

# Acute Right Ventricular Myocardial Infarction Following Percutaneous Coronary Artery Intervention

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**S**ide-branch occlusion during percutaneous coronary intervention (PCI) is a well known complication of right ventricular myocardial infarction (RVMI) [1]. Iatrogenic acute RVMI following PCI of the right coronary artery (RCA) is rare. van der Bolt et al. [2] reported nine cases of acute RVMI following 2300 cases of PCI of RCA (0.4%).

The electrocardiographic pattern of RVMI may be misinterpreted and unrecognized if not suspected.

We report a case of RVMI following PCI at our medical center.

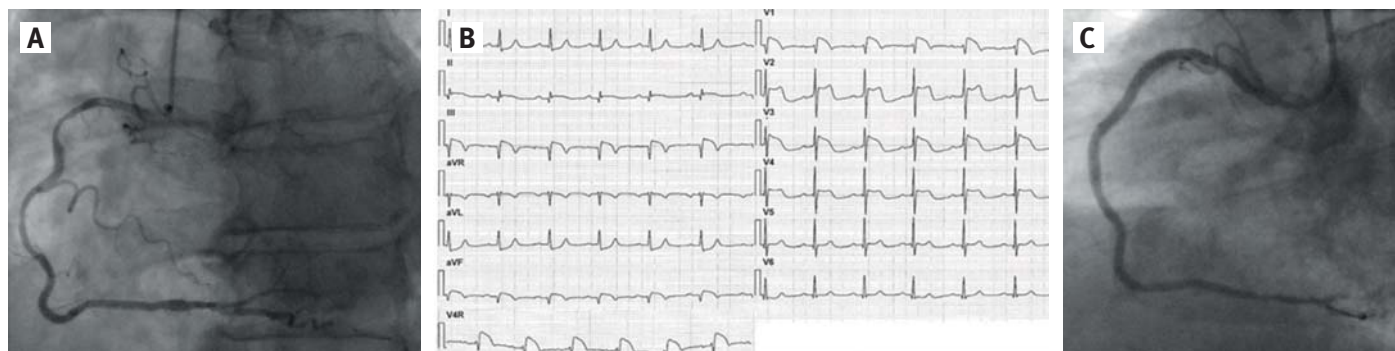
## PATIENT DESCRIPTION

A 56 year old male patient with hypertension, hypercholesterolemia, and a family history of ischemic heart disease experienced precordial pain episodes a day before he was referred to our medical center. He was asymptomatic when admitted. A chest X-ray and physical examination were unremarkable. His electrocardiogram (ECG) showed sinus rhythm, 63 beats/minute, Q and negative T waves in leads II-III-AVF, Q and negative T waves in leads II-III-AVF with normal QRS pattern in V4R. Echocardiographic examination revealed mild diaphragmatic wall hypokinesis. At hospital admission his creatinine kinase-MB (CK-MB) was 417 IU/L (normal value 0–40 IU/L) and his troponin T value was 931 µg/L (normal value ≤ 14 µg/L). One day later the values lowered to 223 IU/L and 339 µg/L, respectively.

Coronary angiography performed 2 days after the patient’s hospital admission demonstrated 80% narrowing proximal and mid-dominant RCA [Figure 1A],

mild irregularities of proximal, and 70% narrowing of distal left anterior descending coronary artery (LAD). Drug eluting stenting was performed in the two RCA lesions. Shortly after the procedure the patient complained of severe chest pain and the ECG showed ST segment elevation in leads II-III-AVF, V1–4, and V4R with ST segment depression in leads I-aVL [Figure 1B]. An immediately repeated coronary angiogram revealed no changes in LAD perfusion and patent RCA but total occluded right ventricle branch and posterior descending artery (PDA), most probably was due to distal embolization [Figure 1C]. Treatment by intracoronary nitrate infusion was started and chest pain resolved completely within 20 minutes. PCI to right ventricle branch and PDA was not attempted because the patient was hemodynamically stable. An ECG obtained 2 hours after chest pain onset showed complete ST segment elevation resolution in lead V4R, 50% ST segment elevation resolution in leads V1–4 and

**Figure 1. [A]** Coronary angiogram shows 80% narrowing proximal and mid dominant right coronary artery (RCA) **[B]** Electrocardiogram taken shortly after the successful proximal and mid RCA stents implantation shows ST segment elevation in leads II-III-AVF; V1–V4, and V4R with ST segment depression in leads I-aVL **[C]** Coronary angiogram performed shortly after patient’s chest pain complaints. Showing patent RCA but total occluded right ventricle branch and descending artery



II-III-AVF, and 50% decreases in ST segment depression in leads I-aVL. No development of anterior Q waves were seen. The next day, coronary angiography (CK-MB) raised to 1363 IU/L and troponin T to 1835 µg/L.

The patient remained asymptomatic and hemodynamically stable during in-hospital follow-up.

### COMMENT

The right ventricle had blood flow supplied mainly by the RCA. The conal branch irrigates the outflow tract and the right ventricle branch irrigates the posterior wall of the right ventricle. In our patient, the occlusion of the right ventricle branch caused RVMI.

ST segment elevation in precordial leads is seen during anterior left ventricular myocardial infarction (MI) due to the occlusion of LAD as well as during isolated RVMI following occlusion of the right ventricle branch or non-dominant RCA.

Isolated RVMI is characterized by ST segment elevation in V1–V4 and is higher in V2 than in V3–V4 leads because the

right ventricle is anteriorly positioned with respect to the left ventricle and in the V4R lead [3].

RVMI has been observed in 10% to 50% of patients experiencing acute diaphragmatic MI [4] and it is due to the occlusion of RCA proximal to the conal and right ventricle branches.

Diaphragmatic MI with right ventricle involvement is characterized by ST segment elevation in leads II-III-AVF-V4R and ST depression in leads I-AVL. When RVMI is associated with left ventricle (LV) diaphragmatic MI, the injury electric current of the LV dominates that of the RV and suppresses the ST segment elevation in V1–V4 [5]. In our patient, ST segment elevation in leads V1–V4 was not suppressed during the diaphragmatic myocardial reinfarction, probably because the injury of the LV inferior wall was minimal.

### CONCLUSIONS

ST segment elevation in leads V1–V4 with V2 > V3–V4, and leads during PCI of RCA raises the suspicion of right ventricle MI due to right ventricle branch occlusion

and avoids the wrong diagnosis of LAD occlusion.

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### Capsule

#### From childhood to adulthood: disease activity trajectories in childhood-onset systemic lupus erythematosus

No previous research has studied the longitudinal disease course of childhood-onset systemic lupus erythematosus (cSLE). Lim et al. assessed distinguishable differences in disease activity trajectories in cSLE patients to determine baseline factors predictive of disease trajectory membership and whether the different disease activity trajectories are associated with different damage trajectories. In this retrospective, longitudinal inception cohort of cSLE patients, patients were followed from diagnosis as children until adulthood. SLE disease activity was modeled as a latent characteristic, jointly using the Systemic Lupus Erythematosus Disease Activity Index 2000 and prednisone in a Bayesian growth mixture model. Baseline factors were tested for membership predictions of the latent classes of disease trajectories. Differences in damage trajectories by disease activity classes were tested using a mixed model. A total of 473 patients (82% females), median age at diagnosis of

14.1 years, were studied. The authors studied 11,992 visits (2666 patient-years) and identified five classes of disease activity trajectories. Baseline major organ involvement, number of American College of Rheumatology criteria, and age at diagnosis predicted classification. A higher proportion of Asians were in class 2 compared to class 5. Class 1 was associated with the most accrual of damage, while class 5 was associated with no significant damage accrual, even after 10 years. The authors concluded that there are five distinct latent classes of disease trajectory in patients with cSLE. Classification within disease trajectories is predicted by baseline clinical and demographic factors. Classification in different disease activity trajectory classes is associated with different damage trajectories.

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Eitan Israeli

**“The main difference between a cat and a lie is that a cat only has nine lives”**

Mark Twain, (1835–1910), American humorist, writer