Pitfalls in Pacemaker Implant for Hypersensitivity of the Carotid Sinus

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Introduction

Syncope is the cause of 3% and 1% of emergency and hospital admissions, respectively [1-4]. It is the final common pathway of a host of different pathophysiological mechanisms [5]. Accurate diagnosis of the mechanism of syncope is essential for adequate management and prognosis in individual cases.

Prior to the introduction of the head up tilt table test (HUTT) in clinical practice, most cases of syncope remained undiagnosed. The routine use of the HUTT has shown that reflex syncope comprises the most frequent mechanism underpinning those cases previously diagnosed as “syncope of undetermined origin” [6,7].

Reflex syncope is currently classified as (i) vasovagal (the common faint), (ii) situational (cough, micturition, laugh, defecation, and (iii) carotid sinus syndrome (CSS) [8]. CSS is said to be present when a loss of consciousness is elicited in response to accidental mechanical manipulation of the carotid sinus region. It can be reproduced in the lab through carotid sinus massage (CSM) [9]. Carotid sinus hypersensitivity (CSH) represents a ventricular pause >3 seconds and/or a fall in systolic blood pressure >50 mmHg after carotid sinus massage. The CSS is a rare condition, accounting for only 1% of patients with syncope in most clinical series [10]. CSS is most common in elderly men [11]. It also constitutes one important mechanism underlying cases of unexplained falls in the elderly [12].

About CSM there is strong consensus that the diagnosis of CSS requires both the reproduction of spontaneous symptoms during CSM and clinical features of spontaneous syncope compatible with a reflex mechanism.

Syncope in patients with carotid sinus hypersensitivity almost always occurs in the standing or sitting position [13].

From a hemodynamic perspective, CSS can be (i) cardioinhibitory (asystole lasting >3 seconds in response to CSM), (ii) vasodepressor (drop of systolic pressure >50 mmHg in response to CSM), or (iii) mixed, when asystole and hypotension co-occur in the same patient [10,14]. European Society of Cardiology, ESC, Task Force on Syncope recommends CSM in individuals over 40 years in the investigation of unexplained syncope [15]. CSM requires massage performed for 10 seconds on both sides in both supine and upright positions [15]. There is little agreement among different authors on the relative prevalence of these mechanisms. Differences in methods of blood pressure assessment may explain some of these discrepancies. The following case illustrates how a misinterpretation of the hemodynamic response to carotid sinus massage may delay the correct diagnosis and perpetuate the occurrence of syncope.

Case Description

Informed consented was given by the patient to publish his case report.

A 71-year-old man reported several episodes of fainting when standing over the few weeks before his first consultation. He worked as lawyer. The loss of consciousness episodes had no relation with head movements or neck manipulation. In one such episode, he sustained a severe facial trauma, indicating that at least some of his faints were not preceded by warning signs. His cardiovascular and neurologic exams were normal, as were his blood tests, electrocardiogram (EKG), Holter monitoring, head CT, and duplex scans of the vertebral and carotid arteries. He did not develop hypotension on standing, nor was he taking drugs that might explain his falls. His premorbid history did not provide clues for the cause of his faints either. To further investigate the etiology of his syncope, the patient underwent a HUTT preceding by CSM as detailed in a previous article [16]. Briefly, the tilt test table was equipped with a ‘TEB’ system for continuous EKG monitoring and support for the feet, allowing 60-80°C inclinations. Blood pressure was measured with an oscillometric device and the measures were confirmed by sphygmomanometer every two minutes or less in case of symptoms. Beginning with the right side, CSM was
manually applied during 5 seconds to each carotid sinus at a time with the patient in the supine position at zero degree. After one minute of rest, the table was inclined at 60°C and the procedure was repeated. The HUTT consisted of two stages, namely, (i) a “passive” stage, and (ii) a pharmacologically sensitized stage, which consisted in administering 1.25 mg of isosorbide dinitrate by sublingual route. Each phase lasted 25 minutes or less, in case of the emergence of pre-syncopal symptoms.

There was a positive cardioinhibitory response to right CSM at 60°C with a systolic pause of 7 seconds. Left CSM and the HUTT were negative. Based on these findings, the patient received a diagnosis of CSS, cardioinhibitory subtype. A DDI bicameral pacemaker with rate-drop response function was implanted following the guidelines of the Brazilian Society of Cardiology [17].

In spite of the procedure, the syncope episodes persisted unchanged, with a resulting severe limitation of the patient’s activities of daily living, a follow-up exam was performed. This time, however, right CSM elicited a systolic drop of 80 mmHg. Despite prompt activation of the pacemaker and increase in heart rate to 100 bpm, the patient lost consciousness and developed convulsive movements. Left CSM and the HUTT were again negative (Figure 1)."


