South Afr J Anaesth Analg. 2022;28(5 Suppl 1):S117-121
https://doi.org/10.36303/SAJAA.2022.28.5.2881

South Afr J Anaesth Analg
ISSN 2220-1181 EISSN 2220-1173

FCA REFRESHER COURSE

Anaesthesia for the child with special needs

S Mayet

Department of Anaesthesia, School of Clinical Medicine, Faculty of Health Sciences, Rahima Moosa Mother and Child Hospital, University of the Witwatersrand, South Africa
Corresponding author, email: *shafs.mayet@gmail.com*

This review article aims to address the perioperative course of the child with special needs presenting to theatre. It focuses mainly on children with an intellectual disability presenting to theatre as well as children with autism, behavioural and emotional disorders or the sensory impaired child who presents to theatre. These children can present to theatre for diagnostic or therapeutic procedures that may or may not be related to their special needs condition. Relieving preoperative anxiety and the use of a multidisciplinary team and parents or caregivers is crucial in the perioperative management of these patients. Specialised communication skills and adequate preoperative pharmacological and non-pharmacological measures assist in making the process atraumatic.

Keywords: children, special needs, anaesthesia

Introduction

The term "Special Needs" refers to an individual with a mental, emotional or physical disability.[1] These individuals face multiple challenges. These include movement, communication, self-care, education and decision making.[1] The impairments in the special needs population extend to their physical health without an intellectual impairment, or vice-versa, or even both.[1] Children with special needs presenting to theatre are usually anxious and the anxiety extends to caregivers, parents and hospital staff. This review article aims to shed knowledge on how to deal with this subset of patients presenting for anaesthesia and will focus on the child with intellectual disabilities, including the autistic child. It will also focus on behavioural and emotional disorders and sensory impaired children who present to theatre.

There are four categories of special needs children who present to theatre:[2]

1. Physical disability

These children have a chronic disability with an underlying physical aetiology. Examples include muscular dystrophy, multiple sclerosis, asthma, cystic fibrosis, obesity, cancer, and congenital heart disease. This review will not discuss the physically disabled child presenting to theatre.

2. Developmental/Intellectual disability

These children have differences that are usually present at birth and uniquely affect the individual's physical, intellectual and may even affect emotional development. Examples include autism, dyslexia, processing disorders and Down's syndrome.

3. Behavioural/Emotional disorders

This group include a diagnosis of bipolar mood disorder, depression, oppositional defiant disorder or attention deficit disorder with or without hyperactivity. Autism spectrum disorder tends to overlap with this group as well.

4. Sensory impaired

This group includes hearing impaired, total hearing loss, low vision or visually impaired. Significant overlap can exist between the categories.

Intellectual disability

Intellectual disability (ID) or a generalised learning disability (formerly known as mental retardation) involves cognitive, adaptive or functional impairment.[3] The Diagnostic and Statistical Manual of Mental disorders (DSM-5) in conjunction with the American Psychiatric Association have summarised the diagnostic criteria for ID as:[4]

1. **Deficits in intellectual functioning:** This would include reasoning, problem solving, planning, abstract thinking, judgement, academic learning and experiential learning. An Intelligence Quotient (IQ) test score of about 2 standard deviations below average is significant. This is usually a score of 70 or below.
2. **Deficits in adaptive functioning:** This would include limited abilities in skills required for independent daily living, such as communication, social skills, personal independence in a home setting and school or work functioning.
3. **Cognitive impairment:** This must have occurred during the developmental period, usually less than 18 years of age.

Aetiology of intellectual disability[5]

- **Genetic:** These include Down's syndrome and fragile X syndrome.
- **Pregnancy related:** Conditions that can interfere with foetal neuro-development such as alcohol or drug use, malnutrition, infections, or preeclampsia.
- **Due to childbirth:** Birth asphyxia, hypoxia at birth (e.g. cerebral palsy) or extreme prematurity.
- **Infections/Injury:** Infections like meningitis, diphtheria or measles have been implicated in ID. Severe head injury, near-drowning, extreme malnutrition, infections in the brain, exposure to toxic substances such as lead, and severe neglect or abuse can also cause it.
- **Unknown aetiology:** Occurs in two-thirds of all children who have ID.

Preoperative concerns and challenges in the child with intellectual disability

Parent/caregiver

It is important to establish a rapport with the family or caregiver. The child might not cooperate or communicate effectively with the anaesthetist.[3,6] The child might also be apprehensive and anxious due to a lack of understanding of the visit to theatre. An adequate history should be obtained from a caregiver or a parent. This would include past medical and surgical history, allergies, milestones reached and previous anaesthetic exposure. The caregiver might also be anxious and will need reassurance. It might be difficult to examine the child or get special investigations.[6] The caregiver should be actively involved at the preoperative visit. The parent or caregiver might be able to help ease communication difficulty and give insight into how the child behaves and the calming strategies required.[3] The role of the caregiver must not be undermined. The caregiver will be able to give a good history, assist with examination of the child and if the caregiver is legally committed as a guardian or parent, will be able to provide informed consent for procedures to be undertaken. Caregivers can also be given perioperative instructions including preoperative fasting times and postoperative care.[3,6]

The patient[3]

Examine for associated comorbidities and congenital abnormalities such as a concomitant cardiac lesions or a neuromuscular abnormality. There may also be craniofacial abnormalities or other organ system involvement.

The airway may be difficult and a thorough assessment should be done. Assessing the airway might be difficult due to lack of cooperation, however, one needs to rule out macrognathia, macroglossia, microcephaly, bulbar involvement, neck contractures or even a short neck and subglottic stenosis. If previous anaesthesias were administered, it might be helpful to get previous anaesthetic charts as a guide to further airway management.

The procedure[3]

Up to 40% of ID patients may present to theatre. Diagnostic indications for a procedure would include a CT scan, MRI scan, electroconvulsive therapy or even a Ryle's tube insertion. Therapeutic procedures are non-specific and examples include dental procedures, corrective surgery like cleft palate or lip surgery and even ocular surgery. Procedures may be related to the disability, or not be disability related.[3]

Psychological challenges[6]

The most important psychological challenge is trying to establish a rapport and to communicate with patients with ID.

When this subset of patients presents to theatre, they are not only challenged by the disability they have but the added pressure of the anxiety that is associated with the perioperative process.[7]

Preoperative anxiety has many challenges. These include an under-reporting of cases, difficulty in expression and diagnosis as well as the presence of parental anxiety. The consequence of this anxiety includes hypertension, sweating, tachycardia and an increase in hospital stay. ID children presenting to theatre need to feel safe and reassured. The challenge is they can be quite combative throughout the process of hospitalisation. Preoperative anxiety is also associated with postoperative maladaptive behaviours like bedwetting, behavioural changes, and nightmares.[7] Thus, it is imperative to address the anxiety in this period. This includes administration of premedication and other non-pharmacological measures to ease anxiety.

Strategies for premedication

Adequate preoperative preparation includes the use of pharmacological strategies and non-pharmacological actions. Administration of a suitable pharmacological agent may be helpful to ease the process. A helpful hint would be to disguise the premedication taste.

Non-pharmacological actions are listed in Table I.

Pharmacological interventions as part of premedication are listed in Table II.

Table I: Non-pharmacological actions[8]

Educational approach	Complementary and alternative approaches	Behavioural approaches	Technology
• Preparation programmes	• Music	• Cognitive behavioural therapy	• Audio
• Information to caregiver	• Hypnosis	• Parental presence at induction	• Videos
• Role play	• Acupressure		• Augmented reality

Table II: Examples of premedication drugs used in special needs kids[8,9]

Drug	Route	Dose	Onset of action	Duration of action	Effects
Midazolam	Oral	0.25–1 mg/kg	10–30 minutes	60 minutes	Amnestic Anxiolytic Sedative Paradoxical reaction
Clonidine	Oral/ enteral	4 ug/kg	45–60 minutes	Up to 90 minutes	Hypotension Bradycardia
Ketamine	Oral Intramuscular	0.5 mg/kg 1–2 mg/kg	10–15 minutes 30–60 minutes	3 hours 30–120 minutes	Delirium Hallucinations Salivation Nystagmus Dissociation
Dexmedetomidine	IV Intranasal or buccal	0.5–1 ug/kg 1–4 ug/kg	5–10 minutes 15–30 minutes	60–120 minutes 40–135minutes	Bradycardia hypotension Not always easy to administer

Intraoperative issues in the intellectually disabled child

The anaesthetist should provide a calm, unhurried environment, especially during induction. If the premedication was appropriately administered, the induction of anaesthesia is easier. Gas induction or intravenous (IV) induction can be used.[3] If IV induction is employed, a local anaesthetic cream can be applied to topicalise the site of IV insertion. It is crucial to communicate with the child if the child is not sedated. The presence of the caregiver at induction can aid in calming and holding the child.[6] Try to keep the anaesthetic simple and uncomplicated. Physical restraints should be avoided but bear in mind restraints may be a part of the normal life of the child.[6] Adequate analgesia using a multimodal approach should be used. Antiemesis should also be administered to avoid postoperative nausea and vomiting. Regional anaesthesia can be used once the child is asleep. Document strategies that have worked to assist future anaesthetic procedures.[6]

Postoperative issues in the intellectually disabled child[3]

If the IV line is not required for further care, it is advisable to remove it asleep. The caregiver should be in the recovery room as soon as possible. Delirium and pain should be addressed. Pain scores include the Faces, Legs, Activity, Cry and consolability (FACES) scales. Document events in the recovery room.

The child with autism

Autism is a neurodevelopmental disorder with an incidence of 1:100 and increasing worldwide. It is characterised by difficulty in communicating socially and relating to the outside world.[10] Perception of the outside world is also affected. Diagnosis is based on clinical observation and history. Clinical features include impairment in social communication, verbal and non-verbal, repetitive patterns of behaviour that include language, motor or play, fixed interests and change in information processing. Parents often detect delayed speech as an alarming sign.[11]

Previously, there were five major types of autism which include **Asperger's syndrome, Rett syndrome, childhood disintegrative disorder, Kanner's syndrome,** and **pervasive developmental disorder** not otherwise specified.[12] Currently, autism diagnoses are not separated into different types of autism, though this was not the case prior to 2013. Today, autism spectrum disorder is an umbrella diagnosis that encompasses presentations that were previously divided into separate diagnoses or types of autism.[12]

It is imperative to remember that each child with autism is different. Each child requires different levels of support, ranging from very little to substantial support. Children with autism, like ID children, also present to theatre for a myriad of procedures that can range from dental, therapeutic, diagnostic or even surgical procedures.

Challenges facing the autistic child coming to theatre are listed in Table III.

Table III: Specific challenges facing the autistic child coming to theatre[11]

Noise
Bright lights
Feel of the hospital gown
Previous bad experience with healthcare system
Taste of the premedication
Unfamiliar environment
Difficulty with communication
Difficult to get a history/examine the patient
Polypharmacy-patients may be on anti-epileptics, antidepressants, antipsychotics, sedatives, anxiolytics or mood stabilisers

Preoperative planning for the autistic child[6,11]

The preoperative visit needs to be as stress free and safe as possible. It involves advanced planning that ideally would involve a multidisciplinary team. This would involve the surgeon, anaesthesiologist, caregiver or a parent, nursing and administrative staff. The team should develop a perioperative coping plan. The use of a behavioural specialist or a child life specialist is also important to aid in advice and management strategies, however, this service is not always feasible. This plan should include getting information on the weight, height and medication history in advance.[6]

1. *Role of administrative staff*: Staff should be aware that a child with special needs is being admitted. The admission process should be expedited and should avoid delays.
2. *Role of nursing staff:* Nursing staff should also be made aware of the patient with special needs. The patient should be admitted to a quiet room with minimal noise and low lighting.
3. *Role of the caregiver/parent:* They play an integral role in helping with communication with the autistic patient. They are also able to advise on calming strategies for the patient. This may include toys, weighted blankets and therapeutic holding. It is advisable to have the caregiver/parent involved throughout the perioperative period including at induction and in the postoperative period.
4. *Role of premedication:* Premedication strategies are similar to that for the patient with ID, however premedication may worsen maladaptive behaviours and have an adverse effect. The patient should be advised to take chronic medication on the morning of surgery. The oral route is preferred and should be disguised with juice or a carrier solution like paracetamol. Nasal or injectable routes should best be avoided. In the extremely difficult patient, a ketamine dart (intramuscular injection) can be given. Restraints should not be used as first line but may need to be employed. Consider topical local anaesthetic cream application and the insertion of an IV line as an option.

Preoperative course

The patient should be admitted to a quiet ward with minimal interference from nurses and administrative staff. A caregiver and even a behavioural specialist can be allowed to accompany the patient. The patient should be placed first on the list to decrease fasting times and waiting. Transfer the patient to theatre with items of comfort as well as the caregiver presence. The premedication should be timed to assist in anxiolysis.

Intraoperative course[11-13]

The presence of the caregiver/parent is crucial in a quiet environment. The decision of gas induction versus IV induction is individualised and depends on cooperation from the patient and the degree of anxiety. IV line should be well secured. Multimodal analgesia and PONV prophylaxis should be given. There should be adequate hydration and use of medications that are known to decrease emergence delirium.

Postoperative course[11-13]

Remove the IV line while patient is asleep if it is not required. Keep the recovery room as quiet as possible, with minimal stimulation. Get the caregiver to be with the patient as soon as is possible. Transfer to a quiet ward once again with minimal stimulation and keep vital signs checks to a minimum.

Anaesthesia for behavioural/emotional disorders[14]

This group of special needs children includes:

Anxiety and depression sufferers[1]

Especially common in the 6–17 year age group. They present with symptoms like chest pain, panic, abdominal pain, anxiety and panic. They may also have a history of poor academic and behavioural problems. This group of patients would benefit from a sedative premedication and the presence of a caregiver and behavioural specialists input.[14]

Disruptive behaviour disorders[14]

a. Oppositional defiant disorder – usually uncooperative and combative preoperatively.
b. Conduct disorder-aggressive and defiant with a history of bullying, vandalism and neglect of rules and the law.
c. Attention deficit and hyperactivity disorder – usually present with hyperactivity and inattention, lack of concentration and severe anxiety.
d. These patients may be on methylphenidate which is known to decrease the effectiveness of midazolam and may require increase in volatiles at induction.
e. Obsessive-compulsive disorder – extreme preoccupation with the future as well as unwanted thoughts and impulses. The extreme worry about surgery and anaesthesia may be exaggerated.

As a group, the emotional and behavioural disorders patients presenting perioperatively will need to continue their chronic medication up until the morning of surgery. These medications may include antidepressants, mood stabilisers and antipsychotics. Take note of the interactions these medications may have with anaesthetic drugs. A smooth transition is required at induction, therefore, involvement of the behavioural specialist or psychiatrist may also be helpful when devising a perioperative plan. This should be tailored to the child's needs, with limited stress, informed caregivers and the use of pharmacological and non-pharmacological strategies as premedication (as described).

Anaesthesia for the sensory impaired child presenting to theatre[15]

There is a paucity of literature on anaesthesia for the sensory impaired child presenting to theatre. This group includes impairment in hearing, sight and speech.

Hearing impaired child

The anaesthetist needs to consider if the hearing loss is congenital or acquired and whether it forms part of a syndrome like Alport, Gruzons or Treacher Collins syndrome. A sign language specialist might need to be a part of the team or a caregiver who is able to communicate via sign language. Flash cards, videos with subtitles and pictures may also be helpful.

Visually impaired child

This may vary from low vision to a complete absence of vision. There may be added anxiety and fear associated with the perioperative process. The caregiver plays a vital role in this

process. The anaesthesiologist should introduce themselves to the patient and the patient should be aware of the anaesthesiologist's presence. Communicate with the patient all the time in a clear voice before doing anything and explain what will be done. The child can play with the mask and the circuit so they can explore.

Communicating with special needs children[16,17]

As illustrated, communicating with special needs children can prove quite difficult. Augmentative or alternative communication (AAC) refers to all forms of communication where oral speech can be difficult to interpret and an inability of their natural speech to meet all of their daily communication needs.

It may range from facial expressions and gestures to assistive technology.

Gestures, communication charts, picture charts (Figure 1), symbols, and drawings can be used. They may be low-tech like sign language, pen and paper, and hand gestures, or high tech where a specially fitted device allows people to communicate using custom buttons and pressure sensors, or the use of laptops and smartphones. With autism spectrum disorder children, a story might need to be mapped out some time before the surgery. This is known as a social story and each action to be carried out can be placed into a story in a step-wise fashion and rehearsed regularly so the child is better prepared for events on the day of the surgery.[6]

Figure 1: Example of alternative communication in special needs kids[6]
Symbol selection for anaesthesia; Widgit Symbols & Widgit Software 2002–2012 www.widgit.com

Conclusion

The child with special needs who presents to theatre adds further stress in an already challenging anaesthetic. However, with adequate preparation, a multidisciplinary approach and an understanding of the conditions, as anaesthesiologists, we can try to make this experience less stressful and atraumatic for both the perioperative period and thereafter.

ORCID

S Mayet https://orcid.org/0000-0001-8101-4436

References

1. Kagan J. What is a special needs child? June 23, 2021. Investopedia. Available from: https://www.investopedia.com/terms/s/specialneedschild.asp#toc-what-qualifies-as-a-special-need.
2. Landman L. Four types of special needs. Feb 5, 2018. Available from: https://lisalandman.net/four-major-types-of-special-needs-disabilities/.
3. Chaudhary K, Bagharwal P, Wadhawan S. Anesthesia for intellectually disabled. J Anaesthesiol Clin Pharmacol. 2017;33(4):432-40. https://doi.org/10.4103/joacp.JOACP_357_15.
4. Committee to Evaluate the Supplemental Security Income Disability Program for Children with Mental Disorders; Board on the Health of Select Populations; Board on Children, Youth, and Families; Institute of Medicine; Division of Behavioral and Social Sciences and Education; The National Academies of Sciences, Engineering, and Medicine; Boat TF, Wu JT, editors. Mental Disorders and Disabilities Among Low-Income Children. Washington (DC): National Academies Press (US); 2015. Clinical Characteristics of Intellectual Disabilities. Available from: https://www.ncbi.nlm.nih.gov/books/NBK332877.
5. Girimaji SC, Basheer S, Biswas A, Gangadharan SK. Intellectual disability—concepts, aetiology, and genetics. Oxford textbook of the psychiatry of intellectual disability, Oxford textbooks in psychiatry. Oxford; 2020. https://doi.org/10.1093/med/9780198794585.003.0003.
6. Short JA, Calder A. Anaesthesia for children with special needs, including autistic spectrum disorder. Continuing Education in Anaesthesia Critical Care & Pain. 2013;13(4):107-12. https://doi.org/10.1093/bjaceaccp/mks065.
7. Das S, Kumar A. Preoperative anxiety in pediatric age group - a brief communication. J Anesth Crit Care Open Access. 2017;8(5):00317. https://doi.org/10.15406/jaccoa.2017.08.00317.
8. Agbayani CG, Fortier MA, Kain ZN. Non-pharmacological methods of reducing perioperative anxiety in children. BJA Educ. 2020;20(12):424-30. https://doi.org/10.1016/j.bjae.2020.08.003.
9. Strauss L. Premedication in paediatrics. S Afr J Anaesth Analg. 2021;27(6 Suppl 1):S131-5.
10. Zeidan J, Fombonne E, Scorah J, et al. Global prevalence of autism: A systematic review update. Autism Res. 2022;15(5):778-90. https://doi.org/10.1002/aur.2696.
11. Vidya Yi, Dufur JP, Wittling K, Middlebrooks B, McClain A. Anesthesia for the child with autism. Available from : https://www.uptodate.com/contents/anesthesia-for-the-child-with-autism?search=Premedication&source=search_result&selectedTitle=4~150&usage_type=default&display_rank=4. Accessed 8 Sept 2022.
12. Volkmar F, Reichow B, McPartland J. Classification of autism and related conditions: Progress, challenges, and opportunities. Dialogues Clin Neurosci. 2012;14(3):229-37. https://doi.org/10.31887/DCNS.2012.14.3/fvolkmar.
13. Vlassakova BG, Emmanouil DE. Perioperative considerations in children with autism spectrum disorder. Curr Opin Anaesthesiol. 2016;29(3):359-66. https://doi.org/10.1097/ACO.0000000000000325.
14. Reddy SK, Deutsch N. Behavioral and emotional disorders in children and their anesthetic implications. Children (Basel). 2020;7(12):253. https://doi.org/10.3390/children7120253.
15. Bhalotra AR, Kakkar B. Anesthesia for the deaf and mute. Korean J Anesthesiol. 2017;70(6):654-5. https://doi.org/10.4097/kjae.2017.70.6.654.
16. Volmer E. Oct 2020. Therapy works. Available from: https://therapyworks.com/blog/language-development/what-is-aac/. Accessed 5 Sept 2022.
17. Beukelman DR, Mirenda P. Augmentative and alternative communication: supporting children and adults with complex communication needs, 3rd ed. Baltimore Brookes Publishing Co.; 2005.