

Delirium in a Child in Pediatric Intensive Care Unit

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Abstract

Delirium is a syndrome with an acute onset that is accompanied by fluctuation and is associated with behaviors that indicate impaired consciousness and cognition. It is common and costly and is associated with severe functional decline and distress in an adult. However, its detection and diagnosis are so challenging in children. Herein, we report a 2-year-old girl who was admitted in the pediatric intensive care unit (PICU) with pneumonia and was intubated because of respiratory failure. She needed a lot of benzodiazepine and opioid drugs to be sedated. During hospital course after extubation, she developed by agitation and restlessness and dissociation from environment. Electroencephalography was done and diffuse generalized slow wave was observed. Finally, by environmental factors' correction, benzodiazepine decreasing, and risperidone administering, she became well and discharged. Delirium should be considered as an important, underdiagnosed, and common condition in the PICU. It should be considered in altered cognition, consciousness, and circadian rhythm disturbance situation in children.

Keywords: Benzodiazepine, delirium, pediatric, pediatric intensive care unit

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INTRODUCTION

Delirium is a syndrome with an acute onset that is accompanied by fluctuation and is associated with behaviors that indicate impaired consciousness and cognition.^[1,2] It is common and costly and is associated with severe functional decline and distress and is a manifestation of acute encephalopathy.^[3] However, its diagnosis is so challenging in children. Delirium is common in critically ill patients and is associated with increased intensive care unit (ICU) length of stay and long-term cognitive impairment.^[4]

It is usually underdiagnosed.^[5] Three hypoactive, hyperactive, and mixed subtypes commonly occur in severely malnourished children and adults, indicating global dysfunction due to the direct physiological impact of an underlying disease or its treatment. Delirium in children is strongly associated with a poor prognosis, including increased mortality, prolonged hospital and pediatric ICU (PICU) stay, and increased duration of mechanical ventilation and treatment costs.^[1]

The care of delirium patients depends on the correct diagnosis and treatment of the underlying cause. Management of delirium patients is currently avoiding the aggravating and initiating factors of delirium and atypical antipsychotic drugs.^[6] Delirium affects up to 80% of adults admitted to the ICU and up to 30% of children admitted to the PICU.^[7,8]

CASE REPORT

A 2-year-old girl (patient consent form has been obtained), previously known for protein malabsorption by a genetic test that used to receive amino acids and venofer weekly, had a fever 2 days before admission and she had difficulty breathing, so she brought to our hospital and was admitted.

At the beginning, she had tachypnea and tachycardia and severe respiratory distress, which she underwent the noninvasive ventilation (NIV). Due to the continuation of the respiratory distress and intolerance of the NIV, the patient was intubated and connected to the ventilator. Ceftriaxone and vancomycin were administered.

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Chest-x-ray showed lobar pneumonia. She was anemic in the first laboratories as past. PCR and COVID-19 antibodies were sent and were negative. Bactec that was sent outpatient 2 days before admission reported positive. She had mechanically ventilated, so midazolam and fentanyl were started.

Under mechanical ventilation, due to the patient's alertness and fight, fentanyl and midazolam were fully dosed and dexmedetomidine and ketamine were added. She was still sometimes quite alert and looked at her mother and communicated with her, and sometimes needed doses of stat midazolam. An opioid rotation was performed and fentanyl was changed to morphine.

Finally, 11 days later, the patient underwent (spontaneous breathing trial) and extubation.

The patient's sedation and analgesics were continued with the previous level, but the stat doses were discontinued.

The day after the extubation, we noticed that the patient did not communicate with her mother. She was awake but did not have a meaningful look and did not pay attention to her surroundings. Vital signs and laboratory tests were stable and suspicious movement of seizure was not evident. The mother stated that she had been fully awake the night before and had not slept at all. Suspicious of delirium, midazolam and ketamine were discontinued, and the dose of dexmedetomidine was increased and continued with morphine drip. Because of withdrawal symptoms, tablet diazepam was started.

The patient gradually became more restless, screaming, and still not communicating. Cornell Assessment of Pediatric Delirium score was 24. Single dose of haloperidol was tried but did not seem to have much effect.

The patient was transferred to a single PICU room and the ambient noise was controlled. When sleeping at night, the room light was low and the day was exposed to light. The mother was given the necessary training to be present and communicate with her and create a familiar environment for her. Periods of restlessness continued. She did not sleep all night. The mother said that she is not my previous child at all. Electroencephalography (EEG) was taken, and generalized slow wave compatible with encephalopathy was reported. Finally, risperidone 0.25 mg per day was started for the patient, which was given at night. Thyroid tests were sent. Due to Withdrawal Assessment Tool score and withdrawal symptoms, the morphine dose was increased, and finally, diazepam tablets had to be prescribed every 12 hours. Then, gradually, over the next few days, the patient's cognition improved and his restlessness and sleep at night completely improved. With the onset of recovery, diazepam was gradually reduced daily, then morphine was reduced, and finally, dexmedetomidine was discontinued. The patient was discharged in good general condition with oral morphine with tapering plan.

DISCUSSION

Delirium is defined in the Fifth Edition Diagnostic and Statistical Manual of Mental Disorders as a disorder of attention and consciousness that can no longer be well explained despite previous or evolving dementia. This disorder develops in a short time and tends to fluctuate throughout the day. Moreover, the direct result is another medical problem such as toxicity or withdrawal or infection or electrolyte disturbances and various other etiologies.^[9] Therefore, delirium may occur in different cases.^[10] Determining the cause is very important because it is associated with high mortality.^[11] In our case, there were predisposing factors such as ICU admission, invasive devices, invasive procedures such as repeated sampling, intubation and mechanical ventilation, and multiple drug therapy. All of which can act as delirium triggers or aggravating factors.^[10,12]

The need for many high-dose sedatives and analgesics, especially benzodiazepines in this patient, was one of the main factors in causing delirium. In a case report of a 7-year-old girl with an asthma attack, even administration of ranitidine was identified as the main cause of delirium in her, and many drugs have been identified as causative agents, such as h2 blockers due to their anticholinergic effect.^[13-15]

In references, age under 2 years and previous growth retardation have been cited as predisposing factors.^[1,10,12] Other factors include electrolyte, metabolic disorders, hypoxia, shock, anemia, hypothermia or fever, severe acute illness, surgery, physical restraints, and hypnotic sedatives such as benzodiazepines, opioids, and infections.^[12,16] Many of these factors were present in our patient: fever, anemia, severe acute illness, physical inhibition, infection, especially the use of high doses of sedatives, especially benzodiazepines such as midazolam.

EEG diffuse slow wave was reported. Generalized slowing in the EEG is strongly associated with delirium and its severity. In addition, generalized slowing in EEG causes concerns about the prognosis of delirium patients by changing mental status.

In patients with cognitive changes in references, EEG monitoring is recommended if there is a concern about seizures. Moreover, if there is no concern about seizures, EEG can help as a useful diagnostic tool in situation of changing the mental state. A normal EEG is against the diagnosis of delirium in adult patients,^[17,18]

Prevention is the most effective way to reduce the incidence of delirium. It is important to know the risk factors because they can be controlled and treated to some extent.

The main strategies include correction of environmental, iatrogenic, and disease-related factors. Treatment depends on prevention of risk factors, timely diagnosis, clinical monitoring, and elimination of the underlying disease.^[19,20]

Symptoms usually improve with the onset of the underlying disease, but drug therapy is recommended as an alternative treatment in cases where nondrug therapy is insufficient.^[20,21]

Antipsychotic drugs such as risperidone and haloperidol are considered as the first-line appropriate treatment options. The action of risperidone is to decrease dopaminergic and serotonergic pathway activity in the brain, therefore decreasing symptoms of schizophrenia and delirium. We used risperidone for treatment and it was very effective.^[22]

CONCLUSION

In this article we reviewed the definition, prognosis and management of delirium. With emphasizing that delirium is common in intensive care unit and should be highly sensitive for its detection and treatment. This case had many predisposing factors for presenting delirium. Despite the risk factors and severe form of delirium the patient improved by correcting environmental and disease related factors and at last drug treatment. Finally she was discharged with good general condition and proper consciousness.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her clinical information to be reported in the journal. The patients understand that their names and initials will not be published, and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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