Perioperative Acute Coronary Syndrome during functional endoscopic sinus surgery in a young HIV-infected patient. A case report

E. CHOPPIN (*), S. DE WIT (**) and M. SOSNOWSKI (*)

Abstract: We report a case of a young HIV-infected woman treated for more than ten years by Highly Active Antiretroviral Therapy, presenting a peroperative Acute Coronary Syndrome caused by a hypertensive episode after systemic resorption of locally applied epinephrine during a functional endoscopic sinus surgery. Since patients with multiple risk factors for Coronary Artery Disease seems to be more susceptible to complications of epinephrine injection, this reminds us of the higher cardiovascular risk for HIV patients with long term treatment. Therefore anesthesiologists should be susceptible to consider specifically the pre- and postoperative evaluation of patients with long term antiretroviral therapy.

Key words: HIV; sinus surgery; acute coronary syndrome; epinephrine.

INTRODUCTION

Functional endoscopic sinus surgery (FESS) is a worldwide used minimal invasive technique, allowing direct visual examination and opening of the sinuses. This is a safe surgery, with a low morbidity level (1). However, during this intervention, systemic resorption of locally applied epinephrine on the mucous membrane is responsible for many adverse hemodynamics effects (2). We report the case of a massive epinephrine resorption, causing coronary vasospasm in a HIV patient, who was treated for many years with antiretroviral therapy. This case illustrates the potential risk of preoperative local epinephrine use, even during minor surgery. In addition, recent reviews reports a higher level of cardiovascular complication, in particular coronary syndrome among HIV infected patients (3, 4).

CASE DESCRIPTION

A 49 years old african woman, 78 kg, BMI 26, suffering from chronic sinusitis was admitted for endoscopic sinus surgery. The patient is seropositive for HIV since 1991, and is treated for more than 10 years by protease inhibitors (PI), nucleoside reverse transcriptase inhibitors (NRTI), and non nucleoside transcriptase reverse inhibitors (NNRTI), (see Table 1). Her treatment has been adapted many times, depending on tolerance and the development of new antiretroviral molecules. Through a careful medical monitoring and good compliance to treatment, her viral load remained undetectable. Shortly before surgery, the CD4 count is measured at 408 [410-1590], CD4/CD8 0.5 [0,6-2,8].

Currently, her treatment consist of lamivudine, tenofovir disoproxil, atazanavir. She also have a severe persistant allergic asthma, treated by salmeterol/fluticazone propionate 50/500, montelukast 4 mg, theophylline 200 mg, levocetirizine 5 mg. She has chronic hepatitis B, and have had breast reduction surgery and cervix surgery several years before, without complications. She is non smoker and drinks no alcohol on a regular basis. There is no history of any drug addiction. The preoperative biological tests are normal, with the exception of moderate hypercholesterolemia (203 mg/dl [< 190]; HDL-Cholesterol 77,1 mg/dl [> 40]; LDL-Cholesterol 109 mg/dl [< 100]; Triglycerids are normal. The hsCRP level is 4,2 mg/l, [0,1-10,0].

ECG and chest radiography are normal, while the respiratory function tests shows an obstructive syndrome. In the setting of HIV follow up, she underwent one year before a cardiologic examination and echocardiography. Both of them were normal. All usual medications are taken on the morning of intervention. On arrival in operating room, the patient is monitored as follows: Datex Ohmeda 3 derivations scope with ST-segment
monitoring on DII, NIBP, pulse-oxymeter. Induction of anesthesia was started with Propofol TCI (Diprifusor® target 4 µg/cc) and a bolus of Sufentanil 20 µg, curarisation with rocuronium 40 mg. The intubation was easy, and there was no hypertensive response at this time. Mechanical ventilation 500 ml x 10/min with Primus (Dräger Medical). A prophylactic antibiotherapy was administered with amoxicilline/clavulanate 2 g, as well as a 5 mg dexamethasone to prevent postoperative nausea and vomiting. According to the usual surgical protocol, 1/1000 diluted epinephrine swabs are placed in the nasal concha by the surgeon, to reduce the peroperative bleeding. Within seconds after application, the patient had a major hypertensive access, measured at 230/140 mm Hg, and a few seconds later, a tachycardia measured at 170/min, with a ST-segment elevation measured at 2,8 mm. The swabs were immediately withdrawn, and nasal cavities were flushed with saline. However, tachycardia persisted as well as the ST-segment elevation. Hemodynamic parameters gradually returned to normal, but the ST-segment elevation persists.

The procedure was pursued, and the surgeon performed an electro-cauterisation of the concha. Antalgic medication were given (tradonal 100 mg and acetaminophen 1 g). After this, the patient waked up normally, without precordial pain. She was admitted to the recovery room where a 12 derivation ECG was immediately performed. The image was comparable to the preoperative ECG. This was reassuring since a normalization of ST-segment is a powerful indicator of good prognosis in the short and long term (5). A dosage of cardiac enzymes was carried out 6 hours postoperative: CK 159 UI/L [1-172], CK-MB 13,2 ng/ml [normal values: 0,1-4,9], Troponin T 0,76 ng/ml [0,00-0,1]. Enzyme kinetic is shown in Table 2.

During the following days, the patient experienced a good evolution, despite an episode of nausea, and great fatigue. For the rest she had no dyspnea, nor precordial pain, palpitations or dizziness. No further treatment was undertaken.

Given the sudden onset and rapid regression of the ST-segment elevation, the enzyme kinetics, the absence of clinical symptoms in the immediate postoperative period, and the absence of major cardiovascular risk, we conclude to an ACS on coronary vasospasm. A stress test was performed two months later. Despite a limit of 87% of maximum heart rate on cyclo-ergometry, the cardiologist considered this test as significant. The maximum blood pressure was recorded at 168/107, the maximum heart rate at 148/min. There was no angina pectoris, no arrhythmia, no changes of repolarization, or ST-segment change at the maximum intensity of effort. The test was considered normal by the cardiology team and permits to exclude a significant coronary insufficiency. It was decided not to undertake further investigations.

Given that variations of coronary anatomy may predispose young people to myocardial ischemia (6) one might advise the patient to undergo coronary angiography, or CT angiography.

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**Table 1**

Administered treatments. NRTI : nucleoside reverse transcriptase inhibitor, NNRTI : non nucleoside transcriptase reverse inhibitor, PI : protease inhibitor

<table>
<thead>
<tr>
<th>Date</th>
<th>NRTI</th>
<th>NNRTI</th>
<th>PI</th>
</tr>
</thead>
<tbody>
<tr>
<td>14/08/1991</td>
<td>Zidovudine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18/02/1991</td>
<td>Zavudine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06/02/1995</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>12/10/1995</td>
<td>Zidovudine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>09/11/1995</td>
<td>Zidovudine Stavudine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15/05/1996</td>
<td>Zidovudine Stavudine lamivudine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28/07/1998</td>
<td>Zidovudine Zalcitabine</td>
<td></td>
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<tr>
<td>26/03/1998</td>
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</tr>
<tr>
<td>21/09/1998</td>
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<td></td>
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</tr>
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<td>01/11/1998</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>08/03/1999</td>
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<td>Efavirenz</td>
<td>Nelfinavir</td>
</tr>
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</tr>
<tr>
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<td>Efavirenz</td>
<td></td>
</tr>
<tr>
<td>09/06/2005</td>
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<td>Nevirapine</td>
<td></td>
</tr>
<tr>
<td>10/05/2008</td>
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<td>Efavirenz</td>
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</tr>
<tr>
<td>24/06/2008</td>
<td>Tenofovir Lamivudine</td>
<td></td>
<td>Atazanavir</td>
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</table>
It also appears that patients with multiple risk factors for CAD are more likely to have complications after an injection of epinephrine (9). The only evident cardiovascular risk factor in our patient is hypercholesterolemia.

These last few years the link between an increased cardiovascular risk and CAD, HIV and Highly Active Anti-Retroviral Therapy (HAART) have been an increasing concern (4, 11-15). There are now over 10% mortality from cardiovascular disease in patients infected with HIV (15). The patho-physiological and biochemical mechanisms are not yet fully understood, and the results of many different studies are conflicting to explain these facts. It is likely that the increased risk is related to the viral infection itself, the treatment, and the host inflammation response (15).

Antiretroviral agents are responsible for metabolic disorders. PI’s cause dyslipidemia, lipodystrophy and lipoaccumulation, and the Nucleoside Reverse Transcriptase Inhibitors (NRTI’s) are associated with dyslipidemia, insulin resistance, and an increased risk of diabetes mellitus (3). Non-nucleoside Reverse Transcriptase Inhibitors (NNRTI) do not appear to increase the risk of myocardial infarction (3), but are associated with a higher level of HDL-Cholesterol.

Infection with HIV itself may also be responsible for increased cardiovascular risk. The state of chronic inflammation (13, 16), the impact of the viral load and immunological disturbances (mainly the level of CD4 T-lymphocytes, the CD4 count nadir, and duration of low CD4) could be involved in the development of CAD (3, 4).

However, the evaluation of the impact of HIV infection or HAART on Carotid Intima-Media Thickness (17, 18), a predictive marker for cardiovascular events, or on arterial stiffness (17, 19), a measure of subclinical atheromatous sclerosis, has not given unequivocal results to date. At a biochemical level, several changes in markers of endothelial function are known, but the effect of these changes is not clear (13, 16, 20).

Finally, HIV patients seem to present more frequently than other, classical cardiovascular risk factors (diyslipidemia, hypertension, diabetes, family history and especially smoking) (3, 12), although these factors are similarly associated with cardiovascular risk also in the general population (6, 4).

Faced with this incident, one can question the need for extensive preoperative cardiac assessment (21) for HIV patients with long term ART, including PI. Currently, the recommendations of the ACC/AHA regarding perioperative cardiovascular evaluation by Eagle (22) in non-cardiac surgery do

<table>
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<th>Troponin-T kinetics</th>
<th>03/10/09</th>
<th>04/10/08</th>
<th>04/10/09</th>
<th>04/10/09</th>
</tr>
</thead>
<tbody>
<tr>
<td>CK 1-172 U/l</td>
<td>159</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>CK 0.1-9 ng/ml</td>
<td>13.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Troponin T 0.00-0.11 ng/ml</td>
<td>0.76</td>
<td>0.68</td>
<td>0.5</td>
<td>0.21</td>
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DISCUSSION

In the case described the ACS seems to result of a coronary spasm caused by a massive epinephrine resorption. It occurs in a young patient without complaint or history of cardiovascular disease, with minor risk factors. We discuss below the risks associated with the procedure and the cardiovascular risk factors of the patient.

During FESS, the surgeon frequently uses epinephrine in local application or injection, at various concentrations with or without local anesthetics (LA) to produce mucous vasoconstriction by direct effect on -adrenergic receptors (7). This reduces bleeding and improves visibility of the operative field. Usually, the systemic absorption of epinephrine by the mucosa is minimal (2-7) and causes moderate hemodynamic effects, mainly a hypotension by stimulation of -adrenergic receptors, which appears more marked during injection than local application (7). Moreover, the concomitant use of local anesthetics may be beneficial by reducing the sympathetic response (7). In the present case, the surgeon admitted thereafter that there had been a breach in the sinus mucosa, leading to a direct vascular contact with the epinephrine swabs and causing resorption comparable to intravenous injection (2).

This event should prompt the anesthesiologist in agreement with the surgeon to reassess for each intervention the risk-benefit balance of the perioperative use of epinephrine.

Several cases of coronary vasospasm induced by adrenaline injected intravenously, intramuscularly or subcutaneously have been reported in the literature (6, 8, 9). Most often, these patients are young without cardiovascular risk factors. The coronarography performed in these cases is usually normal or shows a spasm that disappears after nitrates administration (6).

The pathogenic mechanisms of vasospasm remain unclear, but appear to be closely related to atheromatous coronary artery disease (CAD) (10). It also appears that patients with multiple risk fac-

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not take these risks into account. Given the poor positive predictive value of noninvasive stress testing and the risk related to coronary angiography (23, 24), it seems exaggerated now to propose systematic preoperative investigations. In addition, risk maneuvers such as the use of epinephrine during surgery should be made more cautiously with these patients.

In conclusion, we report the case of an ACS on vasospasm after resorption of epinephrine during FESS in a young patient on a long term HAART. The need for careful assessment of cardiovascular risk in these patients, particularly during the perioperative period, should be underlined.

References