



Case Report

Noneccentric closure in a case of bicuspid aortic valve creating diagnostic dilemma

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Summary

We present an echo case report of bicuspid aortic valve in which M mode tracing though aortic valve in parasternal long axis (PLAX) view shows central closure line. To the best of our knowledge M mode tracing in case of bicuspid aortic valve usually shows an eccentric closure line and central closure line is very unusual to find.

Keywords : echocardiography, bicuspid aortic valve.

Introduction

M-mode echocardiography of the aortic valve is performed in conjunction with two-dimensional imaging by targeting the M-mode beam through the aortic leaflets being displayed in the two-dimensional cross sectional view.

Two-dimensional imaging of the normal aortic valve in the PLAX view demonstrates two leaflets (right and noncoronary), while the parasternal short axis (PSAX) demonstrates a symmetrical structure with three uniformly thin leaflets that open equally, forming a circular orifice during systole. During diastole, the normal trileaflet valve form a three pointed star ("upside down Mercedes-Benz emblem") with a slight thickening or prominence at the central closing point formed by the aortic leaflet nodules known as the nodules of Arentius.

M-mode echocardiogram across normal aortic valve in PLAX view shows right coronary cusp above and noncoronary cusp below with a central closure line because of equal cusp size.

CASE 1

An 18 year old girl referred to our centre for evaluation of systolic murmur. General physical

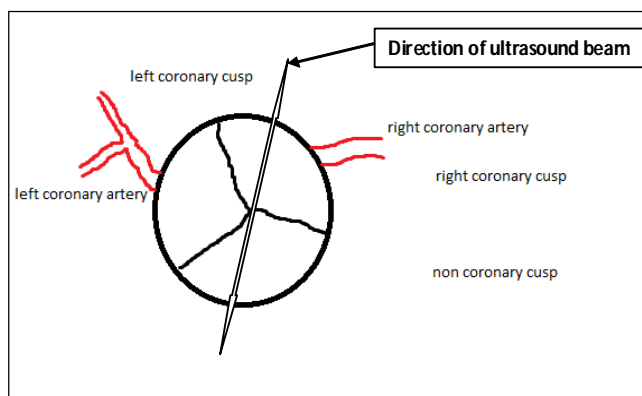


Fig. 1 : Hypothetical diagram showing 3D orientation of cardiac valve cusps.

examination was normal, vital parameters showed Pulse=76bpm regular, Blood pressure (BP) =110/80mm of Hg, respiratory rate 16/min. Cardiovascular system examination revealed normal first & second heart sound and grade III/VI ejection systolic murmur at aortic area. Respiratory system and abdominal examination are within normal limit.

During echocardiographic examination M mode tracing at aortic valve (figure 2) shows a central closure

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line which seems to be a normal aortic valve structure but short axis view at the aortic valve level (figure

3) revealed only two large aortic cusps of equal size confirming the diagnosis of bicuspid aortic valve.

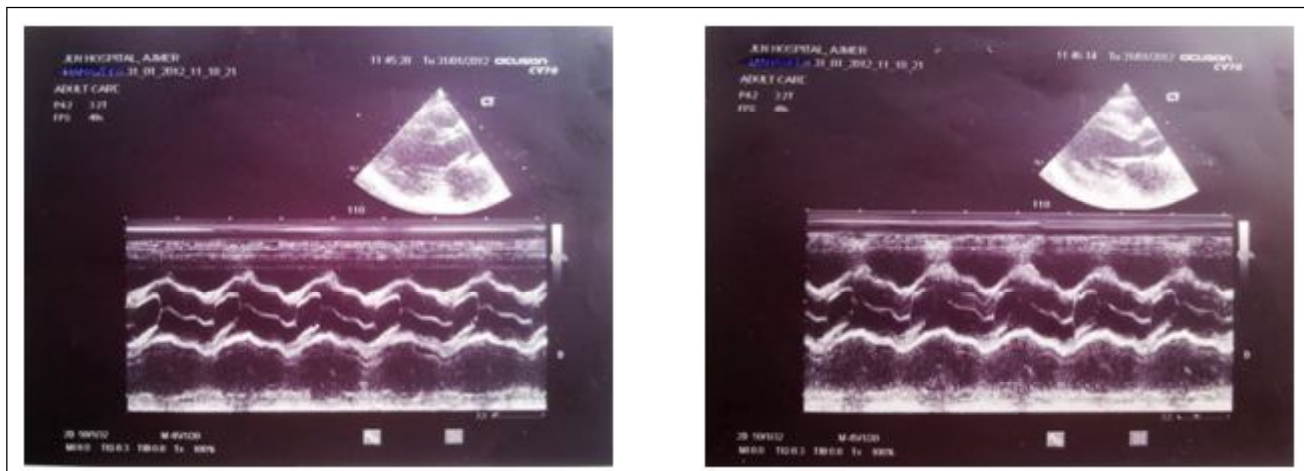


Fig. 2 : M mode tracing at aortic valve level in PLAX view in open and closed states showing central closure line

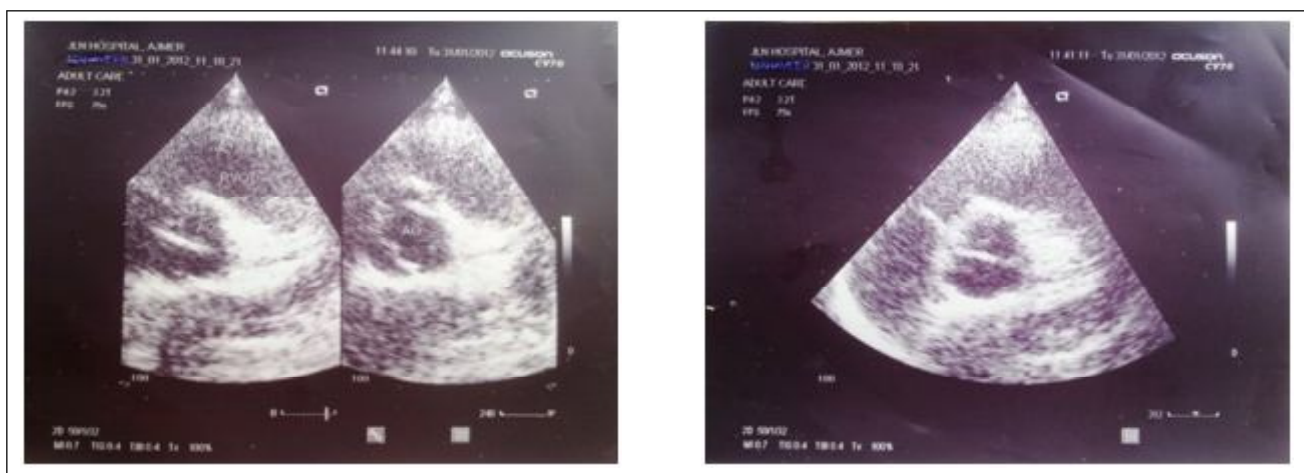


Fig. 3 : 2D image in PSAX view showing only two cusps in open state confirming the diagnosis of bicuspid aortic valve

Case2

A 38 year old female referred to our centre for evaluation of chest pain. General physical examination was normal, vital parameters showed Pulse=86bpm regular, Blood pressure (BP) =118/88mm of Hg, respiratory rate 14/min. Cardiovascular system examination revealed normal first heart sound, soft second heart sound and grade II/VI ejection systolic murmur at aortic area, grade III/VI early diastolic murmur at neo-aortic area. Respiratory system and abdominal examination are within normal limit.

During echocardiographic examination M mode tracing at aortic valve (figure 4) shows a eccentric closure line which seems to be a bicuspid aortic valve structure, short axis view at the aortic valve level (figure

5) revealed rudimentary RCC of aortic valve and fusion of LCC & NCC of aortic valve.

Discussion

The morphology of the bicuspid aortic valve was defined in the parasternal short-axis view, and bicuspid aortic valve anatomy was classified according to the cusp fusion pattern: left coronary-right coronary cusp fusion (type A), right coronary-non-coronary cusp fusion (type B), or left coronary-non-coronary cusp fusion (type C) [1]

During diastole, the raphe can make the valve appear trileaflet. In diastole, the orifice has a characteristic "fish mouthed" appearance. In the long-axis view, the

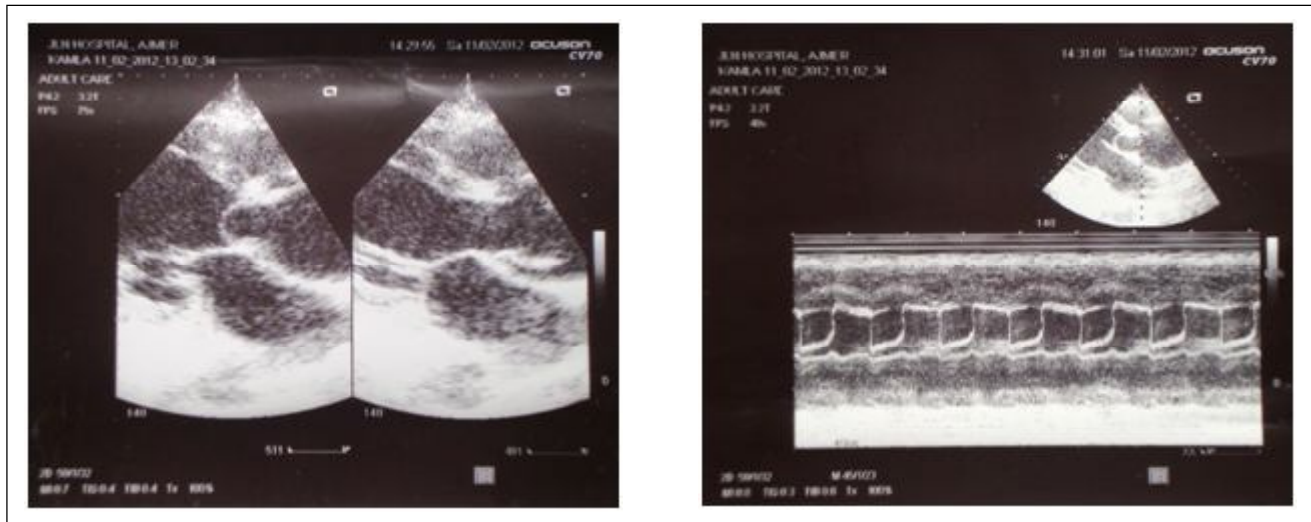


Fig. 4 : Parasternal long axis view across across aortic valve showing eccentric closure line, M mode tracing at the same level shows rudimentary or absent RCC with prominent excursion of NCC.

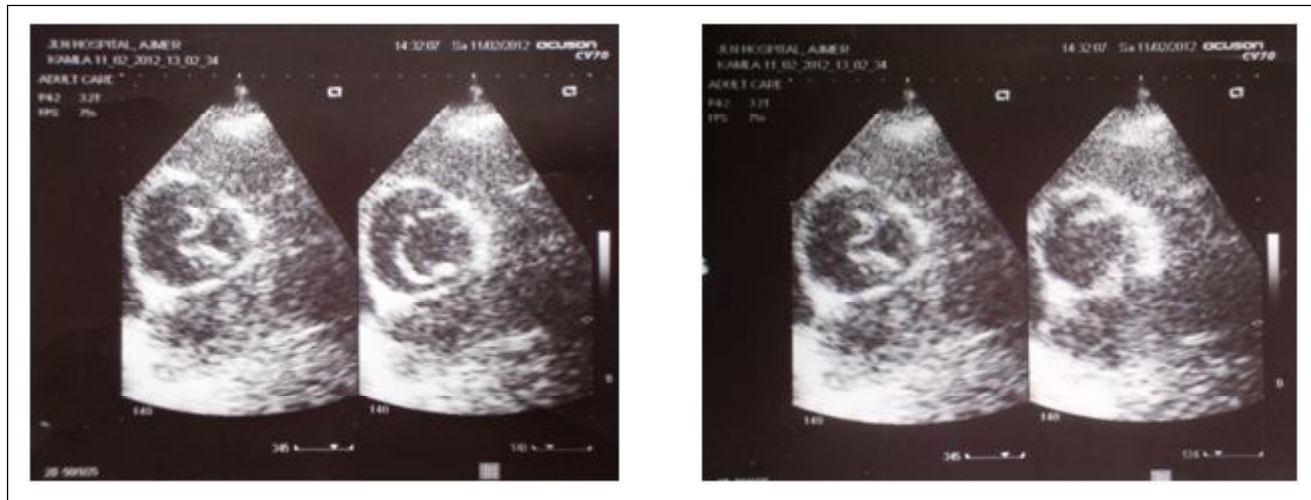


Fig. 5 : parasternal short axis view at aortic valve level confirms absent RCC with fusion of LCC& NCC.

valve often has an eccentric closure line and there is doming of the leaflets² but a central closure line cannot exclude the diagnosis of bicuspid aortic valve hence In order to establish the diagnosis, the valve must be visualized in systole in the short-axis view.

M mode echo at aortic valve in PLAX view shows central closure line. This is due to antero-posterior excursion of the leaflet (RCC anterior, NCC posterior) along the line of ultrasound beam the LCC is at right angle to the beam hence doesnot contribute to central closure line. Therefore any inequality in the size of RCC or NCC gives the appearance of eccentricity of the closure line in M mode echo. Hence eccentric closure line in M mode echo of aortic valve showed relative reduction/inequality of RCC or NCC and need not

required confirmation on 2D echocardiography. On the contrary the reduction or absence of LCC cannot be assessed on M mode echo and need 2D echo for confirmation. Hence M mode echo has diagnostic limitations to assess LCC.

References

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