

When Standard Options Are Unavailable, Managing Hypertensive Urgency In A Rural Primary Care Setting: A Case Of Clinical Adaptation

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1. Abstract

Hypertensive urgency is characterized by a marked elevation in blood pressure without acute target organ damage. In rural primary care settings, management can be challenging due to limited drug availability, diagnostic tools, and specialist access.

A 48-year-old male presented to a rural clinic with palpitations but no chest pain, dyspnea, or neurological symptoms. His blood pressure was 230/120 mmHg with a heart rate of 104 bpm. Physical examination was unremarkable, and ECG showed ST-segment elevation in leads V1-V4 with deep Q waves and left ventricular hypertrophy. Two doses of sublingual nifedipine failed to reduce blood pressure. After remote consultation with a cardiologist, bisoprolol and amlodipine were administered, lowering the blood pressure to 150/90 mmHg after 24 hours. The patient remained stable.

Hypertensive urgency should be managed with gradual blood pressure reduction using appropriate oral agents. Sublingual nifedipine is not preferred due to the risk of rapid hypotension and ischemia. Persistent ST elevation with deep Q waves may indicate an old myocardial infarction or left ventricular aneurysm, and echocardiography is valuable for assessing left ventricular function. In settings lacking cardiac enzyme testing and imaging, empirical treatment for acute coronary syndrome may be considered.

This case emphasizes the importance of adaptive decision-making in resource-limited settings. Collaboration with specialists, rational

use of available medications, and adherence to guideline-based approaches can improve outcomes in managing hypertensive urgency.

2. Keywords

bisoprolol, clinical adaptation, echocardiography, hypertensive urgency, late-onset myocardial infarction, nifedipine, primary care

3. Introduction

Hypertensive urgency refers to a significant elevation in blood pressure ($\geq 180/120$ mmHg) without signs of acute damage to target organs [1,2]. Although this condition does not require immediate intravenous therapy as seen in hypertensive emergencies, careful and timely reduction of blood pressure remains critical to lower the risk of serious cardiovascular events, including stroke, myocardial infarction, and kidney injury [3,4]. Management usually focuses on oral antihypertensive adjustment, close monitoring, and addressing contributing factors.

However, implementing guideline-based care can be difficult in rural or resource-constrained settings. The absence of parenteral medications, limited diagnostic tools, and minimal access to specialist support often force primary care providers to adapt their management strategies to what is realistically available. These challenges can delay optimal treatment and increase the risk of complications, particularly in patients with longstanding uncontrolled hypertension [3,5].

In such situations, clinicians must rely heavily on clinical judgment and practical, context-appropriate solutions to stabilize patients. This case report illustrates the adaptive management of persistent hypertensive urgency in a rural primary health center with limited resources. It emphasizes the importance of flexible decision-making, timely intervention, and individualized care in real-world low-resource settings [6].

4. Case Presentation

A 48-year-old male presented to a rural primary care clinic with a chief complaint of palpitations that had started one hour prior to arrival. He denied experiencing typical or radiating chest pain, dyspnea, dizziness, nausea, vomiting, visual disturbances, or peripheral edema. Notably, symptoms commonly associated with hypertensive urgency-such as severe headache, blurred vision, epistaxis, or neurological deficits-were also absent.

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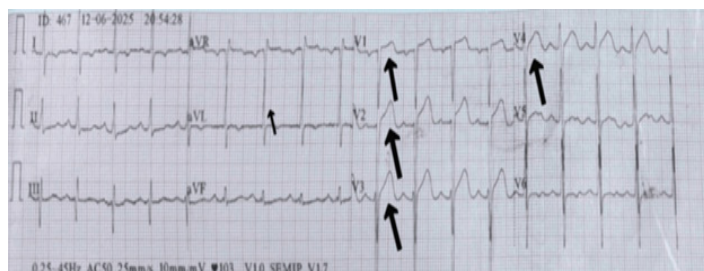


FIGURE 1: Twelve-lead electrocardiogram (ECG) obtained at the emergency department of a primary health care center. The recording shows sinus tachycardia with a heart rate of 104 beats per minute. ST-segment elevation is visible in leads V1–V4 (black arrows), indicating anterior wall involvement. Left ventricular hypertrophy (LVH) is suggested by an R wave amplitude greater than 11 mm in lead aVL. The calibration is 25 mm/s and 10 mm/mV.

4.1. Past medical history: Uncontrolled hypertension

On physical examination, the patient was fully conscious with a Glasgow Coma Scale score of E4M6V5. His blood pressure was markedly elevated at 230/120 mmHg, and his heart rate was 104 beats per minute with a regular rhythm. Other systemic examinations revealed no abnormal findings.

4.2. Investigations: Electrocardiography revealed ST-segment elevation predominantly in leads V1–V4, accompanied by deep Q waves in V1–V2, which may indicate a late-onset anterior myocardial infarction with poor R-wave progression. The R-wave amplitude in lead aVL measured more than 11 mm, suggesting the presence of left ventricular hypertrophy. These findings are illustrated in Figure 1.

4.3. Initial management: Because the visit occurred outside regular pharmacy operating hours, only limited medications stored in the emergency room were accessible. Parenteral antihypertensive drugs were unavailable, and nifedipine was the only oral antihypertensive agent in stock at that time. Therefore, two doses of sublingual nifedipine were administered at one-hour intervals. Despite this, the patient's blood pressure remained persistently elevated.

Consultation and further management: Referral to a tertiary hospital was considered. However, after a teleconsultation with a cardiologist, it was advised to continue treatment at the primary care level using bisoprolol 5 mg and amlodipine 10 mg, given the stable clinical status and resource limitations. The patient was monitored closely overnight.

Outcome: After 24 hours, his blood pressure gradually decreased to 150/90 mmHg, heart rate stabilized, and he remained symptom-free without any new complaints.

5. Discussion

This case illustrates the real-world challenges of managing hypertensive urgency in a resource-limited rural primary care setting. According to the European Society of Hypertension and European Society of Cardiology guidelines (2023), the preferred management strategy involves the use of oral antihypertensive therapy to achieve a gradual blood pressure reduction over 24 to 48 hours [1]. Commonly recommended agents include calcium channel blockers such as amlodipine, ACE inhibitors, or beta-blockers, which allow for controlled and sustained lowering of blood pressure without the risk of rapid hemodynamic shifts [2]. Sublingual nifedipine, which was once widely used for its rapid onset of action, is no longer recommended in current guidelines [3,4]. The main concerns are its unpredictable and sometimes abrupt blood pressure reduction, which can lead to severe hypotension, reflex tachycardia, myocardial ischemia, or even ischemic stroke. The rapid vasodilation caused by nifedipine may also compromise coronary and cerebral perfusion, especially in patients with underlying cardiovascular disease. These safety concerns have led to its removal from the list of first-line options for hypertensive urgency.

In this case, nifedipine was administered not as a preferred treatment but as a measure of necessity. The patient presented outside regular pharmacy operating hours, and the emergency drug stock at the primary care center was extremely limited. Parenteral antihypertensive agents were unavailable, and nifedipine was the only oral agent accessible at that time. Despite two sublingual doses given at one-hour intervals, the patient's blood pressure remained high, prompting teleconsultation with a cardiologist. Subsequent administration of bisoprolol 5 mg and amlodipine resulted in a steady and safe reduction in blood pressure, in line with guideline recommendations [1,2,4].

Electrocardiography demonstrated persistent ST-segment elevation with deep Q waves in leads V1–V4, raising suspicion of a prior anterior myocardial infarction—possibly beyond the acute phase—or the presence of a left ventricular aneurysm. Persistent ST elevation with pathological Q waves often reflects aneurysmal remodeling or regional wall motion abnormalities [5]. Echocardiography plays a crucial role in confirming the diagnosis, assessing left ventricular ejection fraction, and identifying structural complications.

In rural facilities where cardiac biomarkers and imaging modalities are not readily available, clinicians must rely on clinical judgment and empirical management. The European Society of Cardiology STEMI Guidelines (2023) recommend prompt initiation of evidence-based therapy when acute coronary syndrome cannot be ruled out [6]. This includes antiplatelet therapy with aspirin 150–300 mg orally as a loading dose, anticoagulation with enoxaparin 1 mg/kg subcutaneously every 12 hours (when available and not contraindicated), and titrated morphine for pain relief [6].

Hypertension remains one of the leading global contributors to cardiovascular morbidity and mortality [7]. Elevated blood pressure is a well-established risk factor for adverse cardiovascular outcomes [8]. Previous studies have shown that

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hypertensive urgencies account for the majority of hypertensive crises encountered in emergency settings [3]. Pharmacologic therapy should be tailored according to drug availability and patient characteristics [4]. In cases where ACS cannot be excluded, evidence-based NSTEMI management should also be considered [6].

Ultimately, this case highlights the importance of sound clinical reasoning, adaptive decision-making, and close collaboration between primary care providers and specialists. Strengthening referral pathways and ensuring a consistent supply of essential cardiovascular medications-including safer oral antihypertensives and antiplatelet agents-are critical steps in improving cardiovascular outcomes in rural and resourceconstrained settings.

6. Conclusions

This case illustrates that persistent hypertensive urgency can still be effectively and safely managed at the primary care level, even in rural settings with limited resources. Thoughtful clinical judgment, adherence to evidence-based recommendations, and timely collaboration with specialists play a crucial role in guiding appropriate therapy when standard treatment options are not readily available. Strategic use of oral antihypertensive agents can help achieve controlled blood pressure reduction and minimize complications. Furthermore, in patients with abnormal or suggestive ECG findings, echocardiography remains an important tool to evaluate ventricular function and identify structural complications such as left ventricular aneurysm, thereby supporting better long-term management

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