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Title: Fatal myocardial infarction in a young patient due to thrombosis of left main coronary artery aneurysm- A case report

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4 coronary artery aneurysm- A case report

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6 **AUTHORS:**

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22 **Short Running Title:** myocardial infarction in young patient

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24 **Guarantor of Submission:** The corresponding author is the guarantor of  
25 submission.

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33 coronary artery aneurysm- A case report

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35 **ABSTRACT**

36 Coronary artery aneurysms is a rare abnormality, now increasingly diagnosed  
37 because of the advent of the angiogram. it is commonly due to atherosclerosis but  
38 can be due to congenital or other secondary causes. This is a case of a twenty year  
39 old university student presented with excersional chest pain went in to cardiac arrest  
40 shortly after admission. His ECG showed ST elevation in aVR lead and ST  
41 depressions in all the other leads. Cardiac arrest was refractory to the advanced  
42 resuscitation, during autopsy it was found that is due to an aneurysm in the stem of  
43 the left main coronary artery; 2x2x2cm size large aneurysm obstructed with a  
44 thrombus. These days atherosclerosis is the most common cause for the coronary  
45 aneurysms, this was proven via angiograms. In this patient all the possible causes  
46 for the aneurysm were excluded and Kawasaki's disease (KD) was suspected. This  
47 was supported by the histopathology of the aneurysm. It is important to consider  
48 coronary artery disease due to KD in myocardial infarction of young patients.

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50 **Keywords:** coronary artery aneurysm, Kawasaki's disease, myocardial infarction

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65

## 66 INTRODUCTION

67 Coronary artery aneurysm is a rare abnormality defined angiographically as a  
68 localized luminal dilatation measuring at least 1.5 times the diameter of the normal  
69 adjacent segment [1]. They are now increasingly diagnosed because of the advent of  
70 the angiogram. They are usually atherosclerotic in origin, may be congenital or  
71 secondary to injury (including percutaneous coronary intervention), dissection,  
72 infection, inflammation, autoimmune diseases (polyarteritis nodosa, systemic lupus  
73 erythematosus, scleroderma), or Kawasaki disease (KD) Takayasu disease, syphilis,  
74 Marfan syndrome, Ehlers-Danlos syndrome. Aneurysms involving the left main  
75 coronary artery are extremely rare with an incidence of less than 0.1% of the  
76 population undergoes coronary angiograms [2]. They may have varied presentations  
77 like angina, myocardial infarction and sudden death. Our patient had large left main  
78 coronary artery aneurysm of 2cmx2cmx 2cm size. He developed in left main  
79 coronary artery occlusion with a large thrombus and died.

80

## 81 CASE REPORT

82 We present a case of a 20 year old university student, presented with excersional  
83 chest pain, developed over 8 hour duration, associated with sweating. Patient had no  
84 history of fever or any other co morbidity during recent past. Patient was admitted to  
85 the emergency treating unit nearly eight hours after initial onset of chest pain  
86 following exertion due to worsening of intensity of pain, on admission patient was not  
87 in pain, afebrile, not dyspnoeic, pulse rate 84/min, regular pulse ,good volume,  
88 blood pressure 100/80 mmHg, heart was in dual rhythm, no murmurs, lungs was  
89 clear. Abdominal and neurological examination was normal. Inward ECG was as  
90 below,

91 ST elevations in lead aVR and V9, but ST depressions in lead II/III/aVF/ V2-V7  
92 (Figure 1)

93 Troponin I was negative. Serial repeat ECG didn't show dynamic changes

94 ECG implied an occlusion in left main coronary artery stem. Unfortunately patient  
95 developed sudden cardiac arrest, cardiac monitor showed polymorphic VT.  
96 Emergency resuscitation was commenced according to standard advanced life  
97 support protocols.

98 Sinus rhythm was reestablished, but with a weak, pulse rate 80/min, blood pressure  
99 was 60/40mmHg. Intravenous dobutamine infusion started. But meanwhile blood  
100 pressure was picking up, patient went to several episodes of ventricular tachycardia,  
101 and synchronized 200J DC cardioversion done in each episode. Although sinus  
102 rhythm regained which was not stable. Patient rapidly entered to cardiac arrest. .

103 Ultimately asystole developed, CPR continued, several cycles of adrenalin therapy  
104 given but cardiac arrest was ultimately refractory. Post mortem findings as follows

105 Swelling was seen on the left atrium. Dissection showed swelling as an aneurism of  
106 left main coronary artery, 2cmx2cmx2cm in size, with enlarged deformed coronary  
107 ostia 1cmx1cm ( Figure 2 A/B/C)

108 Aneurysm contained thrombus. Lower part of the aneurism and left coronary artery  
109 were completely blocked with the thrombus. No pale area in left ventricular  
110 myocardium. Pulmonary oedema seen. Other organs were congested.

111 Causes of death

112 1a. Pulmonary oedema

113 1b. Myocardial infarction

114 2. Thrombosis of the aneurysm in left coronary artery.

115 Histopathology showed organizing thrombus within the aneurysm. (Figure 2D)

116 Aneurysmal wall showed chronic inflammation and myxomatous degeneration. This  
117 is compatible with Kawasaki's disease although the clinical presentation not typical.

118

## 119 DISCUSSION

120 Left main coronary artery aneurysms are exceedingly rare condition in clinical  
121 practice, encountered incidentally in approximately 0.1% of patient undergo routine  
122 coronary angiography [3]. None was seen in a survey of 1200 coronary aneurysms  
123 by Swaye and others in their study [4]. In the study by Topaz [5] found 22 LMCA  
124 aneurysms in a series of 22 000 catheterizations, all were associated with  
125 atherosclerotic coronary artery disease, with a predominance of male sex [8]. From

126 the causes which are associated with coronary artery aneurysms about 50% are due  
127 to atherosclerosis. The most common site for aneurysms is left anterior descending  
128 artery [4, 5]. other causes include Kawasaki's disease, congenital malformation,  
129 trauma, polyarteritis nodosa, systemic lupus erythematosus, Ehlers-Danlos  
130 syndrome, scleroderma, Marfan syndrome, Takayasu's arteritis, mycotic aneurysms,  
131 syphilis and etc. The sizes and shapes of coronary artery aneurysms vary; may be  
132 fusiform, or saccular. The main complication of aneurism is ischemia or infarction,  
133 the rupture of aneurism is being rare. Other known complications are thrombosis and  
134 distal embolization, and vasospasm [8]. Giant coronary artery aneurysms may also  
135 compress surrounding structures and also associated with fistulas to a cardiac  
136 chamber most commonly the left ventricle [9]. Non-invasive imaging like  
137 echocardiography, cardiac CT, MRI may help in diagnosis. But the definitive  
138 investigation is coronary angiogram. Although percutaneous coronary intervention  
139 (PCI) is used in isolated coronary insufficiency, the surgical options include Coronary  
140 artery bypass graft (CABG) or cardiac transplantation. PCI or CABG is the treatment  
141 of Choice for coronary artery aneurysms in a setting of acute myocardial infarction  
142 [5, 7]. In our patient atherosclerosis was not found in the post mortem. There was no  
143 history of trauma. The main possibility was Kawasaki disease though there is no past  
144 medical history of such in this patient.

145 Kawasaki's disease (mucocutaneous lymph node syndrome) is predominantly affect  
146 infants and young children, is an acute vasculitis with unknown etiology. Kawasaki  
147 first describes the illness, in Japan in 1967 [10]. Symptoms of Kawasaki's disease  
148 include fever, erythema of lips and oral mucosa, strawberry tongue, bi-lateral non  
149 exudative conjunctivitis. Changes are seen in the limbs such as rashes, oedema,  
150 and desquamation. Cervical lymphadenopathy and thrombocytosis are also  
151 explained. Nearly 15% to 25% of untreated children with Kawasaki's disease will  
152 develop coronary artery aneurysms or ectasia which may lead to myocardial  
153 infarction, sudden death, or chronic coronary artery insufficiency [11]. Intravenous  
154 gamma globulin therapy in the acute phase reduces the risk of coronary artery  
155 aneurysm by three to five folds [12]. It sometimes remains subclinical in the acute  
156 phase or may not be recognized because of nonspecific features, may present later  
157 date as cardiac consequence [13]. We suppose that what happened to this patient

158 was his childhood unrecognized occurrence of kawasaki's disease has led to  
159 formation of coronary artery aneurysm, which got obstructed with a large thrombus  
160 and led to an acute myocardial infarction.

161 It is very rare to see histopathology of a coronary artery aneurysm due to kawasaki's  
162 disease with recent treatments with IV immunoglobulin.

163 Following three pathological stages have been described in Kawasaki's disease.

- 164 1. Acute necrotizing arteritis
- 165 2. Subacute / chronic vasculitis
- 166 3. Myofibroblastic proliferation

167 Our patient's histopathology was compatible with sub-acute / chronic inflammation in  
168 arteries.

169

## 170 **CONCLUSION**

171 ECG is important to localize the territory of arterial obstruction. Here it shows ST  
172 elevations in aVR and all the other standard leads shows ST depressions, indicating  
173 the lesion is in the left main coronary artery.

174 An important message here is, coronary artery aneurysm with thromboembolism as  
175 sequel of kawasaki's disease should keep in mind as differential for young patients  
176 with ischemic heart disease, as well as in chest pain.

177

## 178 **CONFLICT OF INTEREST**

179 No conflict of interest

180

## 181 **AUTHOR'S CONTRIBUTIONS**

182 Study conception and design: UDN Prasad, HMS Senanayake, SMHMK  
183 Senanayake

184 Acquisition of data: UDN Prasad, SMHMK Senanayake

185 Analysis and interpretation of data: UDN Prasad

186 Drafting of manuscript: UDN Prasad

187 Critical revision: UDN Prasad, HMS Senanayake SMHMK Senanayake ,

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222 **FIGURE LEGENDS**

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224 Figure 1: ECG showed ST elevations in lead aVR/V9, ST depressions in lead II/III/  
225 aVF/V2-V7.

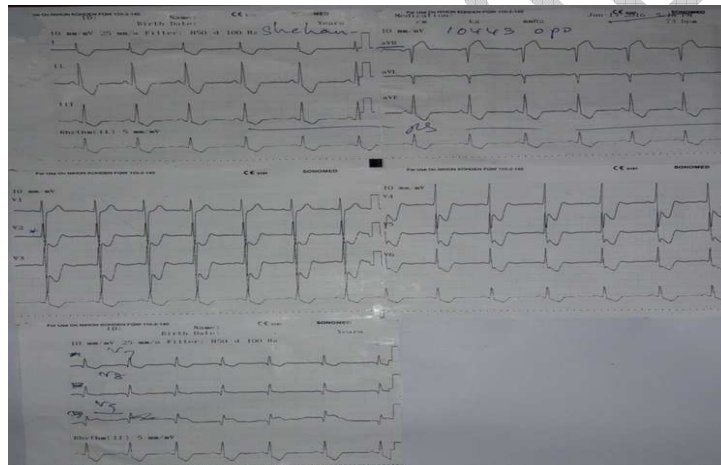
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227 Figure 2: (A) - shows left coronary artery aneurism from outside. (B)- View of cut  
228 section with thrombus inside. (C)- Showing opening of the aneurysm via coronary  
229 sinus (D) - biopsy of coronary artery aneurysmal wall, shows inflammatory cell  
230 infiltrate suggesting subacute or chronic vasculitis[x 400]

231

232 **FIGURES**

233



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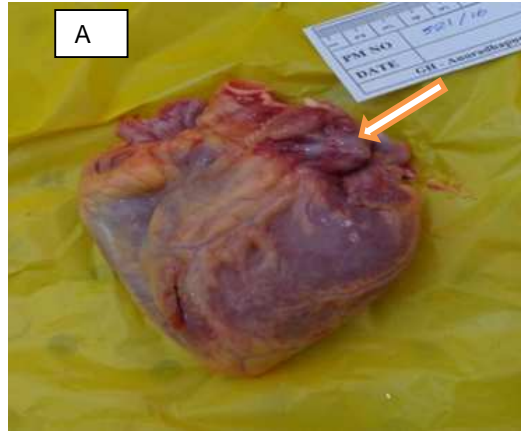
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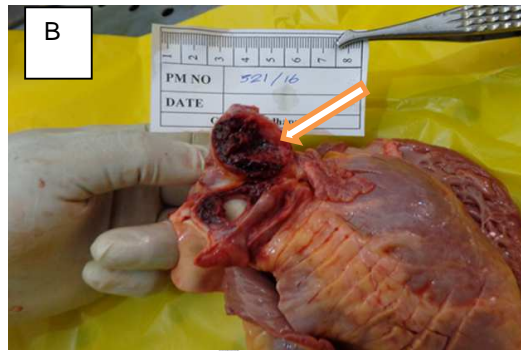
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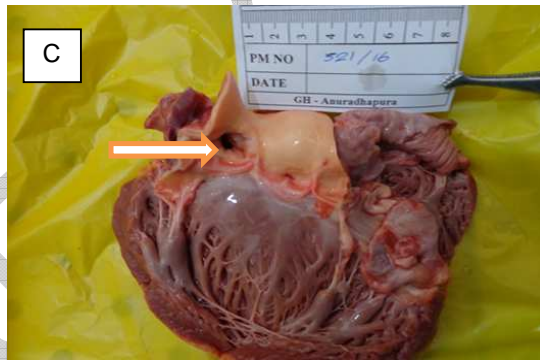
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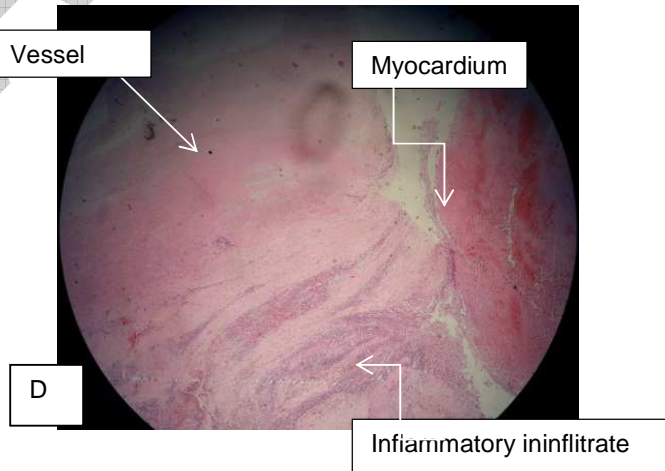
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