

Pediatric Patient with Autism Spectrum Disorder Presents to MRI

Learning Objectives

- Discuss Autism Spectrum Disorder and the different spectrums
- Discuss different techniques of induction of anesthesia in pediatric patients
- Discuss different medications for preoperative anxiolysis and sedation

Introduction

Autism Spectrum Disorder is a biologically based neurodevelopment disorder that causes repetitive and restrictive patterns of activity and behavior, differentiating interests, and deficits in social interaction and communication. A diagnosis usually presents in the first two years of life but can be diagnosed well into child and adulthood. The first sign normally seen by care takers is the inability to make eye contact and little interest in socializing.

Pragmatic language skills are often impaired to different degrees in patients with ASD, making the spectrum of communication and interaction varied. Pragmatic language skills that are often impaired to varying degrees are: difficulty maintaining or starting a conversation, not using language to communicate, difficulty choosing words appropriate for the conversation, not having interest in conversation, difficulty understanding the meaning of what was said, and not understanding nonverbal communication or context.

In addition to language impairment, patients with ASD also commonly present with other neurodevelopment conditions such as anxiety disorder (up to 80%), attention deficit hyperactivity disorder (up to 50%), oppositional defiant disorder, and depression. Sleep problems associated from restlessness and sleep anxiety may also be present, along with feeding difficulties from atypical response to sensory stimuli, and other medical conditions such as epilepsy are frequently seen.

Case Report

A 19-year-old female patient, 152 kg, presents to MRI with history of Autism Spectrum Disorder, global developmental delay with intellectual disability, selective eating, and rapid weight gain. The patient is admitted for bruising on back and legs with gingival bleeding. Patient is non-verbal, has projectile emesis when anxious, and relies on family to be exclusive historian. In the past year, patient has gained over 50 kg, mainly due to sedentary lifestyle and diet.

Last CBC has the following results: WBC 9.4, Hgb 7, Hct 24, Plt 254, MCV 80. Lower extremity ultrasound negative for DVT.

The anesthetic plan is to induce patient with mask induction, obtain intravascular access, secure airway with an endotracheal tube, apply MRI compatible ASA standard monitors, and extubate when MRI is completed. However, considering the patients medical history with the patient easily becoming agitated and combative in the presence of clinicians and non-family members, the patient is a predicted difficult induction for MRI. The history of difficult IV placement with no current intravascular access, also rules out the option of doing an IV induction in the patient.

Discussion

Autism is a fairly common neurodevelopmental delay, occurring in approximately 1 out of 4 children, and is 4x more likely to be diagnosed in a male child compared to their female counterpart. Presenting with varying degrees of social communication impairment, ASD can present with many different levels of communication and social interaction. These can range from ASD Level 1- the lowest level, which entails some inhibited social interaction and lack of organizing or planning, all the way to ASD Level 3- the most severe, which entails limited ability to communicate and socially interact, requiring very substantial support.

Since the 19-year-old female was presenting for a diagnostic MRI with a general anesthetic at a pediatric hospital, a mask induction would be the typical approach. However, considering the patient's medical history concerning ASD Level 3, with a weight of 152 kg, and no IV, this would pose as very difficult.

In typical pediatric inductions, the patient normally receives a mask induction of nitrous oxide and sevoflurane and then has a peripheral IV placed, before any airway management is done. In an adult sized patient who is non-verbal and combative, a mask induction can be difficult. It also has the possibility to cause trauma to the patient and can further increase fears of going to the doctor's office or being around strangers. This leads anesthesia providers to consider alternative, less traumatizing ways of getting a non-cooperative patient to cooperate for vascular access or a mask induction.

One way to provide anxiolysis to these patients, to help facilitate with a smoother induction is with the use of different medications. A few medications to consider for calming patients before an anesthetic without intravascular access include IM Midazolam 30-60 min prior, Intranasal Midazolam, 0.2-0.8 mg/kg 15 min prior, Oral Midazolam 0.25-1 mg/kg 30 min prior, and IM Ketamine 4-6 mg/kg, redosing after 10-15 min as needed at 2-3 mg/kg. For this patient specifically, intranasal, and oral midazolam pose as difficult to administer, considering the patient's very restricted food intake and combativeness, leading to IM midazolam and IM ketamine as seemingly the best options.

There are several benefits in using medication to calm combative, non-responsive patients, one very importantly being enhanced patient satisfaction. Preoperative Midazolam has been proven to decrease incidences of post-operative nausea and vomiting, postoperative pain, and preoperative anxiety and amnesia. IM Ketamine has also been proven to work as a very rapid and safe sedative for combative patients without intravascular access, allowing for rapid control and sedation in difficult patients. The use of IM Ketamine not only poses as a calming and sedative agent for the patients, but also works as a safety net in protecting healthcare workers from potentially violent patients.

Conclusion

The management of combative patients without intravascular access can be difficult. Not being able to console patients with communication can also enhance the situation, leading to needing another means of comforting and calming the patient before putting them in a stressful environment. It is important to understand each patient's level of understanding and communication abilities, so that clinicians can provide best care at an individualized level. Some patients with extreme fear of strangers and/or clinical settings may need anxiolysis and sedation through the means of preoperative medication. This is where it is beneficial to consider using ketamine and midazolam as anxiolysis and for getting a more cooperative patient- all which will help increase the safety of anesthesia delivered and enhance the satisfaction of the patient.

References

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