

# Acute coronary syndrome without significant stenoses on coronary angiography: what are the diagnoses?



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**Background:** Acute coronary syndrome (ACS) in patients with normal coronary arteries has previously been described. We aimed to evaluate the clinical characteristics and diagnoses in such patients.

**Methods:** We retrospectively analysed all patients with acute onset of chest pain plus ischemic marker elevation from May 2002 through April 2011. Patients without coronary artery stenosis  $\leq 50\%$  on angiogram (ACOS-group) were compared to 253 patients with non-ST-elevation NSTEMI-group myocardial infarction undergoing percutaneous coronary intervention [Fig 1].

**Results:** Normal coronary angiograms were obtained for 563 out of 4.958 ACS patients (11.4%). The most frequent diagnoses in such patients in our series were biopsy proven myocarditis in 13.9%, hypertensive (6.9%), and Tako-Tsubo-syndrome (6.9%). In 272/563 (48.3%) patients no detectable causes were found; Table 1. ACOS pts were significantly younger (mean age  $62.2 \pm 15.1$  versus  $65.4 \pm 12.0$ ;  $p=0.003$ ), female (49.6% versus 28.9%;  $p<0.001$ ), and had less severe anginal symptoms on presentation (CCS class III/IV 41.9% versus 49.8%;  $p=0.05$ ). ACOS pts had lower ischemic-marker levels ( $1.8 \pm 5.6$  versus  $27.4 \pm 68.7$  [Troponin], and  $4.0 \pm 7$  versus  $14.2 \pm 20$  [Creatine kinase];  $p<0.001$  for both), well preserved left ventricular function ( $55.9 \pm 13.9$  versus  $48.1 \pm 12.4$ ;  $p<0.01$ ), and less frequent regional wall abnormalities (31.7% versus 67.7%;  $p<0.001$ ). Among patients with myocarditis Parvovirus B19 was detected in 56/78 (72%), followed by Entero-Virus (13%), and Human-Herpes-Virus-6 (10%). At follow-up biopsy after 6 months 64% of the patients had spontaneous virus elimination.

**Table 1:** Diagnoses in patient with acute coronary syndrome and coronary artery stenosis  $\leq 50\%$

	n	%
Myokarditis/DCMI	78	13.9
Pneumology	41	7.3
<i>Pulmonary embolism</i>	23	4.1
<i>COPD + right heart decompensation</i>	7	1.2
<i>Spontaneous pneumothorax</i>	2	0.4
<i>Tension pneumothorax with AV-Block 3</i>	2	0.4
<i>Pneumonia with pericarditis</i>	2	0.4
<i>ARDS</i>	2	0.4
<i>Porto-pulmonary hypertension</i>	2	0.4
<i>NSCLC</i>	1	0.2
Hypertension	39	6.9
Tako-Tsubo-syndrome	39	6.9
Rhythm disturbances	35	6.2
<i>AV-Block 3</i>	10	1.8
<i>Atrial fibrillation</i>	7	1.2
<i>Embolie</i>	5	0.9
<i>Tachyomyopathy</i>	2	0.4
<i>Sinu-atria-block</i>	3	0.5
<i>Atrio-ventricular nodal re-entry tachycardia</i>	2	0.4
<i>Long QT with ventricular tachycardia</i>	2	0.4
<i>Ventricular tachycardia</i>	2	0.4
<i>Frequent VES</i>	1	0.2
<i>ICD discharge</i>	1	0.2
Pericarditis	9	1.6
Decompensation of known dilated cardiomyopathy	9	1.6
Aortic stenosis	8	1.4
Endocarditis	6	1.1
Sepsis	5	0.9
Hypovolemia	4	0.8
Stroke	3	0.5
Lab error	2	0.4
Ruptured coronary plaque with spontaneous lysis	2	0.4
Borelliosis	1	0.2
Coronary spasm	1	0.2
Hypertrophic obstructive cardiomyopathy	1	0.2
Hyperthyroidism	1	0.2
Amyloidosis	1	0.2
Transistoric ischemic attack (TIA)	1	0.2
Elevated TNI following PCI 10 days before	1	0.2
Cholecystitis	1	0.2
Pancreatitis	1	0.2
Aortic aneurysm	1	0.2
Hypoglycaemia	1	0.2
unknown	272	48.3

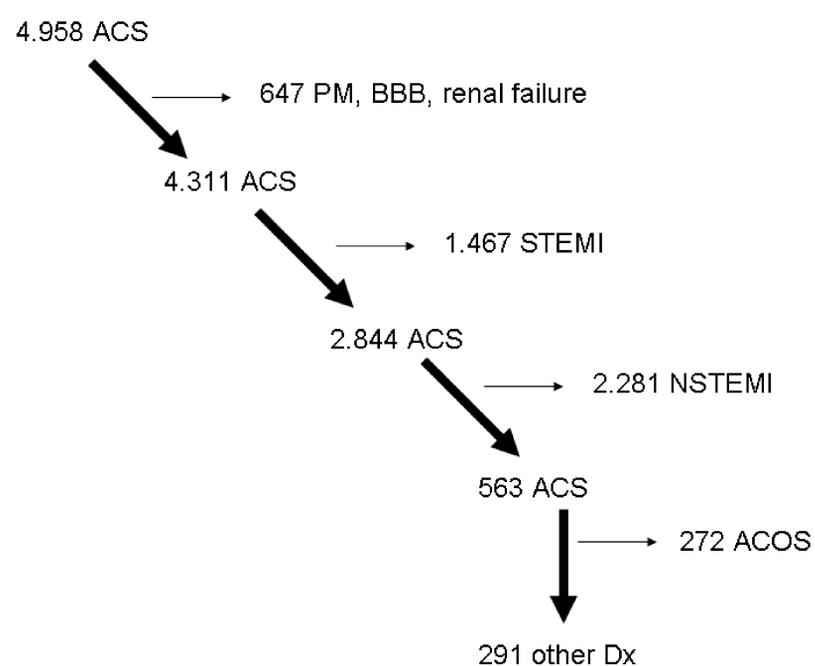


Figure 1: Patient flow chart

**Conclusions:** ACS in patients without significant stenoses on angiography has a broad spectrum of differential diagnoses. Myocarditis, hypertensive problems, and Tako-Tsubo-syndrome were the most frequent causes. However, in almost half of the patients no detectable cause was found.