

# Left Atrium (LA ) Compression / Impression : Unusual Cause ?

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## Abstract

Patient presenting with breathlessness has a variety of reasons in the middle age. Apart from respiratory, metabolic, cardiac, infectious, cases have been reported in the literature with compression/impression of Left Atrium (LA) by extracardiac structures like the gastrointestinal tract, aorta / intrapericardial , pulmonary and mediastinal structures. Amongst mediastinal compression, no case has been reported to date due to compression by the dorsal spine. We report such a case of compression of LA due to the dorsal spine, secondary to trauma at a young age, and presenting in the middle age with increasing breathlessness.

## Introduction:

Transthoracic echocardiography is capable enough to assess anatomical , functional , haemodynamic abnormalities (1). In a case of normal left ventricle systolic function , the symptoms like exercise intolerance , dyspnoea on easy fatigue ability draws attention towards pathologies to structure dorsal to left atrium i.e. extra cardiac pathologies which are well described below but Left Atrium (LA ) compression / impression by dorsum of spine is not reported in literature.

## Case Presentation :

We report an unusual case of LA impression , where the compression was caused by unusual structure , not reported in the literature .

43 years old female presented to us with marked breathlessness ( even on slight exertion of going to toilet ) for past 10 years with recent worsening of symptoms to NYHA III -IV. She also complaints of occasional hemoptysis and frequent history of recurrent paroxysmal nocturnal dyspnoea. She relates to her illness with history of fall on staircase approximately 10 years prior to presentation. Patient gives history of backache also since 10 years. No history of fever is present. Physical examination revealed pulse of 110/mt , BP of 100/70 mm Hg ( right arm supine position ), respiratory rate of 24 /minute. On auscultation , first heart sound was heard with mid diastolic rumble over precordium. The second heart sound was normally heard with loud pulmonary component. Xray chest was normal. ECG showed partial RBBB with right axis deviations(Fig.1).

Echo showed evidence of LA compression/ impression by a posterior structure with normal RV and LV function. Evidence of raised LA pressure was seen due to compression/ impression (Fig 2,3,4 and Video 1,2,3).

Patient was subjected to CECT-Chest, which showed evidence of dorsal spine producing compression/ impression of LA (Fig.5,6,7). Patient was advised decompression surgery of spine along with medical manage-

ment. Patient did not agree for surgery and finally succumbed to her illness.

### **Discussion:**

Left Atrium (LA) is a low pressure , thin wall chamber located inferoposteriorly and highly vulnerable and liable to compression by dorsal mediastinal structure (1). The postero lateral approach of pulmonic veins are also susceptible to be compressed by same structures.

The subdivision proposed by D'Cruz et al (1 ) is as follows

1. Proximity – a contiguous or adjacent structure without chamber deformation.
2. Encroachment – distortion of normal cardio vascular architecture without haemodynamic effect.
3. Compression –where impression is responsible for development of haemodynamic instability and symptoms(2).

The above mentioned impressions is clearly seen on TTE as deformed and smaller LA which leads to low output state and causes symptoms like dyspnoea, reduced exercise tolerance , easy fatigue ability and even hemodynamic instability. Depending on the severity or degree of compression , LA pressure may rises to a level leading to pulmonary oedema mimicking heart failure or cardiac temponade (2).

TTE can easily visualise distorted shape of LA by conventional and unconventional views except (i) extreme obesity (ii)poor echo window (iii) previous cardio thoracic surgery (iv) patient on mechanical ventilation etc.

With the aid of color Doppler ,we can pick up turbulent flow due to compressed LA and pulmonic veins. Similarly by additional use of agitated saline contrast echo and ingestion of aerated drinks orally , the vascular and non vascular causes of LA impression can be ruled out (3).

However , Right heart catheterisation , Computed tomography , Cardiac MRI techniques may be finally conclusive , to aid into further management .

As reported before on the basis of its origin , the compression can be classified (4-7):

A: Gastrointestinal (GI) tract structures

B: Mediastinal structure

C: Aorta / Intrapericardial structure

D:Pulmonary structure

But the compression by dorsum spine is not reported in the literature . We , hereby report one such case of LA compression/ impression with dorsal spine , although we have seen two of them.

### **Conclusion:**

An unexplained dyspnoea, reduced exercise tolerance or easy fatigability is normally investigated with echocardiography. The compression/ impression of LA has been described by various structures as mentioned above but it has not been reported by dorsum of spine. We have reported one such case , although we have seen two cases of similar etiopathogenesis.

### **Abbreviations:**

LA - Left atrium

NYHA- New York Heart Association

BP- Blood Pressure

ECG - Electrocardiogram

RBBB- Right bundle branch block

PLAX view- Parasternal long axis view

RV- Right ventricle

LV- Left ventricle

CECT- Contrast Enhanced Computed Tomography

TTE- Transthoracic echo

MRI- Magnetic Resonance Imaging

GI- Gastrointestinal

### **Legends to figures and pictures:**

Fig.1: ECG showing RBBB with right axis deviation.

Fig.2: PLAX View depicting LA compression by Dorsal Spine

Fig.3: Apical 4 chamber view depicting LA compression by Dorsal Spine

Fig.4: Apical 4 Chamber view with color flow mapping with small compressed LA.

Fig.5: CECT scan Spine depicting compression of LA due anterior bend of dorsal spine.

Fig.6: Drawing showing various structure at dorsal spine level compressing LA.

Fig.7: Comparison of drawing of various structure at dorsal spine with CECT image at dorsal spine level.

Video 1: PLAX View depicting LA compression by Dorsal Spine

Video 2: Apical 4 chamber view depicting LA compression by Dorsal Spine

Video 3: Apical 4 Chamber view with color flow mapping with small compressed LA.

### **References:**

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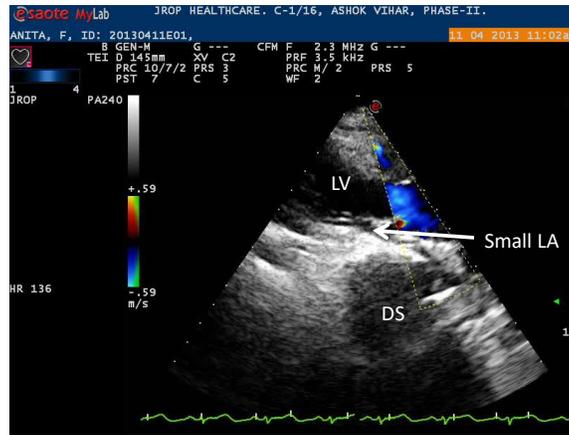
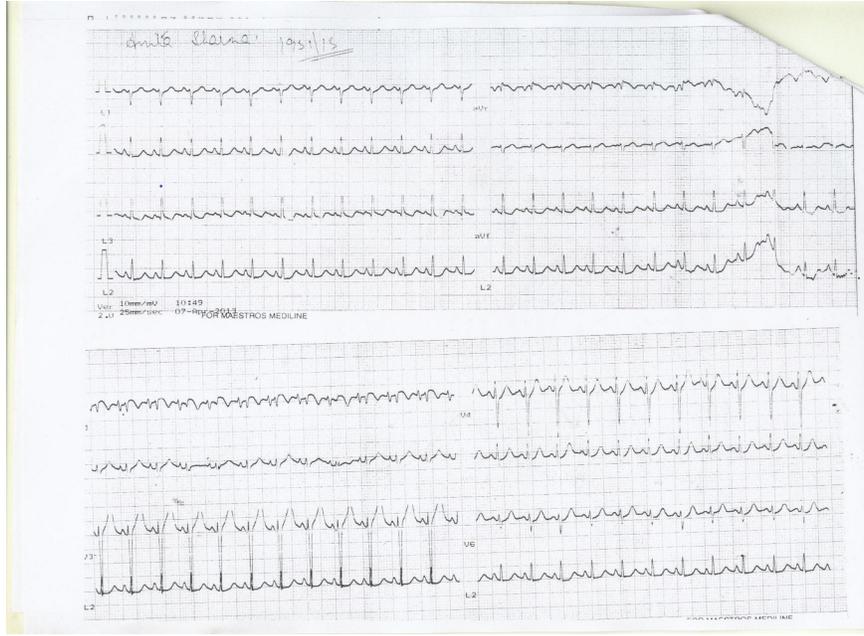


Fig.2: PLAX View depicting LA compression by Dorsal Spine

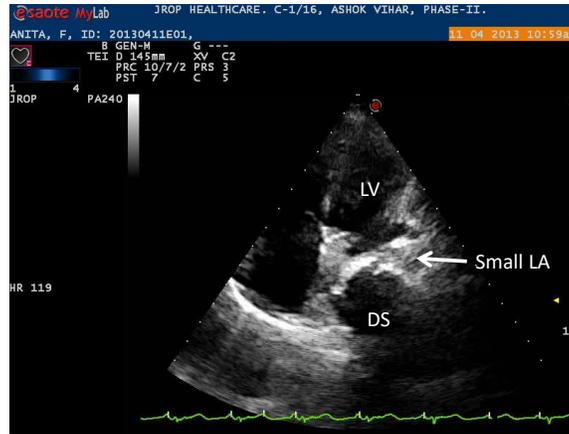


Fig.3: Apical 4 chamber view depicting LA compression by Dorsal Spine

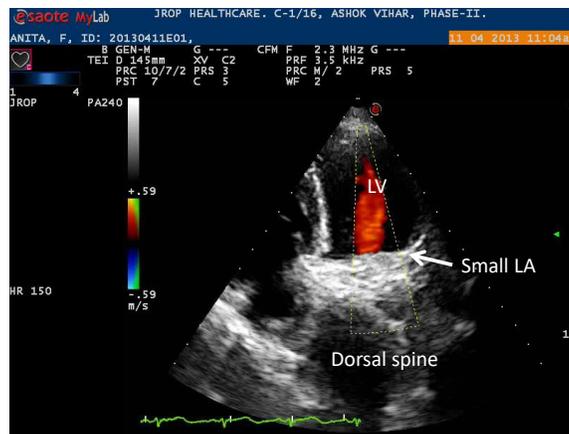


Fig.4: Apical 4 Chamber view with color flow mapping with small compressed LA.

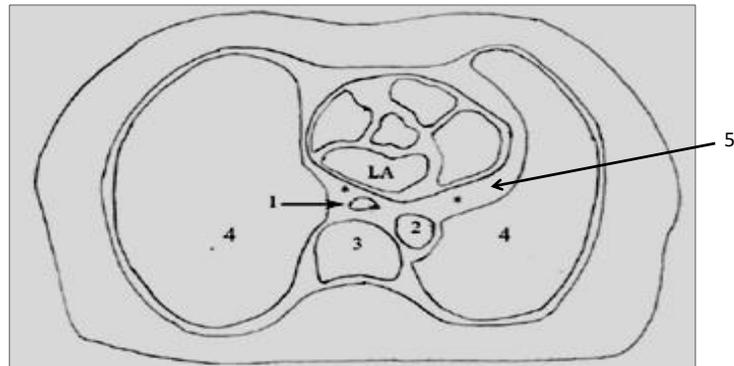
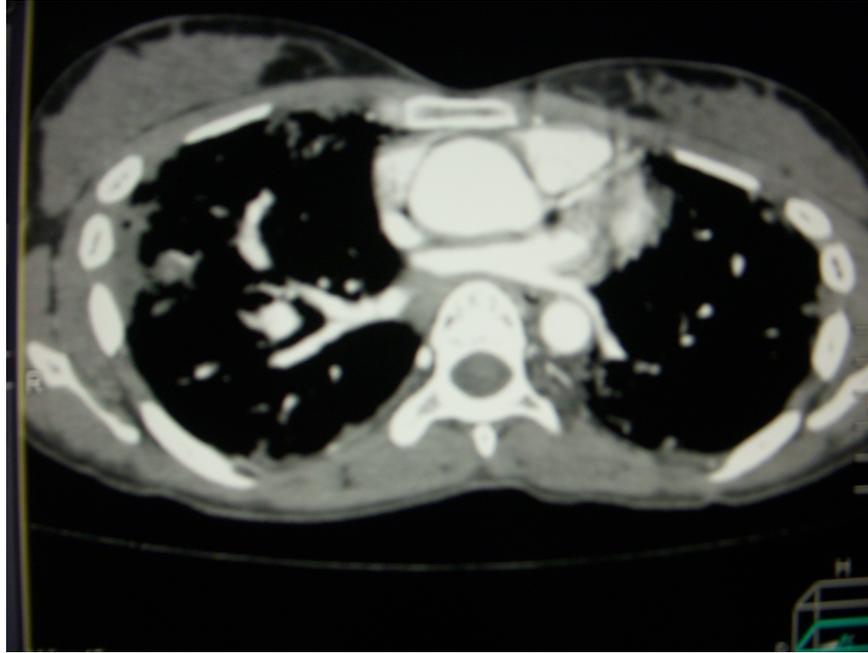


Fig. 6 Transverse schematic diagram at the level of left atrium (LA )  
1.Oesophagus 2 Descending Aorta, 3 Corpus vertebra 4 Lungs 5 Mediastinum

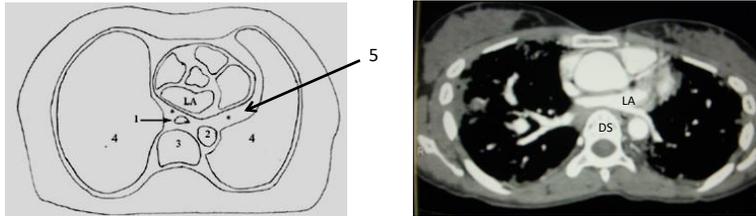


Fig 7 Comparison of drawing with CECT transverse section at the level of Dorsal spine compressing LA