

MINI-FOCUS ISSUE: CORONARY & STRUCTURAL INTERVENTIONS

BEGINNER

CASE REPORT: CLINICAL CASE

Permanent Sinus Node Arrest Complicating Coronary Angioplasty



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ABSTRACT

Sinus node artery (SNA) occlusion is a rare complication of percutaneous coronary intervention and usually has a benign prognosis; sinus arrest may occur but frequently resolves. We report a case of unresolved SNA obstruction following percutaneous coronary intervention of the mid-right coronary artery, for which permanent pacemaker implantation was required. (**Level of Difficulty: Beginner.**) (J Am Coll Cardiol Case Rep 2021;3:407-11) © 2021 The Authors. Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

HISTORY OF PRESENTATION

A 68-year-old woman presented to Onassis Cardiac Surgery Center, Athens, Greece with chest pain on minimal exertion. On admission, her arterial blood pressure was 100/50 mm Hg, her heart rate was 72 beats/min, and her oxygen saturation was 97% on room air. Heart and lung auscultation findings were unremarkable, with no signs of congestive heart failure. Peripheral pulses were symmetrical. The

electrocardiogram showed sinus rhythm, ST-segment depression in leads V₄ to V₆, and T-wave inversion in leads II, III, and aVF (**Figure 1**). Her initial peak troponin level was 1.3 ng/ml (normal value <0.016 ng/ml).

PAST MEDICAL HISTORY

The patient reported rheumatoid arthritis, hypertension, dyslipidemia, and peripheral arterial disease.

DIFFERENTIAL DIAGNOSIS

Initial differential diagnoses included acute coronary syndrome, acute aortic syndrome, pulmonary embolism, pericarditis, and pneumothorax.

INVESTIGATIONS

The chest radiograph was normal. The echocardiogram showed severe hypokinesis of the posterior and

LEARNING OBJECTIVES

- To alert the physician that rhythm and conduction disturbances may occur during or after PCI.
- To emphasize that these abnormalities usually resolve.
- To report that specific therapies are rarely required.

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The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the [Author Center](#).

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ABBREVIATIONS AND ACRONYMS

LCx = left circumflex artery

PCI = percutaneous coronary intervention

RCA = right coronary artery

SNA = sinus node artery

inferior walls, a left ventricular ejection fraction of 45%, mild aortic valve regurgitation with a normal-size aorta, and no pericardial effusion. The patient underwent coronary angiography, which revealed a dominant right coronary artery (RCA) with 2 midsegment stenoses, 80% and 90%, respectively, but Thrombolysis In Myocardial Infarction (TIMI) flow grade 3. The left anterior descending artery and the left circumflex artery (LCx) were normal.

MANAGEMENT

Two overlapping drug-eluting stents were implanted (Onyx 2.75 × 15 mm distally and Endeavor 3 × 18 mm more proximally, Medtronic, Minneapolis, Minnesota). Immediately after deployment of the proximal stent, a junctional escape rhythm developed, with a heart rate of 40 beats/min (Figure 2), but without hemodynamic compromise. Atropine was administered, with no effect. Sinus node artery (SNA) occlusion was promptly recorded (Figures 3A, 3B, 4A and 4B). A temporary pacemaker was inserted, and the

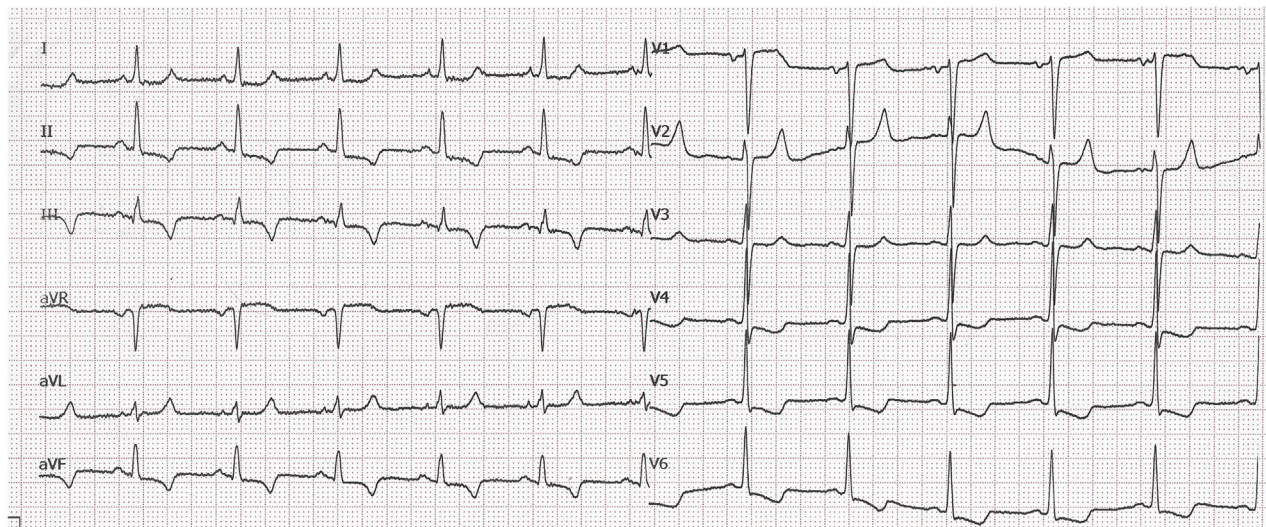
patient was transferred to the cardiac care unit for close monitoring. Two days post-percutaneous coronary intervention (PCI), the patient's troponin level peaked at 32.2 ng/ml. The patient remained hospitalized in the cardiac care unit for 10 days, on junctional escape rhythm (Figure 5). A dual-chamber pacemaker was implanted, and the patient was discharged (Figure 6).

DISCUSSION

In the only published series of 80 consecutive patients undergoing proximal RCA PCI, SNA occlusion occurred in 17.5%. Among them, 28.6% had junctional escape rhythm, which resolved in 3 days in all patients (1), probably as a result of spontaneous reperfusion. Temporary pacing may be indicated, and thrombolysis (2) and thrombectomy (3) have been described. In another report, a permanent pacemaker was implanted on day 14, but normal sinus rhythm was recorded on day 40 (4).

The SNA may be a branch of the RCA in 61%, a branch of the LCx in 37%, and a branch of both the

FIGURE 1 Initial 12-Lead Electrocardiogram



The electrocardiogram shows sinus rhythm, ST-segment depression in leads V₄ to V₆, and T-wave inversion in leads II, III, and aVF.

FIGURE 2 Junctional Escape Rhythm After Right Coronary Artery Percutaneous Coronary Intervention, With Atrial Premature Beats, From Telemetry Recording

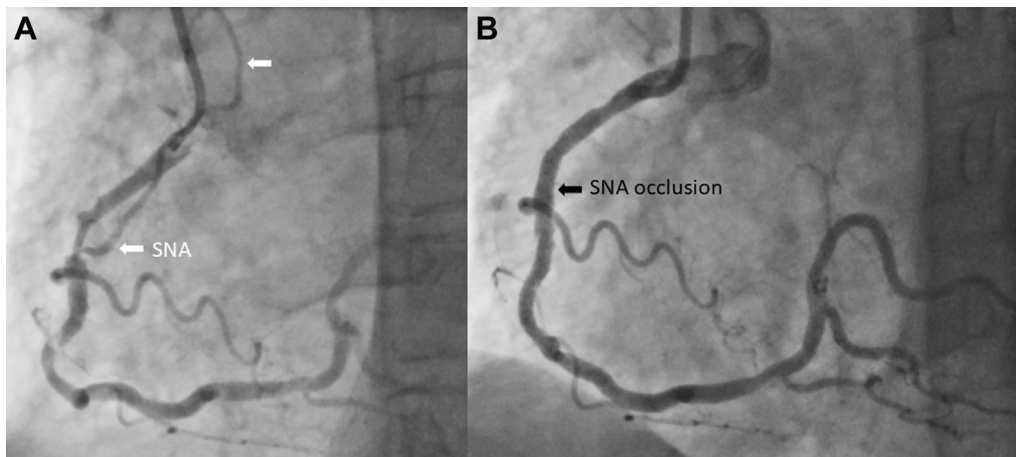


RCA and the LCx in 2% of patients, and occlusion of the SNA during LCx PCI has also been reported (5). Long-standing sinus node dysfunction may be managed conservatively with close, regular, noninvasive evaluation; restoration of sinus rhythm may happen as late as 6 months post-PCI (6).

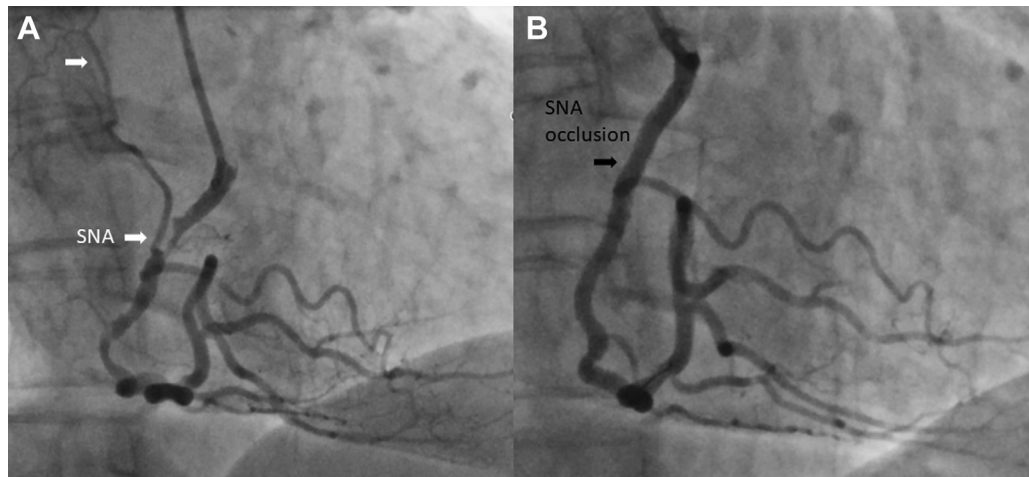
FOLLOW-UP

One month later, during her routine evaluation in the pacemaker clinic, sinus rhythm had not been restored. Of note, the patient remains in paced rhythm atrial pacing and ventricular sensing

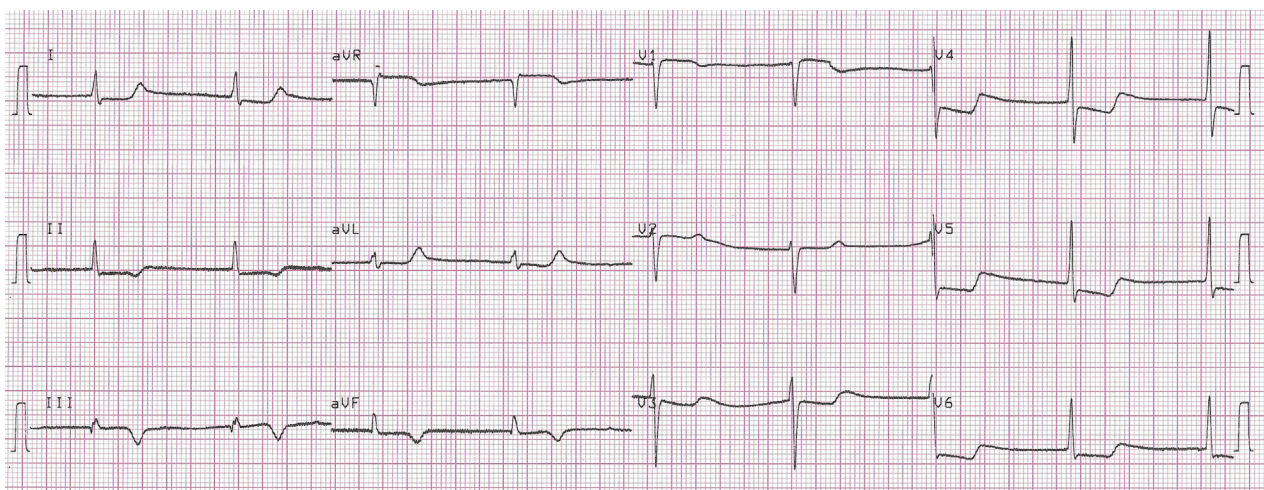
FIGURE 3 Coronary Angiogram in the Left Anterior Oblique Projection



(A) Pre-percutaneous coronary intervention (white arrows showing sinus node artery [SNA]). (B) Post-percutaneous coronary intervention (black arrow showing SNA occlusion).

FIGURE 4 Coronary Angiogram in the Right Anterior Oblique Projection

(A) Pre-percutaneous coronary intervention (white arrows showing sinus node artery [SNA]). (B) Post-percutaneous coronary intervention (black arrow showing SNA occlusion).

FIGURE 5 12-Lead Electrocardiogram on Day 10 Showing an Accelerated Junctional Rhythm

ECG = electrocardiogram.

6 months after her discharge, as shown in both 24-h Holter monitoring and pacemaker interrogations, without evidence of sinus node recovery. The left ventricular ejection fraction fully recovered during follow-up and is now completely normal.

CONCLUSIONS

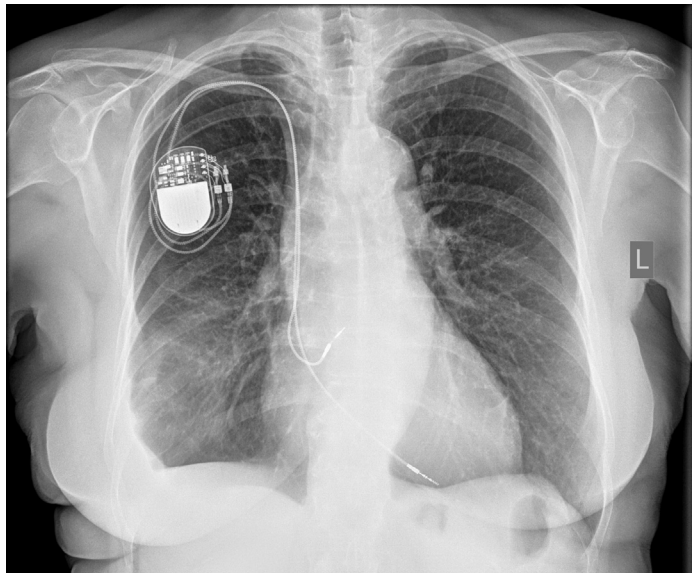
Junctional escape rhythm, following SNA obstruction, may rarely persist and permanent pacemaker implantation may be required, although a conservative approach with watchful follow-up may be a safe alternative.

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The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

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FIGURE 6 Chest Radiograph Showing the Implanted Pacemaker



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