Acute Atrial Fibrillation Derived by Single-Doze Fentanyl Transdermal Usage

Tek Doz Transdermal Fentanil Kullanımına Bağlı Gelişen Atriyal Fibrilasyon

Fentanile Bağlı Atriyal Fibrilasyon / Fentanyl-Derived Atrial Fibrillation

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Özet

Fentanil, seçici ve sentetik bir opioid agonistidir. Özellikle kansere bağlı ağrı tedavisinde fentanil transdermal kullanımı tercih edilmektedir. Fentanil kullanımına bağlı birçok sistemle ilgili klinik etkiler meydana gelmektedir. Fakat en fazla solunum depresyonu, hipotermi ve bradikardi gözlenmektedir. Bu yazımızda tek doz fentanil transdermal kullanılmasına bağlı olarak atriyal fibrilasyon gelişen olguyu sunmayı amaçladık.

Anahtar Kelimeler

Aritmi; Atriyal Fibrilasyon; Fentanil Transdermal

Abstract

Fentanyl is a selective and synthetic opiate agonist. Especially in cancer-derived pain treatment fentanyl transdermal usage is preferred. Clinic impacts occur related to several systems derived by fentanyl usage. However, respiratory failure, hypothermia and bradycardia are observed the most. In this article, we aimed at presenting a case which developed atrial fibrillation derived by single-dose fentanyl transdermal usage.

Keywords

Arrhythmia; Atrial Fibrillation; Fentanyl Transdermal

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Introduction

Fentanyl is a selective and synthetic opiate agonist with high affinity to μ-receptors. Since fat-solubility is high, it quickly passes blood-brain barrier. With this characteristic, its pain killing power is 75-100 times more than morphine. It can be used through oral, intravenous, epidural, transdermal (TTS), intranasal and transmucosal ways in acute and chronic pain treatment. Due to its low molecular weight and lipophilic structure, its transdermal usage is preferred especially in patients with cancer. It has TTS preparations of twenty five, 50, 75, 100 mcg/hour. Its effect is at maximum level in the blood on the first day, it continues by descending on the second and third day and it is effective for seventy two hours[1,2]. Clinic impacts can occur about several systems depending on fentanyl usage. The most frequently occurring impacts regarding cardiovascular system are peripheral vasodilatation, orthostatic hypotension and bradycardia [3]. Clinical reports indicate that an increasing number of cardiovascular (adenosine, positive inotropics) and non-cardiovascular (cancer chemotherapy, non-steroidal anti-inflammatory agents, high-dose methylprednisolone, and several respiratory medications) drugs can induce AF, increasing the number of hospitalizations[4]. Atrial fibrillation derived by fentanyl usage is not informed sufficiently in the literature. Here we aimed at presenting a case that developed atrial fibrillation depending on single dose 50 mg fentanyl TTS usage.

Case Report

Thirty-six year old female patient adhered the 50 mg transdermal fentanyl plaster (50 mg Durogesic TTS®), which was prescribed for the treatment of the pains derived by the breast cancer of her mother, to her left arm triceps muscle localization with the aim of reducing her pains derived by dysmenorrhea. About 10 minutes later she instantly took the transdermal plaster off due to palpitation and weakness. Since her complaints continued, she resorted to our emergency service 45 minutes later. In the history of the patient, it was learned that she didn't have a continuous disease, she didn't use any drugs, she didn't have and food or drug allergy. In the physical examination, her conscious was open, pupils were isochoric, Glaskow Coma Scale was 15. Axillary fever was 36.5°C, respiratory rate was 20/min, oxygen saturation with pulse oxymetry was 98%, pulse rate was 134 pulse/min, but irregular. Arterial blood pressure was found as 110/80 mmHg. In cardiac auscultation pulses were arrhythmic and there was no murmur. There was high ventricle rate and fast atrial fibrillation in the electrocardiograph (Figure-1). The patient's complete blood cell count and other emergency biochemical laboratory tests were normal. Structural or functional heart anomaly was not found in the trans-thoracic ecocardiograph. At around 20th minute of the patient's arriving at the emergency service, it was observed in the monitor that cardiac rhythm was sinus and it was verified with electrocardiograph (Figure 2). This process was not given any antiarrhythmic drug therapy. The patient's cardiac rhythm spontaneously returned to sinus rhythm. Since the patient did not have previous cardiac arrhythmia, didn't have any risk factor regarding atrial fibrillation development, acute atrial fibrillation derived by fentanyl TTS was considered in the patient since acute atrial fibrillation developed after adhering the fentanyl plaster and cardiac

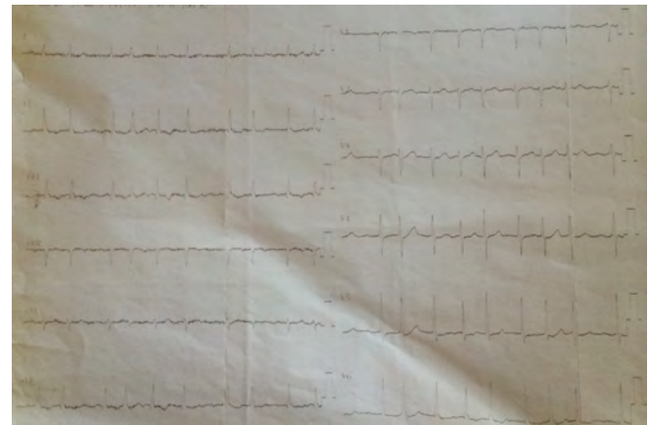


Figure 1. Patient's arrival electrocardiograph

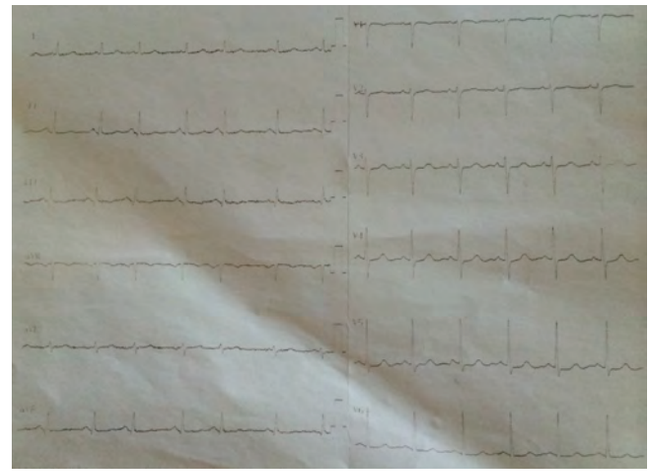


Figure 2. Patient's control electrocardiograph

rhythm returned to sinus rhythm after disconnecting contact with the drug. The patient was monitored for 24 hours. Since arrhythmia didn't develop, she was discharged from hospital without starting drug therapy. After the patient was discharged, it was observed in 15th, 30th and 90th day controls that the patient's palpitation didn't recur and that control electrocardiographs were at sinus rhythm.

Discussion

Fentanyl is used alone or in combination with other preparations in several clinic cases that require pain control, especially at emergency services, intensive care units and in anesthesia applications. It is used in acute or chronic pain treatment.

Several clinic impacts and side effects may develop depending on fentanyl. The most frequent side effect is respiratory depression, hypotension and bradycardia[3]. There is no sufficient publication in the literature that indicates that fentanyl, which is known to cause tachycardia or bradycardia, causes atrial fibrillation. Periaut R et al. informed that atrial fibrillation developed during anesthesia performed with fentanyl and pentobarbital on german dogs[5].

Atrial fibrillation is the most frequently observed arrhythmia that causes hemodynamic disorders and ischemic stroke. Atrial fibrillation is clinically significant as it causes increase in the risk of ischemic stroke and systemic emboli. Atrial fibrillation is related to morphological changes in the atrial myocardium. Vascular changes in sinus and atrioventricular nodes; underlying diseases such as necrosis, cell infiltration, fatty metamorpho-

sis, fibrosis and calcification and acute and chronic inflammatory changes cause enlarging of the myocardium and structural changes and these changes in the atrial myocardium are held responsible for AF formation[6]. Advanced age, cardiac insufficiency, smoking, diabetes, hypertension, male gender, left ventricle hypertrophy, myocardial ischemia due to coronary vasoconstriction/thrombosis, pulmonary disease, heart valve disease and hyperthyroidism is deemed to cause increase in AF risk. Alcohol usage, stress, excessive coffee consumption, surgery, myocarditis, pulmonary emboli are reasons of acute temporary AF[7]. Drug induced AF is reported to have the following main mechanisms: adrenergic or vagal stimulation, direct cardiotoxicity, changing atrial conduction, refractoriness or automaticity, coronary vasoconstriction/ischemia, and electrolyte disturbances[4].

Conclusion

It should be remembered that development of atrial fibrillation derived by fentanyl TTS usage and its turning into sinus rhythm spontaneously can cause arrhythmias such as atrial fibrillation like in making respiration monitoring with pulse oxymetry when the very frequently used fentanyl TTS is used through intravenous or other ways. 12-derivation electrocardiograph and cardiac monitoring should be used for following up the patients.

Competing interests

The authors declare that they have no competing interests.

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