

# A MDCT study of the incidence of various acute aortic pathologies in South Indian population

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## Abstract

**Introduction:** The term acute aortic syndrome (AAS) refers to a spectrum of life-threatening aortic emergencies: Nontraumatic entities such as aortic dissection, intramural hematoma (IMH), penetrating atherosclerotic ulcer, impending rupture and rupture of the aneurysm constitute acute aortic syndrome. **Aims and Objectives:** To Study of the Incidence of Various Acute Aortic Pathologies in South Indian Population by MDCT. **Methodology:** Prospective Study, The study included patients referred to the Department of Radiodiagnosis, Sri Ramachandra Medical College during April 2012 to September 2014 for a CT scan with Clinical suspicion of Acute Aortic Syndrome, Known case of aortic pathology with fresh complaints, All age group were included into study while , Post-grafting / Procedures Follow up cases of acute aortic syndromes Those in whom intravenous contrast studies could not be performed were excluded from study. **Result:** As per the impression of MDCT the most common pathology was Isolated Aneurysm 51.61%; followed by Isolated Dissection 20.97% ; Aneurysm + Dissection 8.06%; Aneurysm + Intramural Hematoma 8.06% ; Intramural Hematoma + PAU + Aneurysm 4.84% ; PAU 3.23%. The most common impression of Dull aching Chest Pain by MDCT was Aneurysm followed by Acute Chest Pain was Aneurysm; Radiating to the Back pain was Aortic Dissection; Breathlessness was Aneurysm; Chest Tightness Aneurysm; Acute Abdominal Pain Aneurysm. **Conclusion:** With the help of the multi planar and volume rendering techniques, we were able to classify and sub classify the various aortic pathologies. The incidence of acute aortic syndromes in our study were clinically aneurysms presenting with acute symptoms followed by aortic dissection, intramural hematoma and penetrating atheromatous ulcers.


**Key Words:** MDCT- Mutidetector Computed Tomography, IMH-Intra Mural Hematoma, AD- Aortic Dissection.

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## INTRODUCTION

The term acute aortic syndrome (AAS) refers to a spectrum of life-threatening aortic emergencies.<sup>1</sup> Nontraumatic entities such as aortic dissection, intramural hematoma (IMH), penetrating atherosclerotic ulcer, impending rupture and rupture of the aneurysm constitute acute aortic syndrome. It has an incidence of 30 cases per

million per year, of which 80% are aortic dissections, 15% intramural hematomas and 5% penetrating ulcers.<sup>2</sup> Two thirds of patients are male; the average age of affected patients is 6<sup>th</sup> decade.<sup>3</sup> Acute aortic syndromes are attributed to sequel of chronic hypertension, atherosclerosis and weakening of the aortic media, predisposing to rupture of the vasa vasorum.<sup>4</sup> The presentations of acute aortic syndromes are usually acute chest pain described as severe, tearing and migratory. The differential diagnosis for patients presenting with an acute chest pain syndrome is broad and includes coronary artery disease, pulmonary embolism, and aortic dissection. Anterior chest, neck and throat pain mimicking angina may be secondary to the abnormalities related to the ascending aorta, whereas back and abdominal pain often indicates descending aortic injury.<sup>9</sup> Syncope suggests development of complications such as cardiac tamponade, obstruction of cerebral vessels or activation of baroreceptors.<sup>3,5</sup> Multidetector CT being the

most accurate and MDCT protocol approaches 100% sensitivity and specificity and is accepted as first-line imaging.<sup>5, 6</sup> Triple rule-out CT protocols are increasingly being used so that all potentially fatal possibilities [coronary artery disease, dissection and pulmonary embolism] can be evaluated in a single examination.<sup>10,11</sup> It has been reported that triple-rule-out CT can safely eliminate further diagnostic testing in over 75% of patients in the appropriate patient population<sup>12</sup>. MRI has higher sensitivity and specificity but is less practical in the group of patients assessed for acute aortic symptoms who are potentially unstable and critically ill.<sup>7,8</sup>

**METHODOLOGY**

Prospective Study, The study included patients referred to the Department of Radiodiagnosis, Sri Ramachandra Medical College during April 2012 to September 2014 for a CT scan with Clinical suspicion of Acute Aortic Syndrome, Known case of aortic pathology with fresh complaints, All age group were included into study while, Post-grafting / Procedures Follow up cases of acute aortic syndromes. Those in whom intravenous contrast studies could not be performed were excluded from study.

**RESULT**

**Table 1: Distribution of Pathology by Impression of MDCT**

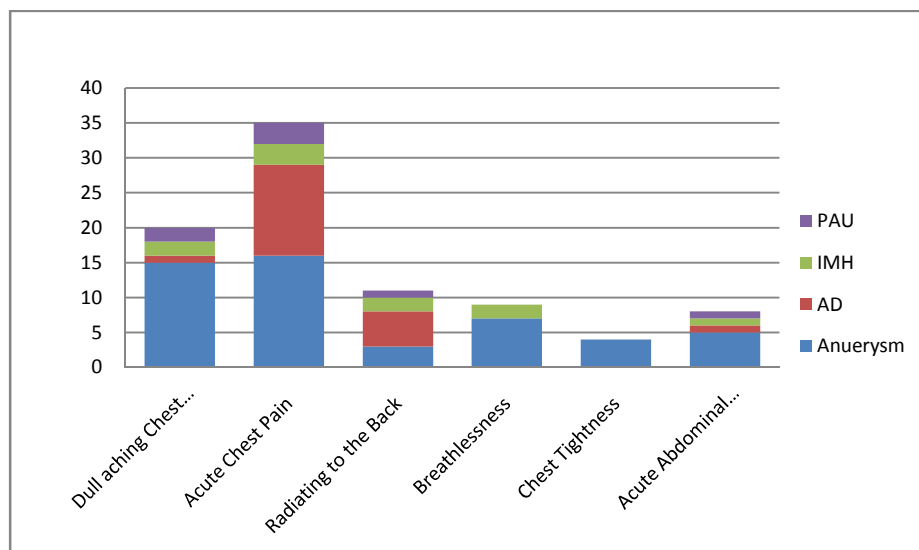
IMPRESSION	NO. OF CASES	PERCENTAGE (%)
Isolated Aneurysm	32	51.61%
Aneurysm + Dissection	5	8.06%
Aneurysm + Intramural Hematoma	5	8.06%
Aneurysm + PAU	2	3.23%
Isolated Dissection	13	20.97%
Intramural Hematoma + PAU + Aneurysm	3	4.84%
PAU	2	3.23%

As per the impression of MDCT the most common pathology was Isolated Aneurysm 51.61%; followed by Isolated Dissection 20.97%; Aneurysm+Dissection 8.06%; Aneurysm+Intramural Hematoma 8.06%; Intramural Hematoma+PAU+Aneurysm 4.84%; PAU 3.23%.

**Table 2: Clinical Features Vs. Acute Aortic Syndromes as per MDCT**

Clinical Features	Aneurysm	AD	IMH	PAU
Dull aching Chest Pain	15	1	2	2
Acute Chest Pain	16	13	3	3
Radiating to the Back	3	5	2	1
Breathlessness	7	0	2	0
Chest Tightness	4	0	0	0
Acute Abdominal Pain	5	1	1	1

The most common impression of Dull aching Chest Pain by MDCT was Aneurysm followed by Acute Chest Pain was Aneurysm; Radiating to the Back pain was Aortic Dissection; Breathlessness was Aneurysm; Chest Tightness Aneurysm; Acute Abdominal Pain Aneurysm.



**Figure 1: Clinical Features**

**DISCUSSION**

Among the acute aortic syndromes diagnosed in our study by MDCT, the distribution of pathology in order of

prevalence were as follows Table 1: Thirty two (51.61%) patients had isolated aneurysms, Five (8.06%) patients had a combination of aneurysm and dissection, Five

(8.06%) patients had a combination of aneurysm and intramural hematoma, Two (3.23%) patients had aneurysm with penetrative atheromatous ulcers, Thirteen (20.97%) patients had isolated aortic dissections, Three (4.84%) patients had intramural hematoma with aneurysm and penetrative atheromatous ulcers and two (3.23%) patients had isolated penetrative atheromatous ulcers.

**Aneurysm:** Of the sum total of 47 aneurysms detected in our study patients, 32(51.61%) patients presented with isolated aneurysms. About 5(8.06%) patients presented with concomitant aortic dissection. Another 5 (8.06%) patients presented with concomitant intramural hematoma. 3 (4.84%) patients has associated intramural hematoma and penetrative atheromatous ulcers. 2 (3.23%) patients had associated penetrative atheromatous ulcers alone. The above results are concordant with the study conducted by Eric M Isselbacher *et al*<sup>13</sup> conducted in the North American population. The common underlying etiologies for aneurysms as identified in our study are atherosclerosis and hypertension along with concomitant coronary artery disease in few patients. The other patient had metastatic necrotic lymphadenopathy from small carcinoma of lung, developed a large pseudoaneurysm with evidence of impending rupture.

**Dissection:** Amongst the eighteen (29.03%) patients who presented with aortic dissection, thirteen (72.22%) patients presented with isolated dissection, whereas five (27.78%) patients had pre-existing aneurysm. [Table 3] The preponderance of aortic dissection amongst the patients with acute aortic syndromes in our study which amounts to 29.03%, shortfalls the 80% as sited by Arturo Evangelista Masipetalin their study of acute aortic syndromes<sup>2</sup> Intramural.

**Hematoma:** In our study we encountered eight (12.90%) patients with intramural hematoma of which five (62.50%) were associated with aortic aneurysms and 3(37.50%) with both aortic aneurysm and penetrative atheromatous ulcers. [Table 1] The results pertaining to the distribution of intramural hematoma amongst the patients with suspected acute aortic syndromes is similar to the results plotted by Erbel R et al in their study of acute aortic syndromes<sup>14</sup>

Penetrative Atheromatous

**Ulcers:** Amongst the Seven (11.29%) patients who presented with penetrative atheromatous ulcers, two (28.57%) patients presented with isolated penetrative atheromatous ulcers. About Two(28.57%) patients presented with concomitant aortic aneurysm. Another Three (42.86%) patients presented with concomitant aortic aneurysm and intramural hematoma. [Table 1]

## CONCLUSION

In our study multi detector computed tomography of aorta was able to rapidly detect acute aortic pathologies in patients presenting with acute symptoms, with a sensitivity of 100%. With the help of the multi planar and volume rendering techniques, we were able to classify and sub classify the various aortic pathologies. The incidence of acute aortic syndromes in our study were clinically aneurysms presenting with acute symptoms followed by aortic dissection, intramural hematoma and penetrating atheromatous ulcers.

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