A 10 year old girl with a small ASD of 6mm presented on follow up with giddiness, and one episode of syncope. History of

Progressive tiredness to physical activity was present over the past few months.

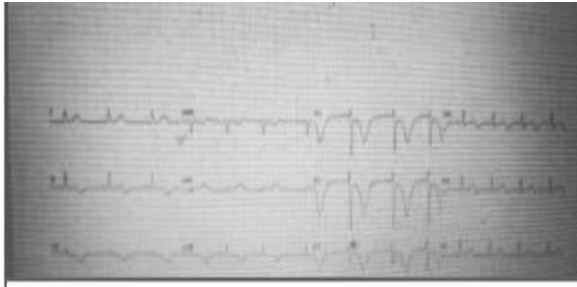
ON EXAMINATION - Tachypnoea (36/min) , tachycardia ( 140/ min ) with , normotensive ( Blood Pressure 100/60mmHg in the left upper limb in supine posture , Hypoxemia (spO2 90-92% in Room air improvising to 99% with face mask oxygen ) , Afebrile (oral temperature 98.6 F )

### **INVESTIGATION**

- Complete Blood counts – Normal
- Chest X Ray - infiltrates,atelectasis and a pyramid shape infiltrate with peak directed to hilus ( hampton's hump)<sup>6</sup>

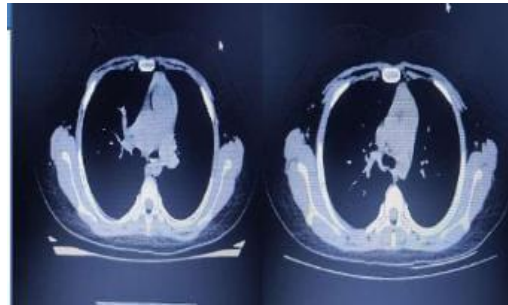
- ECG - sinus tachycardia , Right Ventricular strain pattern (deep T wave inversion in v1-v4,LI, II,III , avF ) , Right atrial enlargement ( P pulmonale ) , Right Ventricular enlargement .(FIG 1)
- ECHO - RV, RA dilation, pulmonary artery pressure elevated, biventricular contractility normal. 6mm ASD Left to Right shunt(FIG 2 )
- Highly sensitive Troponin T levels (Hs-TnT ) were elevated 61 & 52 ng/L on Day 1 and 2 respectively
- CPK- MB Levels elevated ( 86 U/L ) .
- Inflammatory markers were elevated. D-dimer 7607 ng/ml , NT-proBNP levels 1583 pg/ml , S. Ferritin 53.4 ng/ml , LDH was 289 IU/L .
- PT/INR - 13.8/1.08.
- Homocysteine level - 13.36 micromol / L (upper level of normal).
- ANTITHROMBIN III-20.6mg/dl
- Protein C Antigen -84.4%
- protein S Antigen-98.2%
- factor v leiden (mutation analysis RT-PCR)-Not detected
- CT Pulmonary angiography - bilateral pulmonary artery thrombus extending to segmental arteries(FIG 3)  
7,8,
- Bilateral lower limbs Doppler study - deep vein thrombosis in the left calf.<sup>9,10</sup>





**FIG 1:** ECG -deep T wave inversion in v1-v4,LI, II,III, avF.  
thrombosis in the left calf

**FIG 2:**Doppler study - deep vein



**FIG 3:** CT Pulmonary angiography - Bilateral pulmonary artery  
thrombus extending to segmental arteries.

## **TREATMENT**

Child was Started on low molecular weight heparin infusion at 10U/kg/hr and symptoms dramatically improved . Child was then continued on subcutaneous low molecular weight heparin at 1U/kg. Child

was discharged with oral warfarin . Child is now on regular follow up with warfarin adjusted according to target INR value of 2-3 .<sup>11</sup>

## **DISCUSSION**

- Pediatric Pulmonary Embolism remains an important clinical entity that can cause significant mortality and morbidity
- Even a large Pulmonary Embolism can be compensated adequately , so that the patient will present with only subtle clinical signs and symptoms.
- Patients can present with Acute right heart failure, hypotension, dysrhythmia, syncope, and unexplained tachypnea
- In particular , Tachypnea is an important clue for Pulmonary Embolism in the pediatric age group
- Newer Computed Tomography Pulmonary Angiography (CT-PA ) and Magnetic Resonance Imaging (MRI ) techniques increase diagnostic accuracy in Pulmonary Embolism .<sup>12,13,14</sup>
- Anticoagulant agents are the main treatment modality – Unfractionated Heparin, Low Molecular Weight Heparin & oral anticoagulants.
- Future studies are needed for an early accurate diagnosis and treatment of Pulmonary Embolism in children
- Paradoxical embolism can arise in congenital shunt diseases such as atrial septal defects when a thrombus enters the systemic circulation through the shunt defect.

## **CONCLUSION**

Pulmonary embolism can have varied causes ranging from inherited to acquired disorders of coagulation and thrombosis , It mostly occurs as a result of deep venous thrombosis. Congenital heart defects can be an important contributor to this process . The clinical presentation can be vague and can even be a cause of sudden death . Clinicians must be aware of this clinical entity to provide timely diagnosis and cure.<sup>16</sup>

## **CONFLICT OF INTEREST:**

Authors declare no conflict of interest

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