

# A Rare Presentation of Acute Coronary Syndrome, In A Patient of Amputation of Right Forearm: A Case Study

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## **Abstract:**

A patient presented with sudden onset right sided chest pain in the emergency department. He had a past history of amputation of right forearm due to trauma 25 years back. Phantom limb pain was suspected, but on investigations he was diagnosed with acute coronary syndrome with unstable angina. The theory of past experiences, denervation hypersensitivity and cortical plasticity might be the contributors of such atypical angina pain presentation which overruled the dermatomal rule.

**Keywords: Atypical angina pain, Rexed laminae, theory of past experience, cortical plasticity**

## **Introduction:**

Chest pain is the most common presenting symptom in patients with suspected acute coronary syndrome (ACS)[1]. This chest pain or angina pectoris in unstable angina is typically described with a few characteristics like; retrosternal chest pain of squeezing nature, which gets provoked by exertion or stress and not relieved by rest. Pain in most of the patients of ACS radiate to the left jaw and shoulder/arm. The heart and left arm have the same embryonic origin so according to dermatomal rule cardiac pain is commonly felt at left arm. Right sided pain presentation is uncommon and atypical. Few cases in which angina pain was referred in part of “phantom” left arm were recorded previously[2]. Atypical chest pain radiation towards amputated limb can be explained by referred pain hypothesis but exact biological mechanism is yet unclear.

## **Case presentation:**

A male laboratory technician, aged 56 years presented with sudden onset chest pain on the right side of his chest. Common differential diagnosis of Costochondral chest pain was excluded by clinical examination. The patient had right forearm amputation after birth (H/O trauma). There was no history of phantom limb pain. He had history of exertional chest pain for past one year. Most of the times the pain presentation was atypical and so it was ignored by the patient. He was a non-smoker. He used to take alcohol intermittently. He was a known hypertensive and was on angiotensin receptor blocker, but

medicine intake was irregular.No history of other comorbidities like diabetes mellitus,hypothyroidism,dyslipidemia were found. The patient suffered from COVID19 in 2020.He was admitted under cardiology dept in ICCU and investigations and treatment were started immediately.ECG and ECHO were done.ECG report showed T wave inversion in V3-V6 precordial leads with ST elevation (fixed change). Coronary angiogram was done and minor CAD was detected(LAD minor blockage). ECHO report showed mild tricuspid regurgitation,concentric LVH, EF-64%. Blood pressure was 150/90mm Hg, pulse rate-103/minute and Trop T was negative on admission in iccu. Patient's lipid profile,thyroid function test ,kidney function tests,FBS, PPBS was done and reports were normal. Patient's diagnosis was ACS with unstable angina. Patient was treated in ICCU. Patient on discharge was advised oral medications like aspirin.clopidogrel,atorvastatin,angiotensin receptor blocker and nitroglycerine tablets.On discharge salt restricted diet and two weeks bed rest was advised. Follow up: The patient was started additional antianginal medication of tablet ranolazine and patient's symptoms are improved.

**Differential diagnosis:**

Costochondral chest pain, Dextrocardia,Pericarditis,pneumonia, esophageal disease .The phantom limb component of referred pain radiating to right side.

**Discussion:**

In this study a male patient with history of right forearm amputation experiences a sudden onset right sided chest pain , and he is diagnosed with ACS.

The heart and left arm have the same embryonic origin so according to the dermatomal rule cardiac pain is commonly felt at left arm[3].So this type of right sided pain presentation is uncommon and atypical. Dorsal horn of the spinal cord is all the sensory information receiver. All the sensory modalities before reaching their final destination enter the dorsal horn,which is laminated.Out of 10 Rexed laminae of gray matter Lamina VII is unique in a sense that unlike all the lamina it receives sensory information bilaterally[4]. It is how pain referral to the opposite side of that of source of pain is possible. Sensory stimuli act on neural systems that have been modified by past inputs, and the behavioral output is significantly influenced by the “memory” of these past experiences[5]. Patient had previous amputation on right forearm so based on past experience it might have strongly facilitated the direction of sensory signal which is channelized by lamina VII. Here the dermatomal rule exists but it was strongly overridden by the theory of previous experiences and denervation hypersensitivity[6]. Within certain limits, the cortex can allocate cortical area in a use-dependent manner. Cortical maps are dynamic. Somatosensory cortex is plastic or can change and referred sensations can be a marker of cortical plasticity[7]. Neurons that lose their major source of somatosensory activation may gradually responses more to remaining sources of activation like after amputations.

**Conclusion:**

The study highlighted on atypical presentation of ACS as cardiac pain radiated in right side in a special scenario of amputation of right upper limb below the elbow.

The dermatomal rule is strongly overridden by the theory of past experiences of amputation, denervation hypersensitivity and cortical plasticity. A clinician should be aware of atypical presentation of angina

pectoris at different sites and probable mechanism of these diversion to prevent missed diagnosis of a cardiac emergency.

### Limitations of the study:

Functional magnetic resonance imaging could be more specific for cortical plasticity.

Acetylcholine receptor study could give a clue to denervation hypersensitivity.

Conflict of interest: none

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### Figures:

Fig 1: ECG of the patient: Showing v1-v3 leads

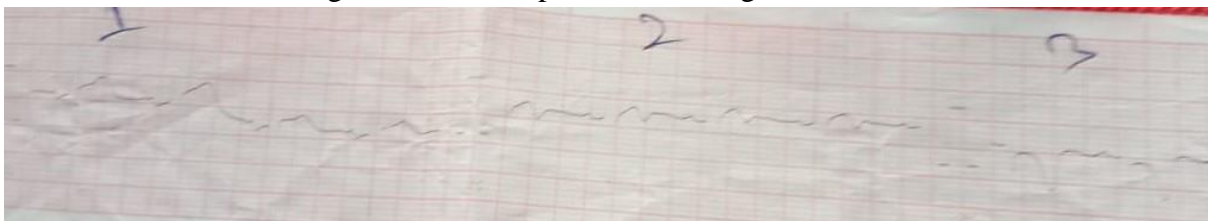
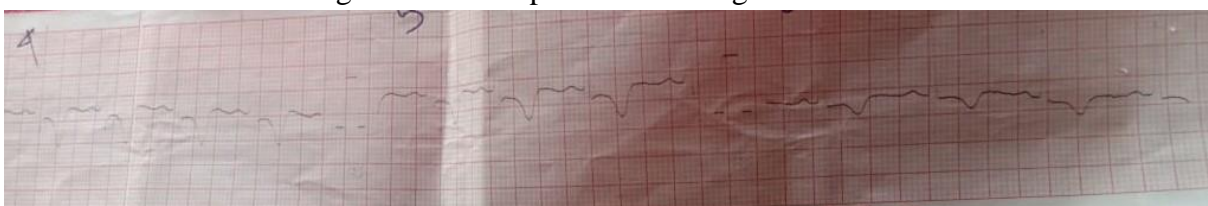


Fig2 ECG of the patient: Showing v4-v6 leads



Twave inversion in v3 to v6 chest leads with ST elevation