

# Is the pepper spray a triggering factor in myocardial infarction? A case report

H. ÇIL, Z.A. ATILGAN, Y. ISLAMOĞLU, E.Ö. TEKBAŞ, Z. DOSTBİL\*

Department of Cardiology, and \*Department of Nuclear Medicine, University of Dicle, Faculty of Medicine, Sur/Diyarbakir (Turkey)

**Abstract.** – Fourth years old man was admitted to Emergency Department with complains of chest pain and dispnea after exposure the pepper gas that sprayed to environment during a social event. Physical examination and electrocardiogram was revealed acute myocardial infarction.

*Key Words:*

Pepper spray, Myocardial infarction.

## Introduction

It is known that volatile agents have negative effects on the heart as well as other body organs. These cardiac side effects could be sudden death due to ventricular tachyarrhythmia, heart failure and myocardial infarction. Apart from industrial exposure, volatile agent exposure occurs to a significant extent by abusing these substances with the aim of excitement. Similarly, gases such as pepper gas or insecticides that sprayed to environment for various reasons is thought to lead to similar consequences.

In this report was presented the case which admitted with myocardial infarction after exposure of the pepper gas that sprayed to environment during a social event.

## Case Report

Fourth years old man was admitted to Emergency Department with chest pain and shortness of breath that sudden onset. After the first evaluation was understood that he was exposed to oleoresin capsicum that known as pepper gas. There was no any chest pain and risk factors for coronary heart disease in his medical history. On electrocardiogram 5 mm ST elevation on derivations V1-6 and 1 mm ST depression on derivation D2, D3, AVF were observed. On physical examination, general condition was intermediate, consciousness was clear. Blood pressure and pulse rate were measured as 110/70 and 95/minute, respectively.

The patient had tachypnea and dyspnea. The levels of myoglobin, troponin I, creatin kinase and CK-MB were detected above normal ranges (455 mg/dl vs 17 ng/ml, 345 vs 67U/ml, respectively). The patient was diagnosed with acute myocardial infarction and redirected to catheter laboratory for primary coronary intervention. Angiography showed that normal right coronary artery and circumflex artery, plaques on proximal of the left anterior descending artery and total occlusion on distal of the thirth diagonal branch (Figures 1, 2, 3). The procedure was finished by the decision of the research for viable tissue in area supplied by LAD. Syntigraphy showed no viable tissue in area supplied by left anterior descending (LAD) artery. This patient was discharged without complications seven days after admission, and was followed-up at the outpatient clinic uneventfully.

## Discussion

Pepper gas is obtained from *Capsicum annum* or *Capsicum frutescens* from solanacea family and oil that obtain from cayenne pepper or bitter as known "Oleoresin capsicum". It also produced synthetically. Pepper gas includes Oleoresin capsicum at a rate of 1-10% in a repulsive solution. It is used as flavoring in some foods<sup>1</sup>. Today it used in postherpetic neuralgie which following Herpes Zoster infections, psoriasis and diabetic neuropathy.

Oleoresin capsicum used to distribute to community by police forces all over the world in the form of tear gas. Its lethal oral dose is 0.5-5 g/kg. capsaicin does effect of analgesic by causing the consumption of "substance P" that is pain neurotransmitter in nociceptive afferent nerve fibers<sup>2</sup>. Immediately after the pepper gas sprayed eyes and respiratory symptoms begin within seconds. Its duration of effect varies between 20 minutes and 2 hours. Effects usually disappear within 1-2 days. Effects of pepper gas is long because of ab-



**Figure 1.** LAD artery was total occluded on midportion (LAO).

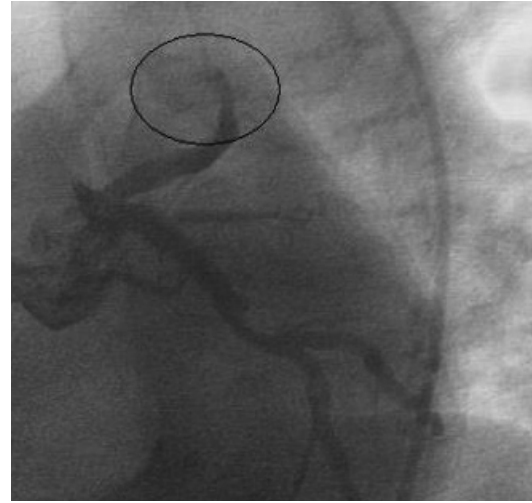
sorbing through the skin and building up in nerve endings and is to slowly releasing.

Effects of Oleoresin capsicum are eye pain, stinging or burning, increase of tear secretion, temporary blindness, rarely, corneal abrasion, mouth and nose burning, runny nose due to gas inhalation, sneezing, choking sensation, breathing difficulties and asthma in patients with bronchoconstriction. Its local effects are rash, dermatitis, eczema and erythema on the affected area of skin, vesicles and blisters in a long-term exposure, headaches, dizziness, vomiting, pulmonary edema, acute respiratory failure, hypotension, chest pain and motor control loss<sup>3</sup>.

In healthy humans the effects of these chemical agents are usually short-term and temporary. But in some cases, these effects may continue in longer time and may be life-threatening. special-



**Figure 2.** Left circumflex artery was narrowed %50 on midportion (LAO-Cranial).



**Figure 3.** LAD artery was total occluded on midportion. Catheter was inserted to LAD selectively (RAO-Caudal).

ly in people with asthma, chronic lung disease, hypertension or cardiovascular disease, these symptoms may be seen as far more significant. Liquid transition into the intracellular spaces in tissues and consequently edema, play a central role on the mechanism of action of pepper gas<sup>4</sup>. Accordingly, sudden decrease on intravascular volume might cause to changes in preload of the heart. In addition, the abnormalities related with gas exchanges due to alveolar edema may cause insufficient oxygenated blood delivery to coronary artery tree. These unfavorable effect of oleoresin capsicum may lead to the development of acute coronary syndrome in people with stable atherosclerotic plaques. The best our knowledge, there is first case related with myocardial infarction due to oleoresine capsicum in the literature.

## References

- 1) Public health response to biological and chemical weapons—WHO guidance (2004): Annex 1: Chemical agents, pp.143-213.
- 2) SMITH J, GREAVES I. The use of chemical incapacitant sprays: A review. *J Trauma* 2002; 52: 595-600.
- 3) ZOLLMAN TM, BRAGG RM, HARRISON DA. Clinical effects of oleoresin capsicum (pepper spray) on the human cornea and conjunctiva. *Ophthalmology* 2000; 107: 2186-218.
- 4) JOHNSON W. Final report on the safety assessment of Capsicum Annuum extract, Capsicum Annuum fruit extract, Capsicum Annuum resin, Capsicum Annuum fruit powder, Capsicum Frutescens fruit, Capsicum Frutescens fruit extract, Capsicum Frutescens resin, and Capsaicin. *Int J Toxicol* 2007; 26(Suppl. 1): 3-106.