

Bladder Distension: An Overlooked Cause Vagal-induced Hypotension during Coronary Angiography

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Abstract Hypotension is a common complication during coronary angiography. Multiple factors can lead to hypotension in cath lab including bleeding and vasovagal reaction. Vagal induced hypotension is commonly associated with severe pain and anxiety. However, other causes of hypotension in cath lab should be considered. Here we present a case of 76-year-old male was brought for coronary angiography and the procedure was complicated by hypotension from an overlooked bladder distention.

Keywords: Coronary Angiography, Coronary Angiography Complication, Hypotension, Vagal-induced Hypotension

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1. Introduction

Hypotension is a concerning and common occurrence during coronary angiography. It may be a sign of benign self-limiting complications or life-threatening events. If it is prolonged, it can lead to severe tissue hypoperfusion and cardiovascular collapse. Therefore, early identification and treatment are paramount. Hypotension during cardiac catheterization has a myriad of causes including vasovagal reflex, bleeding, myocardial ischemia, anaphylactic reaction or transient bacteremia.

Vasovagal stimulation is the most common cause of hypotension during cardiac catheterization and has been reported to occur in as many as 6-25% of all studies [2,3]. A vasovagal reaction may be triggered by different stimuli such as anxiety, pain and in some cases by bladder overdistention. [2,6] Here we present a case of a 76-year-old male who underwent coronary angiography and the procedure was complicated by vaso-vagally mediated hypotension.

2. Report of the Case

A 76-year-old African-American male with past medical history of non-ischemic cardiomyopathy, heart failure with reduced ejection fraction, atrial flutter, benign prostatic hyperplasia, deep venous thrombosis,

emphysema and hypertension who presented to our facility with exertional chest pain. The pain started two days before presentation, increased with exertion, pressure like, and radiating to his back. Electrocardiography showed Sinus rhythm with 1st degree AV block, left axis deviation and old left bundle branch block (Figure 1). His troponin was initially 0.3 ng/L then increased after 6 hours to 0.36 ng/L. He was started on aspirin, clopidogrel and heparin. Transthoracic echocardiography showed ejection fraction estimated to be 20% with dilated left ventricle and moderate diffuse hypokinesis with regional variations. There was severe hypokinesis of the basal-mid inferior, apical septal, and apical lateral wall. He was taken for cardiac catheterization, which showed global left ventricular function depression with mild to moderate diffuse disease. During the procedure, the patient became hypotensive down to 70/40. Oxygen saturation was 95%. The patient was asymptomatic. There were no signs of bleeding, tamponade and anaphylaxis. EKG showed no changes from pre-catheterization EKG. Coronary angiography did not show dissection or perforation; and no retroperitoneal hemorrhage (Figure 2, Figure 3). He was started on dopamine infusion. On examination at cath lab, he was found to have suprapubic dullness indicating urinary retention. The finding was supported by imaging findings. (Figure 4) Foley catheterization was used for urinary retention and about 700 ml urine was produced. His blood pressure improved spontaneously to 130/75. He was discharged with appropriate management for urinary retention and benign prostatic hyperplasia.

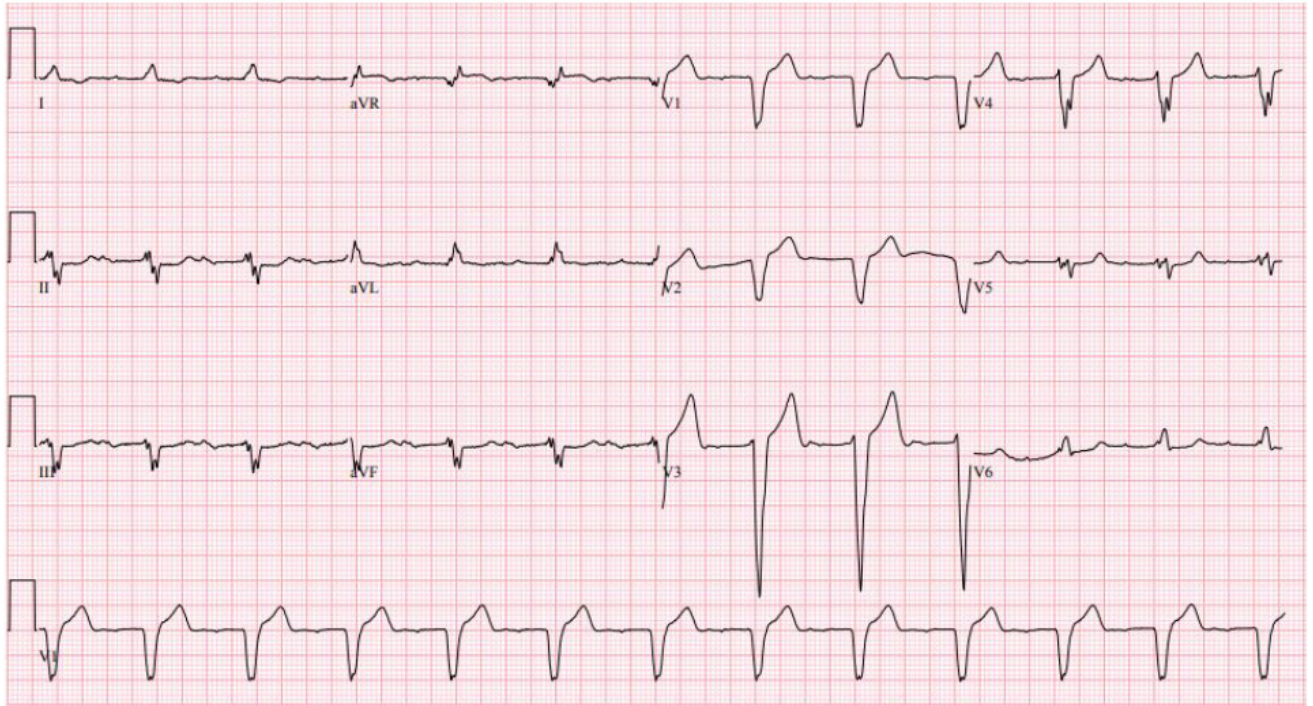


Figure 1. EKG of the patient demonstrates sinus rhythm with 1st degree AV block, left axis deviation and left bundle branch block



Figure 2. Coronary angiography did not show dissection or perforation



Figure 3. Angiography did not show arterial access lesion or retroperitoneal hemorrhage

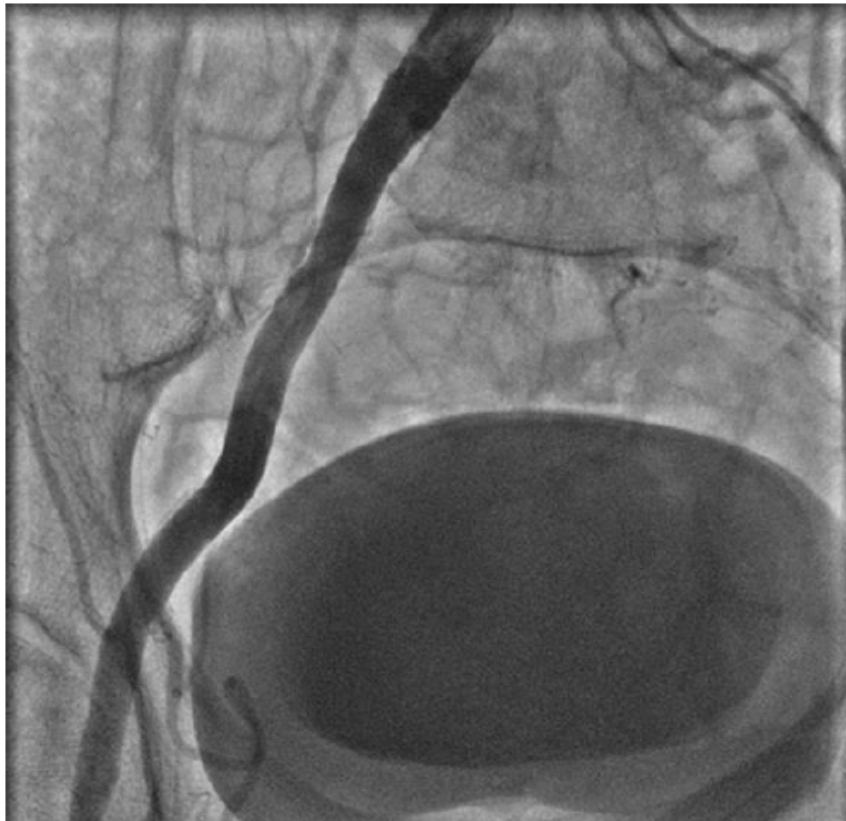


Figure 4. Normal femoral artery and very distended urinary bladder

3. Discussion

Hypotension is an important sign of potential complications during coronary angiography. It has a broad differential diagnosis but based on mechanism can be grouped as follows: a-) Hypovolemia in the setting of bleeding or dehydration, b-) Reduction of cardiac output such as in tamponade, arrhythmia, acute valvular damage or c-) inappropriate systemic arteriolar vasodilatation such as in allergic reaction, transient bacteremia or vagal reaction [1].

Vagal stimulation is the most common cause of hypotension during coronary angiography [4]. A vasovagal reaction has been reported to occur in as many as 6-25% of all procedures [2,3]. It can be provoked by pain, anxiety and as in our case by bladder distention. A vasovagal reaction can be defined as a sudden drop in blood pressure, heart rate and cardiac output as a result of the activation of the vagus nerve. [4]

The typical symptoms of a vasovagal reaction are lightheadedness, nausea, diaphoresis, confusion, weakness, syncope. However these may be absent in the elderly, who may presents with isolated hypotension. [4] Yamaguchi et al initially described bladder distention as a cause of vasovagal reaction and hypotension [5]. They hypothesized that the parasympathetic response to acute bladder overdistension is possibly due to a vaso-vagal reflex (afferent impulse enters the spinal cord through the pelvic nerves, ascends via sacro-bulbar connection close to the vagal nuclei and results on vaso-vagal reflex) [6].

The treatment of choice of vasovagal reaction is eliminating the inciting stimuli and vagolysis with atropine. As shown in our case of urinary obstruction the definite treatment of hypotension was bladder decompression. This resulted in complete resolution of hypotension.

This case highlights the importance of recognizing vasovagal stimulation as a cause of hypotension in the cardiac catheterization laboratory. It is important to remember that the elderly patients may not present with the typical signs and symptoms of vasovagal reaction.

4. Conclusion

Acute bladder overdistension is an important, but unrecognized medical condition that can lead to vasovagal stimulation and unrelenting hypotension. It is important for the clinician to be aware of this phenomenon and recognize it early in order to prevent long-term complications.

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