

# A rare incidence of spontaneous coronary artery dissection in a case of chronic cocaine abuse - a case report

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## Abstract

**Introduction:** Sudden Cardiac Death (SCD) is mostly attributed to atherosclerotic changes involving one or more major coronary arteries. But in very rare and exceptional cases conditions such as Coronary Artery Spasm, Coronary Arteritis, embolism in Coronary Artery, coronary artery bridging, Spontaneous Coronary Artery Dissection (SCAD), or Anomalous Origin of Coronary Artery also play an important role. Spontaneous Coronary Artery Dissection mainly occurs in middle aged women particularly during pregnancy or immediate post-partum. The incidence of SCAD is rare among males and mostly attributed to severe physical exertion and concomitant addiction to cocaine. Following is an example of such rare and exceptional case of SCAD in a male subject with a history of chronic cocaine abuse.

**Keywords:** Sudden Cardiac Death (SCD), Spontaneous Coronary Artery Dissection (SCAD), Atherosclerosis, Coronary Artery Spasm, Coronary Arteritis, Embolism, Coronary Artery Bridging, Anomalous Origin of Coronary Artery, Physical Exertion, Cocaine Abuse.

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## INTRODUCTION

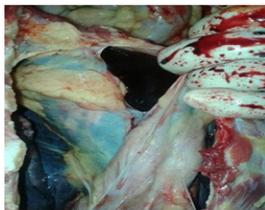
Sudden death has been defined as per literature as a form of death where an apparently healthy individual succumbs to illness all on a sudden or within 24 hours of onset of terminal symptoms, where there is no known cause of trauma, poisoning or asphyxia. Amongst all the causes of sudden death, cardiovascular system involvement accounts for about 45%. In 20% of the cases the pathology involves the respiratory system, central nervous system involvement accounts for 15%, about 6% is due to alimentary system involvement, 4% due to genitourinary system involvement and the rest (about 10%) is due to miscellaneous causes. Sudden death arising out of cardiovascular system involvement (also known as

sudden cardiac death) is predominantly due to coronary atherosclerosis involving one of the major coronary arteries. There are a few rare and exceptional conditions like acute coronary artery spasm, coronary artery dissection (either spontaneous or due to chronic cocaine abuse), coronary artery bridging or anomalous origin of coronary arteries as in Anomalous origin of Left Coronary Artery from Pulmonary artery (ALCAPA) syndrome or “Bland-White-Garland” syndrome where there is anomalous origin of coronary artery from pulmonary artery, non-specific aorto-arteritis (Takayasu’s disease). As found out in the present case, where a male person of 43 years with previous history of smoking and chronic cocaine abuse, succumbed to his illness within 1 hour of hospital admission with the clinical diagnosis of cardiogenic shock. After death the body was sent for post-mortem examination as the precise delineation of cause of death was not possible clinically.

## CASE REPORT

A 43 year old male of normal built, without any previous history of hypertension or diabetes was taken to the emergency department of Medical College Hospital, Kolkata with the history of sudden collapse after a day’s strenuous workout. As per the information obtained, the person was chronically addicted to cocaine for last 10 years. The said information was later substantiated by the

police also. The patient was diagnosed as a case of cardiogenic shock and got admitted into the ICU of the hospital where he succumbed to his illness within an hour of hospital admission. The body was sent to the mortuary to ascertain the cause of death. The body was received in mortuary in the condition of rigor mortis extending up to the lower extremities. There was no apparent injury mark in any part of the body except for features of medical attention in the form of i.v. cannulation marks at both the ante-cubital fossa. There was an evidence of rupture of nasal septum which corroborated with his habit of chronic cocaine abuse. The body was opened with an I shaped incision. There was no remarkable internal finding on alimentary tract and on other body cavities except an oval ulcer (2 inches / 1 inch) at the antral region of the stomach and generalized pallor of all the vital organs. Dissection of the heart was carried out at the fag end of the post-mortem examination. When the pericardium was opened, wells of hemorrhagic fluid came out, which was consistent with the features of cardiac tamponade.



**Figure 1:** Opened Pericardium Showing evidence of collection of blood, consistent with the features of Cardiac Tamponade

Finally heart was dissected along the direction of blood flow which showed cardiac chambers filled with ante-mortem and post-mortem blood. There was an opening (0.5 inch / 1 inch) in the right ventricular wall with irregular margin communicating with the pericardium which is suggestive of left ventricular rupture. After washing out all the blood clots, the coronary artery was dissected horizontally at 2 cm interval tracing from main coronary artery. There was a localized collection of blood in the distal portion of Left Anterior Descending (LAD) artery, over an area of 2 inches in length with total occlusion of distal segment.



**Figure 2:** Opened Left Ventricle Showing evidence of Rupture



**Figure 3:** Exterior of the Left Ventricle showing evidence of rupture

After proper washing under the running water with removal of the clot, the affected segment of the LAD was examined with a hand lens. An area from the inner wall of the artery was stripped off from the adjacent wall of the artery to produce a false lumen where the blood was collected to occlude the lumen of the artery. The resultant pressure within the artery lead to opening up of a weak segment of the myocardium that lead to free escape of blood causing tamponade. Specimen of heart tissue along with the coronary arteries, were sent for histopathological examination which failed to establish any vasculitis, collagen vascular disease or atherosclerosis. Final opinion regarding the cause of death was given as “spontaneous coronary dissection of LAD leading to cardiac tamponade in a patient with chronic cocaine abuse”.

### DISCUSSION

Spontaneous coronary artery dissection (SCAD) is a very rare acute myocardial catastrophe with a very high degree mortality. The first noticeable case as per the existing literature was documented in 1931. Since then about 300 documented cases have been notified in world literature. Angiography and other interventional techniques have increased the chances of detection of SCAD off late. SCAD occurs in two forms primary and secondary, that follows trauma and other interventional surgeries like angiography and PTCA. SCAD is suspected in a young person with no suggestive history of pre-existing factors for acute coronary syndrome like hypertension, diabetes, dyslipidemia etc. Women outnumber men 70% vs 30% in incidence rate of SCAD. The mean age of presentation is between 35-45 years with a range of 30-70 years. Highest incidence occurs below 40 years of age, during pregnancy and immediate post partum period with a steady decrease in the incidence in advanced age. Incidence increases with co-morbidities like fibromuscular dysplasia, Marfan’s syndrome, mixed connective tissue disorders, Kawasaki’s arteritis, alpha-1 antitrypsin deficiency etc. Use of oral contraceptive pills also increases the risk of SCAD. In males, this event usually follows severe physical exertion. Concomitant cocaine use also acts as a major risk factor. Exact patho-physiology of this catastrophic event is unknown. Separation of the different layers of one or more major coronary arteries like intima from media or media from adventitia results in formation of a false pocket with collection of blood. Thrombosis or compression of the coronary arteries by occlusive or non-occlusive obstruction leads to myocardial ischemia or necrosis. SCAD predominantly involves left coronary artery in about 75% cases, right coronary artery involvement occurs in 20% of the cases and circumflex artery involvement occurs in the remaining 5%. Left coronary artery is involved predominantly in female subjects whereas right coronary artery involvement

occurs mostly in males. Now SCAD has been classified by National Heart Lung Blood Institute (NHLBI) under the grade 'A' to 'F' as per angiographic appearance

- (a) **Gr. A:** It has been classified as a minor radiolucent area within the lumen during application of the contrast dye with little or no persistence when the dye is being cleared.
- (b) **Gr. B:** Parallel tracks or double lumen separated by a radiolucent area with minimal or no persistence when the dye is being cleared.
- (c) **Gr. C:** Accumulation of contrast dye outside the lumen resulting in 'extraluminal cap' formation with persistence of the dye in the area.
- (d) **Gr. D:** Areas of dissection represents spiral luminal filling defect resulting in so called "BARBAR SOAP POLE" appearance with excessive contrast staining in the dissected false lumen.
- (e) **Gr. E:** New persistent filling defect within coronary lumen.
- (f) **Gr. F:** Total occlusion of the lumen with no distal ante grade flow.

Among these above mentioned gradations Gr. A and Gr. B occurs as an incidental angiographic finding; whereas Gr. C-Gr. F associated with high degree of mortality. In a few cases the tear has been seen to have extended to involve the ascending aorta. SCAD is to be suspected in an otherwise healthy person who presents with an acute onset chest pain culminating into severe hypotension and cardiogenic shock, without having significant risk factors of atherosclerosis. Literature reviews established that the diagnosis of SCAD was mainly post mortem in earlier times. But now-a-days more and more incidents of detection of the event has been made possible by the use of the angiographic techniques. A literature published by De Maio *et al.*, based on a study consisting of 83 cases, off which 65 was diagnosed post mortem yielding a high degree of mortality of 75%. Another review by Tsimikas *et al.* consisting of 65 cases since 1993 suggested a marked improvement in the outcome in recent times with 68% surviving the acute episode resulting in a mortality rate of only 22%. This was made possible with increased awareness among the medical professionals and use of interventional imaging techniques like angiography during an acute myocardial catastrophic event.

## CONCLUSION

Urgent intervention is the essence of saving life of the patient in cases of SCAD. There must be a high degree of suspicion and anticipation on the part of the medical professionals to achieve a quicker diagnosis. Urgent resuscitative measures aimed at maintenance of the vital functions should be done till appropriate surgical interventions are undertaken. Catheter based interventions or end-to-end anastomotic vascular surgeries remains the

cornerstone of treatment of SCAD. In a case of sudden death in a young person without any previous history of atherosclerosis or any other significant risk factors that has been discussed earlier, the autopsy surgeon should be very much particular in respect to dissection of the coronary arteries regarding the presence of any tear involving any layer of the major arteries that may result in a sudden cardiac death as seen in the present case.

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