Case report

An absent carotid pulse may indicate critical aortic stenosis

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Abstract

In severe valvular aortic stenosis, obstruction to ventricular contraction results in prolonged ventricular systole and diminished peak flow velocity. This may translate into weak or impalpable peripheral arterial pulses. We report a case of severe aortic stenosis associated with an impalpable carotid pulse (in the absence of local carotid artery disease) that became easily detectable following aortic valve replacement. In the presence of an aortic stenosis murmur, a weak or impalpable carotid pulse is indicative of critical aortic stenosis and warrants urgent investigation.

Keywords: Aortic stenosis; Absent carotid pulse; Duplex imaging

1. Introduction

We report a case of severe valvular aortic stenosis associated with an impalpable carotid pulse (in the absence of local carotid artery disease) that became easily detectable following aortic valve replacement.

In the presence of an aortic stenosis murmur, a weak or impalpable carotid pulse is indicative of critical aortic stenosis and warrants urgent investigation.

2. Case report

A 76-year-old female presented with exertional angina and dyspnoea. Examination revealed an ejection systolic murmur. Echocardiography confirmed severe aortic stenosis with a peak gradient of 120-mmHg and valve area was an estimated 0.3 cm². The valve cusps were heavily calcified and thickened with reduced opening. There was no aortic regurgitation and left ventricle dimension and function was normal. Cardiac catheterization revealed heavily calcified but normal coronary arteries and it was not possible to cross the aortic valve.

The patient was admitted for elective aortic valve replacement. Pre-operative assessment revealed a weak left carotid pulse and an absent right carotid pulse, a finding confirmed by three clinicians. A carotid duplex scan confirmed patent carotid and vertebral vessels bilaterally but peak systolic flow velocity in the right internal carotid artery (ICA) was 40 cm/s and in the left ICA 45 cm/s (Fig. 1a). Operative findings were a heavily calcified tricuspid aortic valve with only a small orifice remaining. The valve was replaced with a 19 mm HP St. Jude Medical prosthesis. Postoperative recovery was uneventful. Postoperatively, carotid pulses were now easily palpable bilaterally. A repeat carotid duplex scan demonstrated a peak systolic flow velocity of 60 cm/s in the right ICA and 70 cm/s in the left ICA (Fig. 1b).

3. Discussion

The delayed ejection time observed in aortic stenosis is the result of prolonged ventricular systole due to obstruction to ventricular contraction [1]. Both valvular and supravalvular aortic stenosis produce jet streams, as a jet of blood exits from a point source. The Coanda effect, the tendency of a jet stream to adhere to a boundary wall and consequent selective streaming of blood has been suggested as an explanation for unequal carotid and brachial artery systolic pressures seen in patients with supravalvular aortic stenosis [2].

In valvular aortic stenosis, as the jet of blood progressively broadens beyond the stenotic orifice, the peak velocity is proportionately diminished and kinetic energy is dissipated downstream, thereby preventing any sustained high-velocity stream. This may translate into a clinically weak or impalpable carotid arterial pulse on physical exam-
ination. Theoretically, the greater the severity of aortic stenosis, the more significant the gradient across the valve, resulting in a lower peak systolic flow velocity in the carotid artery.

This patient had severe aortic stenosis with a high transvalvular gradient before surgery. She had weak or impalpable carotid pulses without local carotid artery disease, which were subsequently easily palpable postoperatively with improved systolic flow velocities documented by Duplex imaging of the carotid vessels. This case highlights the importance of bedside examination in elucidating useful clinical signs. This finding does not affect the subsequent diagnostic flow chart of investigation but rather should alert the referring physician to expeditiously arrange an echocardiographic assessment. Although the diagnostic accuracy of this finding cannot obviously be based on the experience of a single case we suggest that in the presence of an aortic systolic murmur, an absent or weak carotid pulse, (in the absence of local carotid artery disease) is indicative of critical aortic stenosis that requires urgent investigation.

References


Appendix A. ICVTS on-line discussion

Author: Dr. Jean Bachet, Consultant Cardio-vascular Surgeon, Institut Mutualiste Montsouris, Departement cardiovasculaire 42, boulevard Jourdan, Paris 75014, France
Date: 10-Oct-2002 08:27
Message: This case report is well documented and points out the importance of clinical examination of our patients. Nevertheless, I am afraid that it labours an obvious point. Indeed, whatever the value and importance of clinical examination, we do not need such clinical signs to assess the tightness of an aortic stenosis in the era of easily and immediately available, reliable echocardiogram. It seems also unlikely that a patient with tight aortic valve stenosis would be asymptomatic or paucisyptomatic and that the physician would not be rapidly oriented. In fact, in the present case, the absence or reduction of the carotid pulse was observed after the diagnosis of severe aortic valve stenosis had been established with certainty. However, it is a good indication that in front of a diminished or even abolished peripheral pulse it might be useful to look for any cardiac (and in particular, valvular) trouble before looking for a peripheral vascular disease.