Intravenous Abuse of Transdermal Fentanyl Therapy in a Chronic Pain Patient

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TRANSDERMAL therapeutic systems differ from other methods of administration, because in this system, the opioid is absorbed slowly and released in a sustained manner, thereby producing relatively constant serum drug concentrations for long periods of time. These characteristics eliminate the peaks and troughs of drug concentrations seen with intermittent intravenous, intramuscular, or oral dosing regimens. Transdermal fentanyl has been used successfully to treat not only acute postoperative pain and cancer pain, but also chronic, nonmalignant pain. As with any other opioid therapy, the potential for abuse exists. We report a case of fentanyl abuse accomplished by the aspiration of the drug contents out of a fentanyl patch and the injection into a permanent central venous catheter, which resulted in respiratory arrest.

Case Report

A 21-yr-old female came to the Pain Management Center complaining of right upper quadrant abdominal pain. She was born with congenital intestinal pseudo-obstruction syndrome, a disorder that results from the failure of the nerves and muscles of the colon to develop. Her condition was diagnosed initially when she was 8 yr old, and she had been hospitalized frequently for treatment of malabsorption syndrome. She had undergone multiple surgical procedures to relieve chronic intestinal obstruction. The patient had had a central venous catheter implanted, and she received hyperalimentation to supplement her severely restricted enteral absorption through this device. A permanent gastrostomy tube had been implanted in the patient for periodic drainage and decompressive purposes.

The patient complained that her right upper quadrant pain began approximately 10 months before her arrival at the Pain Management Center. During her initial evaluation, she was hospitalized and cholecystectomy was diagnosed as the cause of her pain. She subsequently underwent a cholecystectomy. She continued to experience severe right upper quadrant pain and was readmitted to the hospital 1 month after surgery for further evaluation. Bilateral ovarian abscesses were found, and she underwent an exploratory laparotomy and bilateral oophorectomy. At the time of her discharge, she was pain free. Two weeks after the patient left the hospital, her right upper quadrant pain returned with an increased intensity.

At this point, the patient was referred to our Pain Management Center, where she described the quality of her abdominal pain as constant, sharp, and knife-like. She also indicated that the pain worsened with activity. It improved with rest and intravenous hydrocortisone. The pain was located primarily in the right upper quadrant area without radiation. It increased with contact to cold but decreased with the application of heat to the painful area. The pain would occasionally improve with the manipulation of her gastrostomy tube, but that maneuver would never resolve it completely.

Previous medical regimens had included oral ibuprofen, ketorolac, and amitriptyline, none of which offered significant pain relief. Examination of her abdomen revealed multiple nonnester surgical scars. She had an area of diffuse tenderness, distributed in a semilunar pattern, below the right costal margin. Marked hepatomegaly was also present. Her abdomen was somewhat tympanitic; however, the remainder of the physical exam was unremarkable.

Initially, the patient was given a trial of transcutaneous electrical nerve stimulation therapy, which failed to provide pain relief. She then underwent a series of diagnostic and therapeutic procedures, which included trigger point injections, epidural analgesia, intercostal blocks, and several celiac plexus blocks. All were unsuccessful in providing long-term pain relief. The patient then was given intermittent injections of dezocine (10 mg) every 4 h at home, which she eventually increased to 50 mg intravenously every 2 h. Problems she had at home with somnolence and inadequate pain relief prompted her to discontinue using this agent eventually. The patient was admitted and treated for opioid withdrawal from dezocine. However, the diagnosis of opioid addiction was not assigned to her.
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From multiple physicians, drug sales, drug hoarding, and unapproved use of other drugs such as alcohol are all components of the addiction phenomenon. Throughout the course of this patient’s management for chronic pain, she exhibited virtually all of these signs. However, because of her chronic illness, extensive surgical history, poor prognosis, convincing pain complaints, and popularity because she was a young adult patient, even experienced pain management physicians believed that she truly had physiologic pain.

Initial studies estimate the incidence of opioid addiction in chronic pain patients to range from $3.2\%$ to $15\%$. Fishbain et al. stated that although addiction occurs within the chronic pain population, the percentage of patients with this problem is probably significantly less than initially reported. He based this conclusion on a large study by Porter and Jick, which found addiction to opioids in medical patients to be extremely rare.

Whatever the incidence of opioid addiction and abuse in chronic pain patients, a high index of suspicion always must be maintained. Fordyce has proposed that “as needed” medication schedules contribute to clock-watching and drug-seeking behavior. As seen in the behavior of the patient in our study, several attempts to obtain additional opioid medication by fabricating stories about prescriptions being “lost”, thrown out”, or “confiscated by parents” are usually the first signs of opioid abuse. Although transdermal fentanyl patches have the advantages of slow absorption, relatively constant serum drug concentrations, ease of administration, longer dose intervals, improved patient acceptance, compliance, safety, and the inability for patients to take more oral medication, the potential for abuse exists.

The transdermal fentanyl system is a rectangular transparent unit comprised of a protective liner and four functional layers: (1) a backing layer of polyester film; (2) a drug reservoir of fentanyl and alcohol (United States Pharmacopoeia) made into a gel with hydroxyethyl cellulose; (3) an ethylene-vinyl acetate copolymer membrane that controls the rate of fentanyl delivery to the skin surface; and (4) a fentanyl-containing silicone adhesive. The nonopioid components are pharmacologically inactive and nontoxic. This patient admitted to aspirating the partial contents of an unused 50 μg/h fentanyl patch, which contained a total of 5 mg of fentanyl. We cannot quantify the actual intravenous dose of fentanyl administered, but it was sufficient to result in respiratory arrest of a chronic opioid user.

Discussion

Recently, Portenoy defined “addiction” in chronic pain patients as psychological dependence typified by intense desire for the drug and overwhelming concern about availability. Evidence of compulsive drug use with unsanctioned dose escalation, use for other symptoms, associated behavior (including manipulation of physicians to obtain additional drugs), obtaining drugs

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This case of opioid abuse involving transdermal fentanyl therapy prescribed for chronic pain in a patient with permanent central venous access is unique. Although we recognized that the abuse potential existed with conventional routes, we did not anticipate this novel attempt for acquiring the opioid. Therefore, despite the use of transdermal systems, addicted patients are still at risk for drug abuse. Moreover, the large amount of opioids contained in a 3-day patch makes these devices potentially dangerous because of the possibility of profound overdose.

References