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Case Report

# Elderly Dementia Patient with Recurrent Respiratory Failure due to the Abuse of a Fentanyl Patch: A Case Report

## Introduction

I experienced the case of an elderly patient with dementia who had recurrent respiratory failure due to the abuse of a transdermal fentanyl patch. Opioids have been recently used in patients with moderate-to-severe chronic non-cancer pain and in those with cancer pain in palliative care [1]. A transdermal fentanyl patch has been reported effective for the treatment of chronic cancer and non-cancer pain [2]. However, previous reports showed the life-threatening toxicity of respiratory repression from the use of a fentanyl patch. It usually occurred when the dosage or absorbed amount was excessive either by accident or design [3,4].

## Case Presentation

An 84-year-old Asian man presented to our hospital with somnolence and respiratory impairment with hypoventilation. The patient had been in his usual good health until 2 d prior when he started to feel somnolence. His hypoventilation had manifested 6 h before admission.

He had been admitted for recurrent respiratory impairment of an uncertain origin three times over a recent five month period. In all events, he presented with somnolence and respiratory impairment with hypoventilation and required respiratory assistance with mechanical ventilation or only oxygen administration for 3–7 d after admission, after which his respiratory and general condition spontaneously improved. Strangely, this event had never occurred during admission. To make a diagnosis for recurrent disturbed consciousness and respiratory impairment, some investigations were performed, including laboratory tests, an electrocardiogram, cardiac ultrasonography, whole-body computed tomography scanning, magnetic resonance imaging brain scan, and even a psychological test. However, no definitive diagnosis could be reached.

He had medical history of advanced colorectal cancer, for which he underwent a laparoscopic colectomy three years ago. The cancer was completely resected, and he had had no signs of recurrence or metastases after surgery. He had been suffering from cognitive impairment, especially short-time memory, since his mid-seventies. He had no family history of epilepsy.

On admission, the patient was stuporous, his Glasgow Coma Scale score was E3V4M4, temperature was 36.5°C, blood pressure was 145/87 mmHg, pulse rate was regular at 72 beats/min and respiration was 8 breaths/min. A neurological examination revealed no significant paralysis or spasm. A physical examination showed no other specific findings. A routine haematological study and laboratory tests showed no significant findings. The arterial blood gas on room air showed a PaO2 of 72 mmHg, a PCO2 of 50 mmHg and a pH of 7.36. The imaging tests revealed no significant findings.

Again, I could not make the definitive diagnosis; however, a life-threatening emergency was unlikely based on the negative findings from the tests on admission and past clinical course of the three previous events. The patient was supplied oxygen and observed carefully in the intensive care unit. His respiratory and general condition spontaneously improved during this period, and oxygen administration was discontinued 5 d after admission.

At 6 d after admission, a nurse found a transdermal fentanyl patch (Durotep® MT Patch v. 12.6 mg: 75 μg/h) on the patient's back during a bed-bath. This patch was a sustained release formulation prescribed by another hospital for low back pain 6 months before. The patient thought that it was a packing sheet, and he used it only when his back hurt. This misuse was probably due to his cognitive impairment. Since there was no patient declaration, we could not have known this information. I thought that excessive opioids caused repeat respiratory failure, and advised the patient not to use the patch. He was discharged 10 d after admission, has never since used the



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patch and has had no respiratory failure in the 3 years since discharge.

## Discussion

I experienced a case of an elderly patient with dementia who presented with recurrent respiratory failure due to abuse of a fentanyl patch. This case experience has led to my wanting to advocate two messages.

First, to prevent a life-threatening drug-induced event, physicians should take special care when administering a transdermal fentanyl patch to aged patients with dementia. Fentanyl is classified as a strong opioid, it has a lower affinity for μ2 opioid receptors that cause motor inhibition of the gastrointestinal tract, while also having a higher affinity for μ1 opioid receptors that cause analgesia and euphoria [1]. Because of its pharmacological behavior, transdermal fentanyl has significant advantages of a lower incidence of adverse effects, such as constipation, nausea and vomiting, compared to other opioids. A 3 d formulation of the transdermal fentanyl patch, which is widely used in Japan, is a single administration every 72 h to maintain effective blood levels, and its proper use can improve drug compliance [2]. When administered properly, it is an effective and safe drug. However, previous reports showed life-threatening toxicity of respiratory repression from a fentanyl patch that usually occurred when the dosage or absorbed amount was excessive either by accident or design. For example, Serghini et al. [3], reported a fatal intoxication due to an excessive dosage that was an abuse application of multiple transdermal fentanyl patches. Doris and Sandilands [4], reported life-threatening toxicity due to excessive absorption because the fentanyl patch was applied to eczematous skin. To prevent the abuse of fentanyl patches, physicians should assess whether chronic pain really needs the opioid, and they should monitor the effect and any adverse events carefully after administration. In the present case, the patient could not understand the usage instructions of the patch due to cognitive impairment. He misidentified the patch as a packing sheet and wore it as a topical treatment for his backache, resulting in his recurrent respiratory failure and severe opioid toxicity.

Second, abuse of a transdermal fentanyl patch should be considered as a differential diagnosis when a patient presents with a combination of consciousness disturbance and respiratory failure with hypoventilation. In the present report, the physicians missed the patch on the patient's back three times, leading to an incorrect differential diagnosis, resulting in many unnecessary tests and event recurrence. The patient had required respiratory assistance with oxygen administration only or mechanical ventilation several days after admission; however, there was an eventual spontaneous improvement in respiratory function. This means that a single 3 d formulation transdermal fentanyl patch could maintain an effective blood level for at least 72 h, and the amount in the blood gradually dropped to normal because it was not re-administered [2]. In other words, his respiratory depression did not improve immediately and took many hours to resolve due to the long-acting form of the drug. Physicians should let such patients undress and perform a physical examination from head to toe, and a prescription history that not only covers oral drugs but also packing sheets and patches should also be included in the patient assessment.

## Conclusions

Physicians should take special care when administering a transdermal fentanyl patch for elderly patients with dementia. Abuse should be considered as a differential diagnosis if a patient presents with a combination of consciousness disturbance and respiratory failure with hypoventilation.

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