LETTER TO EDITOR (VIEWERS CHOICE)

COMMENTS TO LETTER TO EDITOR - KETAMINE MAY CAUSE TO NEUROTOXIC SIDE EFFECTS FOR THE DEVELOPING BRAINS OF YOUNG INFANTS

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We read with interest the article by Goyal and Anand (1) that reported the favorable bronchodilator and antiepileptic effects of ketamine in a 3 month old infant with organophosphorus poisoning. The authors suggested that in patients of organophosphorus poisoning whom not respond to conventional treatment, ketamine use may relieve bronchospasm and control seizure. But, they have never used intravenous (i.v.) magnesium sulphate ($MgSO_4$) for relieve the prolonged bronchospasm and first generation antiepileptic drugs (e.g. phenobarbital, phenytoin) for control the seizure. However, ketamine is a controversial drug for pediatric clinical use, especially for young infants, and is neurotoxic agent for developing brains. (2-4) Therefore, we would like to make some criticism on their paper.

Ketamine, an N-methyl-D-aspartate (NMDA) type of glutamate receptor antagonist, is widely used for general anesthesia in pediatric practice. Moreover, it alters receptor function at dopaminergic, serotonergic, cholinergic and opiodergic sites. Ketamine provides potent sedation, analgesia and amnesia with a short duration of action, which supporting cardiovascular and respiratory function. These properties make it choice of drug for anesthesia / analgesia during simple procedures. However, it is also listed as an illicit drug by most countries. Significant safety concerns regarding the use of anesthesia during early development have arisen since the animal studies indicating administration of NMDA receptor antagonist during the early stages of central nervous system development can produce neurotoxicity. A growing number of evidences in rodents and nonhuman primates have indicated that exposure to repeat doses of ketamine can induce neuroapoptosis and damage in the developing brain via neuronal mitochondrial apoptosis pathway, mainly hippocampal neurodegeneration causing persistent learning and memory impairment. (2-5)

It has been reported that the use of i.v. $MgSO_4$ is a safe and effective adjunct intervention to conventional bronchodilator therapy in acute severe asthma in children. (6) But, in present case, the authors didn't report the use of i.v. $MgSO_4$ for alleviate the prolonged bronchospasm and need for mechanical ventilation. In addition, although they have mentioned about the presence of bradycardia in their case (1), a heart rate of 117 beats/minute is normal for a 3 month old female child. The normal range of heart rate of 1-11 months aged infants is between 120-160 beats/minute; lower than 80 beats/minute is accepted bradycardia. (7)

In conclusion, there are significant safety concerns regarding the use of ketamine anesthesia during early developmental period. Although ketamine has positive properties, neurotoxicity is a serious potential side effect especially in delicate populations, like newborn infants and pregnant women. Therefore, we advocate that the use of ketamine in this vulnerable population should not be recommended unless further studies concerning the safety of ketamine have been conducted.

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