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Case Report

A Case Report of de Winter Pattern Post-CABG Related to a Hematoma

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Abstract

Coronary artery bypass grafting (CABG) is a common procedure performed for severe coronary artery disease (CAD). Postoperative bleeding requiring a blood transfusion is a common complication. Here, we report a case of a 74-year-old male who underwent CABG for the indication of severe multivessel coronary artery disease. His procedure was complicated by postoperative bleeding requiring one unit of packed red blood cell transfusion. He developed a hematoma around the left lung and a small arterial blood vessel that bled into the pleural fat near the opening made for the mammary pedicle. An electrocardiogram (ECG) was performed prior to the evacuation of the hematoma and was significant for ST depressions and tall T-waves in the precordial leads in the pattern of de Winter syndrome. The de Winter pattern was not present on the repeat ECG after hematoma evacuation. The patient's hyperacute T waves could have been related to sub-endocardial inflammation or infarction. The rapid resolution of the T-wave abnormalities after evacuation of his hematoma suggested a reversible cause and could have been related to irritation from the hematoma. Ischemia must be considered in the postoperative state when ECG changes are noted but can be difficult to distinguish from ST-T changes that are not ischemic in nature. Therefore, these and similar ECG changes noticed post-operatively should be evaluated carefully.

Introduction

Coronary artery bypass grafting (CABG) is a common procedure performed for severe coronary artery disease (CAD). Complications can include 1% mortality, a 2-4% chance of stroke [1], and a 5-10% chance of bleeding requiring a blood transfusion [2]. One of the major concerns is peri-CABG myocardial infarction (MI). Multiple EKG changes can be observed following CABG including right bundle branch block (RBBB), Left bundle branch block (LBBB), atrioventricular block, ST-segment elevation or depression, T-wave changes, and new Q Waves [3]. Most of these EKG changes are transient and benign. However, distinguishing acute MI is crucial. Cardiac memory (CM) is a phenomenon of electrical remodeling seen after periods of altered ventricular conduction [4]. CM poses a challenge in ECG interpretation, as it often imitates findings of ischemia [5]. We present a case of post CABG hematoma which resulted in ST depression and tall T waves in precordial leads (de winter pattern).

Case Presentation

A 74-year-old male with a past medical history of paroxysmal atrial fibrillation on chronic anticoagulation and a history of inferior myocardial infarction treated with placement of a drug-eluting stent to the right coronary artery presented to his cardiologist's office complaining of chest pain despite multiple antianginal medications at maximally tolerated doses. He underwent left heart cardiac catheterization with coronary angiography which demonstrated three-vessel coronary artery disease (severe disease involving proximal and distal left anterior descending artery, proximal right coronary artery, and proximal and distal right posterior descending artery), and he received the recommendation to undergo coronary artery bypass grafting (CABG).

The patient was bridged off dabigatran and underwent CABG with left internal mammary artery to the left anterior descending artery, reverse saphenous vein graft to the posterior descending artery, reverse saphenous vein graft to the 2nd diagonal artery, in addition to Modified cox 4 maze procedure and ligation of the left atrial appendage with a 35 mm Atricure Clip. The estimated blood loss was 300 ml during the surgery, for which the patient was transfused with one unit of packed red blood cells. The patient was subsequently transferred to the intensive care unit (ICU) for vasopressor support. He developed coagulopathy and a general ooze from the chest tubes. A chest x-ray was performed revealing interval worsening in ill-defined opacification in the left midlung zone, as well as a small left pleural effusion. An ECG was significant for ST depressions and tall T-waves in the precordial leads in the pattern of de Winter syndrome (Figure 1), which was not present on prior ECG and was concerning for acute anterior ischemia. On the evening status post his CABG, the decision was made to take the patient back to the operating room for mediastinal exploration and washout. There was a significant amount of hematoma around the left lung, which was evacuated. There was a small arterial blood vessel bleeding in the pleural fat near the opening made for the mammary pedicle that was ligated. The patient was transferred back to the ICU for observation, and he did well post-operatively. De Winter pattern was not present on repeat ECG after hematoma evacuation (Figure 2). The patient was observed for a period of four days post-operatively, did not have any further complications, and was discharged home in stable condition.

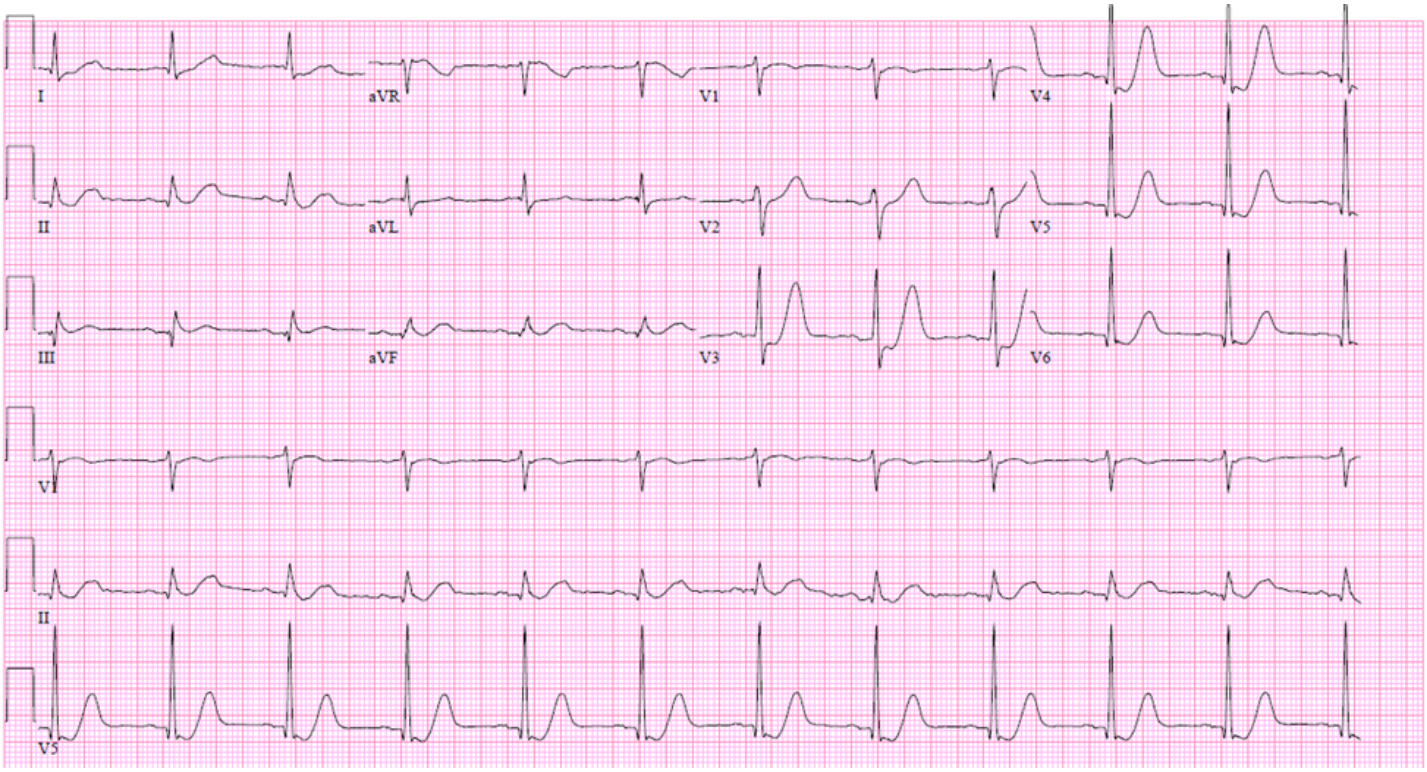

Figure 1: Interval postoperative coronary artery bypass grafting ECG demonstrating normal sinus rhythm, J-point depression with ST and T-wave abnormality in multiple leads. Overall pattern consistent with de Winter pattern, concerning for acute anterior ischemia.

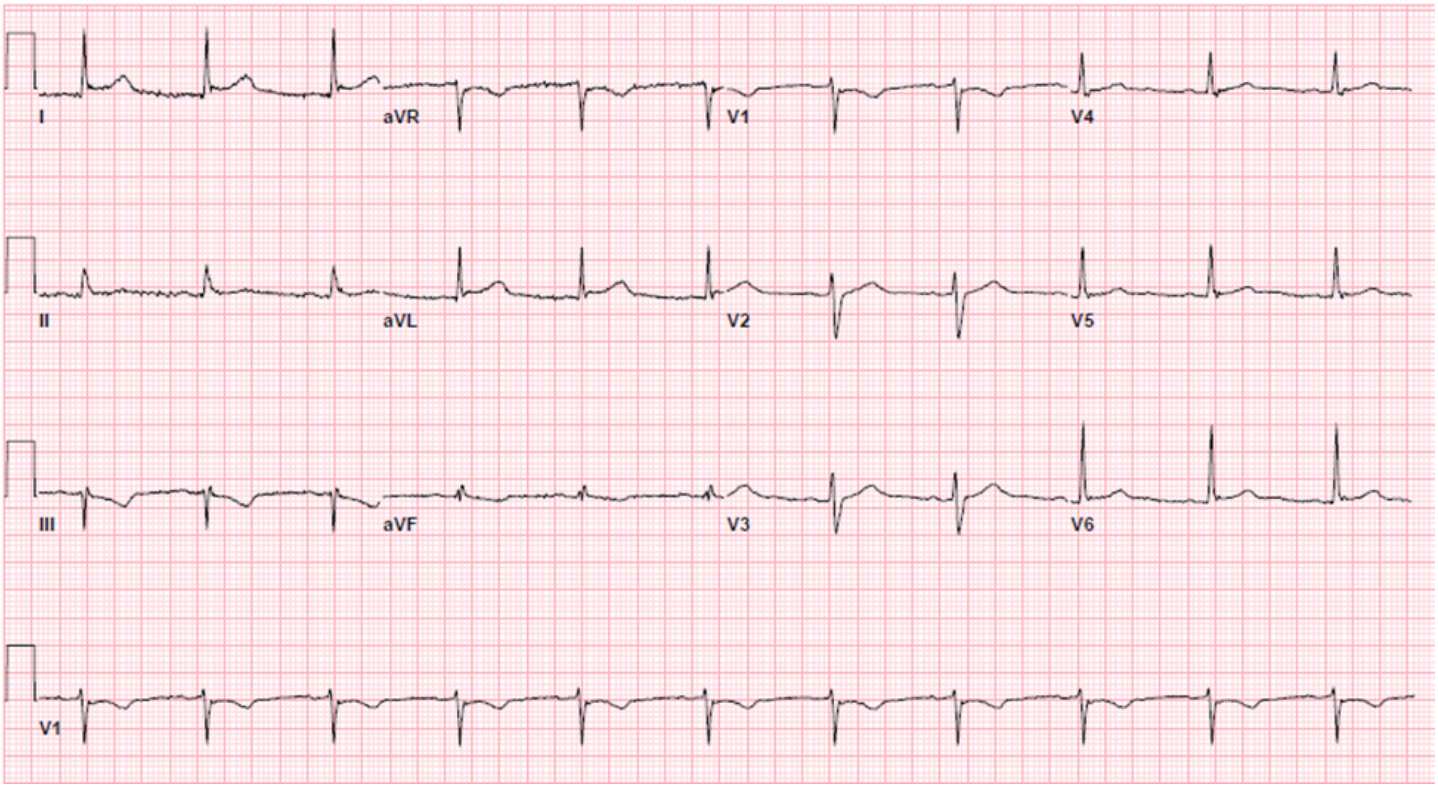

Figure 2: Repeat ECG one day status post hematoma evacuation, demonstrating normal sinus rhythm, and minimal ST elevation in lead I and avL with consideration for early repolarization, pericarditis, or injury. Compared to the prior tracing from Figure 1, the De Winter pattern is no longer present.

Discussion

Bleeding is a common postoperative complication of coronary artery bypass grafting [2]. Several ECG changes can be observed following CABG, including ST-segment elevation or depression, T-wave changes, and new Q waves [3]. We presented a case of a patient who had postoperative bleeding after coronary artery bypass grafting necessitating the patient's return to the operating room for mediastinal exploration and evacuation of his hematoma. Interestingly, our patient's ECG manifested with changes that are typically thought to be ischemic; namely, ST depressions and hyperacute T-waves in the precordial leads in a pattern of de Winter syndrome. These changes normalized after the evacuation of his hematoma. Early experience with coronary artery bypass graft surgery indicated that a significant percentage of patients develop ECG evidence of new transmural infarction in the immediate postoperative period [6]. As more experience was gained, it became apparent that there were certain problems in the analysis of the ECG postoperatively in such patients. Many patients have severe ST-T wave changes after coronary artery surgery which suggests ischemia, but this could be due to pericarditis or metabolic abnormalities, and it seems reasonable to suppose that some of these patients have subendocardial infarction [7]. This patient's hyperacute T-waves could have been related to sub-endocardial inflammation or infarction in a similar manner. The rapid resolution of the T-wave abnormalities after evacuation of his hematoma suggests a reversible cause and could have been related to irritation or compression from the hematoma.

De Winter syndrome is typically thought to involve the left anterior descending artery. This patient's surgery involved grafting of the left internal mammary artery to the left anterior descending artery. Additionally, the patient's oozing of blood involved a small arterial blood vessel that was bleeding into the pleural fat near the opening made for the mammary pedicle, close to a region of the heart that may explain the ECG changes.

The ECG changes in this patient may have been related to a known phenomenon termed cardiac memory (CM). First coined by Rosenbaum et al in 1982, cardiac memory is a phenomenon of electrical remodeling seen after periods of altered ventricular conduction [4]. Such T wave abnormalities have been seen after termination of ventricular pacing, elimination of ventricular pre-excitation after ablation of an accessory pathway, and temporary resolution of conduction abnormalities (predominantly left bundle branch block (LBBB)) [4]. CM poses a challenge in ECG interpretation, as it often imitates findings of ischemia.

Distinguishing T wave changes in CM from those in ischemia is important, as correctly identifying CM can avoid unnecessary additional invasive testing [5]. History and physical examination along with non-invasive diagnostic studies are crucial because they may reveal a reversible cause for the ST-T changes, such as a hematoma that may need evacuation.

Ankit B. Shah et. al. presented a case of a high-risk elderly male who developed deep T wave inversions after coronary artery bypass grafting in the setting of intermittent LBBB [5]. Our case is similar in that it involved T wave changes in the precordial leads after CABG; however, there are unique differences. First, the T-wave changes in our patient occurred in the setting of a hematoma which required evacuation. Second, the T wave changes were peaked and consistent with a de Winter pattern; namely, ST depressions and tall T waves in the precordial leads.

There are several diagnostic methods currently used for the assessment of myocardial injury after CABG. As demonstrated in a review by Weidenmann V. et al, using a combination of biomarker values, echocardiographic signs, and ECG provides the most diagnostically conclusive information [3].

Conclusion

We presented an unusual manifestation (de Winter T waves) of a common complication (post-operative bleeding) of coronary artery bypass grafting. De Winter T waves are typically thought to be ischemic, however, this case has demonstrated that local bleeding complications post-operatively may produce ECG changes that can mimic this syndrome. Ischemia is a feared complication that can be difficult to distinguish from reversible ST-T changes that are not ischemic in nature. Therefore, these and similar ECG changes noticed post-operatively should be evaluated with great scrutiny.

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