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Withdrawal syndrome following prolonged sedation in a burn patient.

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Abstract

Burn patients frequently require prolonged intubation and sedation. A rare complication of prolonged sedation is the "acute withdrawal syndrome" which usually occurs within 24 hours of stopping the sedatives. Our burn team's lack of awareness of the syndrome has led to the occurrence of this preventable complication in one of our burn patients. The case is reported here to increase the plastic surgeons' awareness of this complication and its management.

Keywords: Sedation, Burn, “Withdrawal syndrome”

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Introduction

Three conditions are known to occur after long term sedation of children: tolerance, withdrawal, and physical dependency [1]. Tolerance is a decrease in a drug's effect over time, thereby resulting in the need to increase the dose of the drug to achieve the desired analgesic or sedative effect. The pathophysiology of tolerance is usually related to receptor changes. Withdrawal refers to the signs and symptoms seen after the sedative is abruptly discontinued. Physical dependence is the need to continue the sedative to prevent withdrawal.

Withdrawal and physical dependency following long term sedation is frequently seen in neonates and hence the term, "neonatal abstinence syndrome" [2]. Although this complication is frequently mentioned in the intensive care and anesthesia literature, it has not been mentioned in the burns literature. We report an unusual occurrence of this complication in a 4 year old burn patient to increase the burn surgeons' awareness of this complication and its management.

Case Report

The patient is a 4- year old girl who was a victim of flame burn to the face and hands six months prior to presentation for our service. She was treated at a local hospital with dressing alone. She presented to us with severe ectropian of the upper and lower lips. A tissue expander was inserted in the groin to provide a large area of full thickness skin graft and to allow primary closure of the donor site. Following adequate expansion, the lips were released and the defects were covered with full thickness skin grafts as 'aesthetic unit grafts'. Post-operatively, she was kept intubated and sedated in the paediatric intensive care unit to ensure graft take. She was intubated for a total of six days, and she was maintained on intravenous infusion of midazolam (0.2 mg/kg/h) and fentanyl (6 mcg/kg/h) for sedation. The patient was extubated and transferred to the burn unit in good condition. Twenty four hours later, her condition suddenly changed. She began vomiting; she developed hypertension, tachycardia, tachypnea, a squint in the left eye, and lower limb hypertonia; she also lacked responsiveness to verbal stimuli (Glasco Coma Score of 8). An urgent CT scan of her brain showed no evidence of intracranial bleeding or any other abnormalities. ICU was consulted and the patient was diagnosed with "withdrawal syndrome" . She was moved back to the paediatric intensive care unit and was started on intravenous midazolam and fentanyl in tapering doses over a period of 4 days. This was followed by tapering doses of oral morphine and diazepam. The patient had no neurological sequelae and was discharged. She was sent home in excellent condition with a good graft-take.

Discussion

Our patient had long term sedation with midazolam and fentanyl . Within 24 hours of stoppage of the drug infusion (without tapering) , withdrawal symptoms occurred.

Midazolam withdrawal symptoms include: sympathetic hyperactivity, visual hallucinations, combative behaviour, seizures, agitation, hyperpyrexia and emesis [3, 4]. Treatment is by restarting midazolam at a tapering dose. "Fentanyl withdrawal" seems to be more common in neonates receiving a large cumulative fentanyl dose, especially those requiring extracorporeal membrane oxygenation (ECMO) for respiratory failure [2, 5]. Treatment and prevention may be provided by a tapering dose of oral morphine [6]. The burn surgeon should also be aware that withdrawal symptoms may also occur following the use of other agents for long term sedation of intubated burn patients such as, phenobarbital (a barbiturate) [7] and Isoflurane [8]. 'Short-term' propofol infusion, used to facilitate the process of extubation of burned children, seems to be safe [9]. In contrast, 'long-term' propofol infusion may cause withdrawal symptoms [10] (usually twitching and jitteriness), or may result in the fatal "propofol syndrome" (a triad of lactic academia, rhabdomyolysis and bradyarrhythmias) [11] .

Manifestations of withdrawal vary according to the type of drug used, and the time of onset of the symptoms depends on the drug's half-life. Symptoms and signs frequently involve three systems: the central nervous system (causing irritability, delirium, hypertonicty, hallucinations, and seizures), the gastrointestinal tract (causing diarrhea and vomiting), and the sympathetic nervous system manifested as sympathetic hyperactivity (causing hypertension, tachycardia and tachypnea). Most of these signs and symptoms were seen in our patient.

Bergman et al. [12] described an unusual presentation in infants receiving long-term sedation with a combination of fentanyl and midazolam. These infants displayed choreoathetoid movements and dystonic posturing. It is hard to determine whether this is true "withdrawal syndrome" or a toxic adverse effect [1].

The most important factors leading to the development of withdrawal symptoms are prolonged sedation, high dosage, and abrupt stoppage without tapering the dose. Preventive measures include the use of scoring systems to minimize over sedation, "wake-up protocols", "weaning regimens", adjuvant drugs and post-extubation oral medications in tapering doses [13] . Finally, essential to the prevention of this complication are the burn team's awareness and the clear communications amongst the burn patient's health care providers as the patient is transferred from the intensive care unit to the burn unit.

Conflict of interest

There is no conflict of interest.

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