

A Case of Breakthrough Pain Management with Subcutaneous Fentanyl Administration in a Female Child

Sir,

Breakthrough pain is a transient exacerbation of pain that arises, spontaneously or in association with specific and predictable or unpredictable causes, despite comparatively stable and appropriately managed background pain.¹ The causes of breakthrough pain itself may be cancer, the side effects of cancer treatment or other comorbidities. Usually, in breakthrough pain, 5-20% of the opioid is given hourly or 4 hourly, to deal with the idiopathic pain. Maximum number of doses administered for managing breakthrough pain is 4, after which it is essential to increase the dose of the baseline opioid delivery.

Fentanyl is a rapid-acting opioid with highly lipophilic physico-chemical characteristics with good transmembrane absorption, making it a good candidate for transdermal patches and sublingual formulations. The use of subcutaneous fentanyl has previously been studied in view of its safety and feasibility in prehospital settings.² Fentanyl is hundred times more potent than traditional short-acting opioids, such as morphine. Fentanyl injections have been reported to be administered by oral route sublingually with doses from 25 µg – 100 µg with doses >100 µg restricted due to accommodation of liquid greater than 2 ml in the oral cavity for transmucosal absorption.³

Due to shortage of medicines used in cancer therapy in Pakistan, it is always a challenge to manage cancer patients, especially in tertiary care hospitals.⁴ The current shortage of morphine injections, led to its substitution with fentanyl injections, administered through subcutaneous route, in a case that presented for pain management to palliative care team.

A 14-year female, with Ewing's sarcoma of left thorax extending to T9-T11 spine with spinal cord compression, was being treated with AEWS 0031 compressed cycles of vincristine, doxorubicin and cyclophosphamide / ifosfamide and etoposide (VDC/IE) and radiation therapy (XRT). Patient suffered severe throat, chest and epigastric pain on previous admission for 9th cycle of VDC. The pain was reported to be burning in nature and was associated with XRT-induced epigastritis and mucositis. The chemotherapy was put on hold and the patient was prescribed morphine injections for breakthrough pain.

Palliative care team was consulted by the primary care team, for pain management. After performing the Edmonton symptoms assessment scale, and hospital anxiety and depression scale, the patient was started on morphine sustained-release

capsules, 10 mg, twice daily with haloperidol tablet, 2.5 mg, and mouthwash, for oral mucositis. In the meantime, the patient was discharged, upon completion of therapy for the given cycle.

After three weeks, the patient showed in emergency room with abdominal pain secondary to esophagitis and severe oral mucositis. Oral morphine doses were augmented to 20 mg twice daily but she could not hold anything orally and kept on throwing up and thus, was not able to engulf neither food nor medicines. To resolve these complaints, certain medications, including magic mouth wash, fluconazole injection and sucralfate suspension, and continuous IV omeprazole infusion, were added, respectively. Morphine was started on syringe driver, with 30 mg dose for 24 hours with 2.5 mg haloperidol, but due to shortage of morphine injections, tramadol was added to therapy as an opioid option for intravenous analgesia. Patient's medication history included ondansetron, lorazepam, haloperidol, senna, domperidone and tramadol. Tramadol was intervened later on by the palliative care team. Instead, a therapy overlap of 30 mg morphine capsule twice daily, with fentanyl matrix patch (25 µg/hr), was designed, for transition. But, there still existed the need for breakthrough pain management. After 3 days, the pain was minimally improved, hence, pregabalin, 50 mg capsules, twice daily, were prescribed. The dose of subcutaneous fentanyl, for breakthrough pain, as per need, with 4 hourly nursing assessment, was prescribed 100 µg. On day 1, of the prescribed opioid, only one dose of *pro re nata* (PRN) fentanyl was needed to be administered in routine 4 hourly assessments. The pain was managed safely, with no signs of adverse drug events and pain-related complaints resolved. Fentanyl dose for breakthrough pain, was further reduced to 50 µg per dose. On day 3, of prescribed opioid, patient's mucositis showed signs of recovery, patient was clinically well, and started tolerating oral feed. During admission, the pain score, as per numeric pain rating scale, varied from 3-7. When pain was managed, patient's key goal for discharge was achieved. Thus, the patient was signed off by the palliative care team.

Fentanyl use has been reported for anaesthesia in children in Pakistan, with single dose from 2 µg/kg up to 100 µg, intravenously.^{5,6} Use of fentanyl was reported in children, to manage breakthrough pain associated with cancer, though, the dosage forms were lozenges, nasal sprays and sublingual tablets.⁷ As, these formulations are not currently available in Pakistan, palliative care team opted for subcutaneous route, which is reported in this case study. This was the only option, as the severe oral mucositis did not allow the sublingual administration of fentanyl injections.

Thus, it can be concluded that this was a unique example, as previously, the use of fentanyl injection subcutaneously, has neither been reported in this patient population in Pakistan, for breakthrough pain, with baseline pain management by fentanyl transdermal patch. It is not recommended to use fentanyl in any indication other than cancer-associated pain, specifically, in child population in Pakistan.

CONFLICT OF INTEREST:

Authors declared no conflict of interest.

AUTHORS' CONTRIBUTION:

IG, AS: Conception and design, Interpretation critical revision, final approval.

HH: Analysis and interpretation, drafting, final approval.

HMU: Data acquisition and analysis, interpretation, drafting and final approval.

REFERENCES

1. Doulton B. Pharmacologic management of adult breakthrough cancer pain. *Can Fam Physician* 2014; **60**(12):1111-4.
2. Lebon J, Fournier F, Bégin F, Hebert D, Fleet R, Foldes-Busque G, et al. Subcutaneous fentanyl administration: A novel approach for pain management in a rural and suburban prehospital setting. *Prehosp Emerg Care* 2016; **20**(5):648-56.
3. Twycross R, Prommer EE, Mihalyo M, Wilcock A. Fentanyl (transmucosal). *J Pain Symptom Manage* 2012; **44**(1): 131-49.
4. Elahi E, Andleeb S. Oncology drug shortages - What we have versus what we expect to have? A Critical Scenario of Pakistan. *J Pharm Technol* 2019; **35**(1):41-2.

5. Asghar A, Ali FM. Anaesthetic management of a young patient with homocystinuria. *J Coll Physicians Surg Pak* 2012; **22**(11):720-2.
6. Hamid M, Khan MA, Amanullah M. Single lung ventilation in a young child for repair of coarctation of aorta. *J Coll Physicians Surg Pak* 2010; **20**(8):545-6.
7. Coombes L, Burke K, Anderson AK. The use of rapid onset fentanyl in children and young people for breakthrough cancer pain. *Scand J Pain* 2017; **17**(1):256-9.

Irum Ghafoor¹, Adeel Siddiqui², Haroon Hafeez¹ and Hafiz Muhammad Usman²

¹Department of Internal Medicine, Shaukat Khanum Memorial Cancer Hospital and Research Centre, Lahore, Pakistan

²Department of Pharmacy, Shaukat Khanum Memorial Cancer Hospital and Research Centre, Lahore, Pakistan

Correspondence to: Dr. Irum Ghafoor, Department of Internal Medicine, Shaukat Khanum Memorial Cancer Hospital and Research Centre, Lahore, Pakistan
E-mail: irumghafoor@skm.org.pk

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