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Case Report

Invasive Strategy of STEMI in Patients with TAVB, RBBB, and Dual High-Risk Profiles: Navigating the Challenges of Antithrombotic Therapy – A Case Report

Aisyah Ayu Shafira[1*], Hanestya Oky Hermawan[2]
[1]*Faculty of Medicine, Universitas Airlangga, Dr. Soetomo General Academic Hospital, Surabaya, Indonesia.*
[2]*Department of Cardiology and Vascular Medicine, Universitas Airlangga, Dr. Soetomo General Academic Hospital, Surabaya, Indonesia.*

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**Correspondence:*
aisyaayushafira@gmail.com

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ABSTRACT

Background: It is imperative to diagnose and treat acute coronary occlusion as soon as possible, especially in patients with complicated conduction anomalies. Although electrocardiography (ECG) is still the gold standard for diagnosis, it has drawbacks, particularly when conduction abnormalities such as bundle branch block are present. **Case Summary:** In this case study, a 60-year-old woman with cardiovascular risk factors and type 2 diabetes had an anteroseptal STEMI that was worsened by RBBB and total AV block. The patient's recovery was complicated by extensive gastrointestinal bleeding after a successful percutaneous coronary intervention (PCI) and the implantation of a stent in the left anterior descending artery. **Conclusion:** In addition to highlighting the difficulties of striking a balance between dual antiplatelet therapy (DAPT) and reperfusion strategies in a high bleeding risk setting, this also highlights the management of a high-risk STEMI patient with total atrioventricular (AV) block, right bundle branch block (RBBB), and severe gastrointestinal complications.

Highlights:

1. This case illustrates the complex management of STEMI with total AV block and right bundle branch block, where urgent PCI and temporary pacing achieved rapid hemodynamic stabilization.
2. Post-PCI gastrointestinal bleeding under dual antiplatelet therapy highlights the need for individualized antithrombotic strategies and vigilant post-discharge monitoring in high-risk patients.

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Introduction

When choosing emergency reperfusion, prompt identification of a blocked coronary artery is essential. Electrocardiography (ECG) is the quickest and most practical diagnostic technique, but it has significant drawbacks, especially when it comes to conduction problems such bundle branch block. This case report focuses on important ECG findings in a patient who had an escape ventricular rhythm with a right bundle branch block (RBBB) morphology, acute anteroseptal STEMI, and total atrioventricular (AV) block. The patient's sinus rhythm returned right away following reperfusion.

When severe conduction abnormalities such total atrioventricular (AV) block and right bundle branch block (RBBB) are present, managing ST-Elevation Myocardial Infarction (STEMI) in patients with significant bleeding risk becomes a challenging therapeutic issue. Percutaneous coronary intervention (PCI) and dual antiplatelet therapy (DAPT) are common therapies for STEMI; nevertheless, their use in individuals at high risk for bleeding necessitates a careful balancing act between reducing hemorrhagic episodes and preventing thrombotic consequences. The management of a high-risk STEMI patient with total AV block and RBBB is examined in this case study, emphasizing the necessity of customized treatment programs in these complex situations. A framework for improving care for this susceptible patient group is offered by these observations.

Case Presentation

Three days prior to admission, a 60-year-old lady with a history of cardiovascular risk factors and type 2 diabetes arrived to the emergency department (ED) with foggy vision and chest pain (pain scale 5/10). Total AV block, right bundle branch block (RBBB) escape rhythm, and ST-segment elevation in the anteroseptal leads (V2-V6) were found during the initial evaluation at a prior institution (Fig. 1). Due to unstable hemodynamics and severe bradycardia, she was started on dopamine infusion (5 mcg/kg/min).

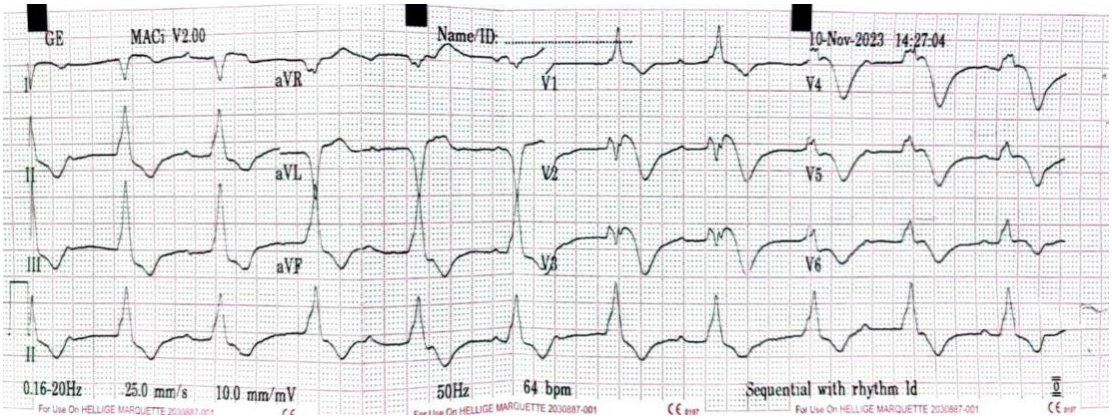

Figure 1. The patient's ECG from the prior hospital indicated complete AV block with a right bundle branch block escape rhythm and ST-segment elevation in the anteroseptal leads (V2-V3). Date: October 11, 2023.

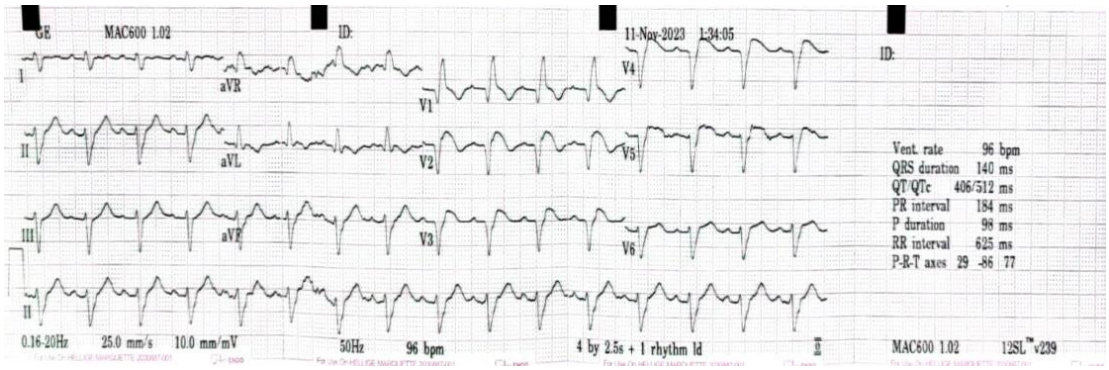

Figure 2. The patient's ECG in the Critical Care Unit, following the insertion of a temporary pacemaker, demonstrated Sinus Rhythm, Grade I AV Block with RBBB pattern escape rhythm, and ST-segment elevation in the anteroseptal leads (V2-V6). Date: November 11, 2023.

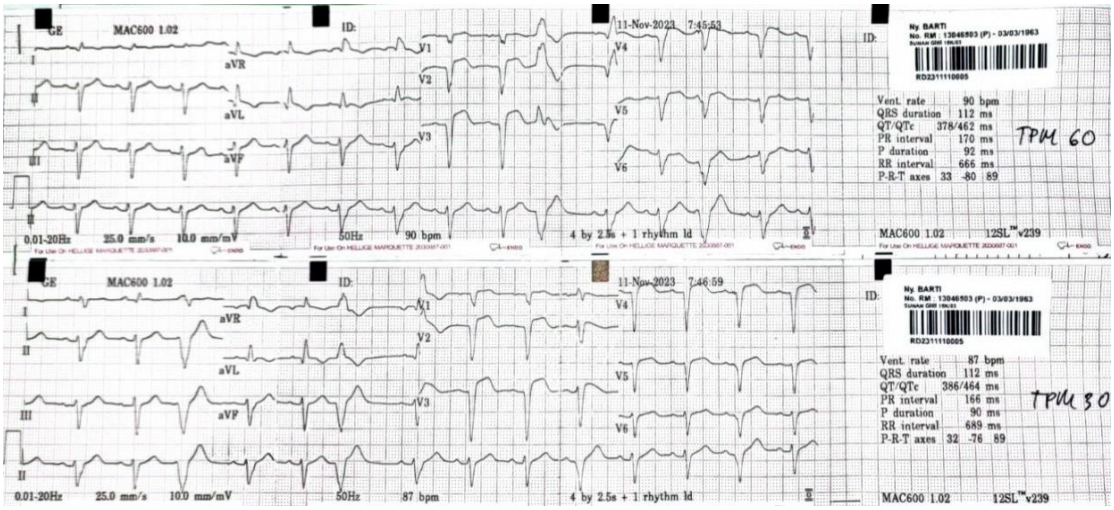

Figure 3. The ECG in the ICCU following PPCI with a temporary pacemaker indicated a recent acute anterior myocardial infarction and many premature ventricular contractions (PVCs). Date: November 11, 2023.

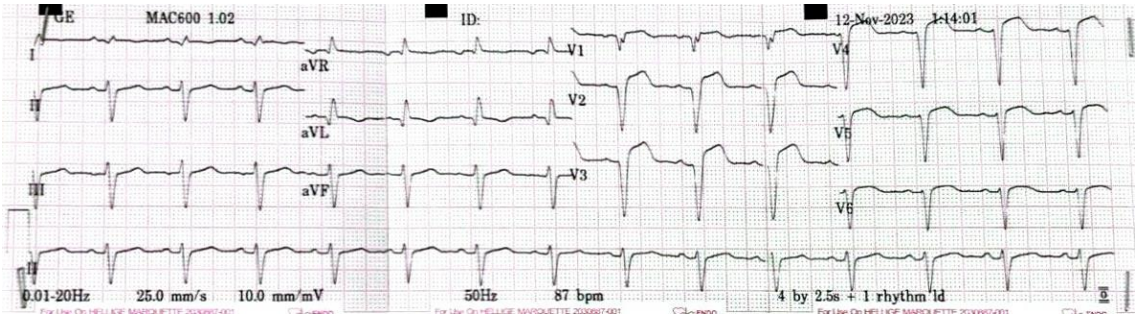

Figure 4. Electrocardiogram in the Intensive Cardiac Care Unit, 24 hours following Primary Percutaneous Coronary Intervention Demonstrated sinus rhythm, QS pattern, ST elevation in leads V2-V6, and T wave inversion in leads I and AVL. December 11, 2023.

Figure 5. Diagnostic coronary angiography (DCA) revealed diffuse disease extending from the proximal to distal left anterior descending artery (LAD) with total occlusion in the proximal LAD.

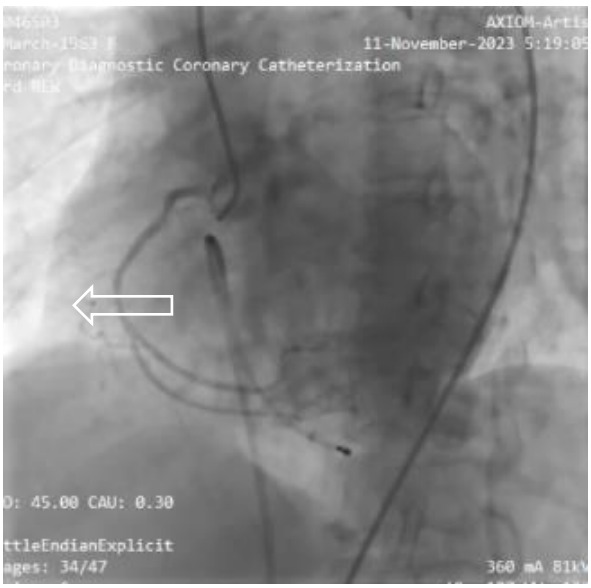

Figure 6. Diagnostic coronary angiography (DCA) revealed the right coronary artery (RCA) exhibiting mild stenosis of 20-30% in the mid-segment.

Upon arrival at our ED, she had stable hemodynamics under vasoactive support, persistent chest pain, and similar ECG findings, along with elevated cardiac Troponin I levels (HS-Trop I: 13.403 ng/L). Echocardiography revealed decreased left ventricular function (EF by TEICH: 47%) and hypokinesia in the anteroseptal region.

The patient underwent urgent coronary angiography, which showed total occlusion of the left anterior descending artery (LAD)(Fig.5) and mild stenosis in the right coronary artery (RCA)(Fig.6).

Percutaneous coronary intervention (PCI) and temporary transvenous pacemaker placement were performed with successful stent placement in the LAD, achieving TIMI Flow III(Fig.7). Twenty-four hours post-procedure, the patient's ECG normalized to sinus rhythm (Fig. 4), and her hemodynamics stabilized, allowing for discharge on day four with dual antiplatelet therapy (aspirin 100 mg and ticagrelor 90 mg), along with other cardiac medications.

Five days post-discharge, the patient returned to the ED with severe nausea, vomiting, and dark-colored diarrhea, leading to hypovolemic shock and anemia. Patient's ECG showed sinus rhythm 90x/minute, with QS pattern and ST-segment elevation in lead V2-V6 with T inversion in lead I and aVL(Fig.8). Early resuscitation, norepinephrine infusion, blood transfusion, and discontinuation of acetylsalicylic acid (ASA) were implemented to manage her condition. Over three days, her symptoms and vital signs improved, with resolution of shock, anemia, hyperkalemia, and hypoalbuminemia. The patient was stabilized and discharged, with plans for outpatient endoscopy and cardiac rehabilitation.

Figure 7. Post PPCI stent in the prox-mid LAD with TIMI flow III.

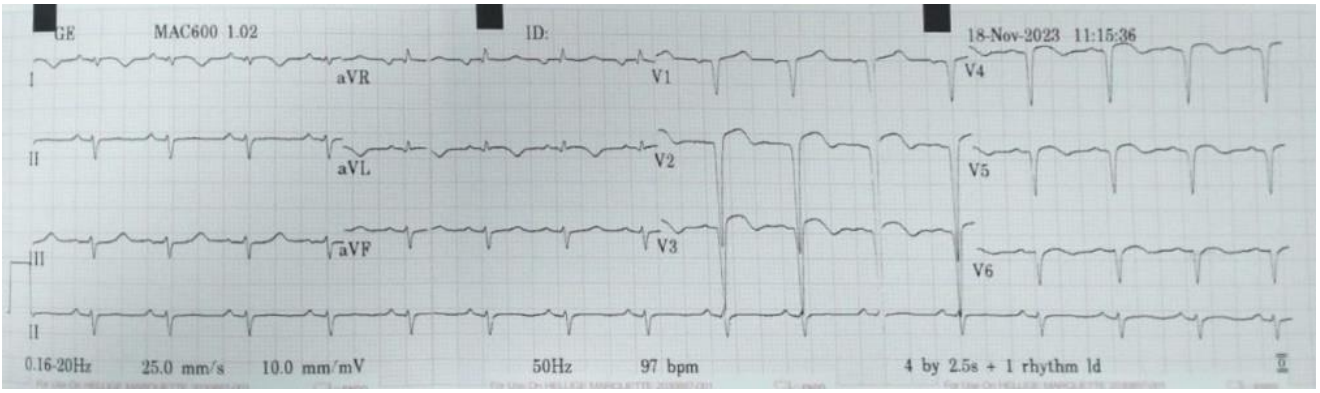

Figure 8. Patient's ECG at the emergency room shows sinus rhythm at 90 beats per minute, regular, with a QS pattern and ST-segment elevation in leads V2-V6, accompanied by T-wave inversion in leads I and aVL (Date: 18/11/2023).

Discussion

The combination of total AV block and RBBB in the setting of STEMI is indicative of extensive myocardial damage, particularly in the conduction system distal to the AV node[1]. The presence of total AV block typically indicates significant involvement of the anterior myocardial wall, often linked to severe ischemia or infarction of the conduction pathway. This lesion manifests as an escape rhythm characterized by a wide QRS complex and occurs within 24 hours. Additionally, total AV block due to acute LAD occlusion will often present with a BBB pattern, indicating the extent of myocardial infarction (MI). As in this case, the ventricular escape rhythm initially had an RBBB pattern. This combination can lead to a high mortality rate[4]. Coronary angiography in this patient confirmed total occlusion of the LAD, consistent with the extensive anterior myocardial ischemia observed on the ECG.

The presence of anteroseptal STEMI with hemodynamic instability required immediate intervention. The decision to initiate dopamine infusion was necessary to maintain organ perfusion until definitive care could be provided[2]. Treatment for patients with electrical instability due to total AV block and bundle branch block is temporary pacemaker replacement, while reperfusion is critical for patients with cardiogenic shock due to coronary artery occlusion[3]. These two main procedures are the cornerstone of treatment for STEMI patients with TAVB and BBB. The success of these interventions led to rapid stabilization of the patient's hemodynamics and clinical condition.

On the second day of hospitalization, the patient's ECG improved to sinus rhythm with a narrow QRS, no longer showing the BBB pattern. However, ST-segment elevation persisted in leads V2-V6. As her hemodynamics improved, she was discharged on day four with oral therapy, including high-intensity statins and dual antiplatelet (DAPT) therapy.

Five days post-discharge, the patient developed severe gastrointestinal symptoms leading to hypovolemic shock. While DAPT is a cornerstone of post-PCI management, it likely contributed to gastrointestinal bleeding in this patient. The decision to discontinue acetylsalicylic acid (ASA) was crucial in managing her bleeding risk, although it introduced the potential risk of thrombotic complications[5]. The choice of which P2Y12 inhibitor (clopidogrel, prasugrel, or ticagrelor) to continue or discontinue depends on individual patient factors and the severity of bleeding.[6] In this case, ticagrelor was continued.

DAPT is crucial in post-PCI treatment; nevertheless, it must be weighed against the risk of bleeding, especially in patients with diabetes and gastrointestinal susceptibilities. Future management of analogous patients may benefit from a more sophisticated approach to antiplatelet medication, maybe incorporating novel drugs with a more

advantageous bleeding profile or personalized medicine tools to evaluate bleeding risk more accurately. The role of gastrointestinal prophylaxis in these patients warrants additional investigation to avert similar consequences. The patient's stabilization and release after intense therapy of her hemorrhagic episode underscore the significance of a multidisciplinary approach and meticulous monitoring to enhance outcomes.

Conclusion

This example underscores the intricacy of managing high-risk STEMI patients with notable conduction anomalies and the danger of severe post-procedural consequences. An equitable, individualized strategy for dual antiplatelet therapy and percutaneous coronary intervention, coupled with meticulous post-discharge surveillance, is crucial for enhancing outcomes in this complex patient demographic. DAPT is essential for post-PCI management, however bleeding risk requires cautious evaluation. Strategies must encompass the modification of antiplatelet treatment in accordance with bleeding risk and clinical circumstances. Vigilant observation is essential for the early detection and management of problems. A multidisciplinary strategy incorporating cardiologists, hematologists, and gastroenterologists is essential for addressing complex situations to enhance patient outcomes.

Future research and guidelines could enhance antiplatelet therapy and bleeding risk management by investigating more nuanced strategies, particularly in individuals with complex conditions including total AV block and RBBB.

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