PRACTICE RECOMMENDATIONS FOR THE PROVISION OF ANAESTHESIA FOR PAEDIATRIC PATIENTS

It is important for anaesthetic providers to appreciate the fact that children undergoing anaesthesia and surgery have different requirements from adults that change as they grow. These need to be considered in order to deliver individualised, optimal and safe anaesthetic care.

As children develop from neonates to adults, their anatomy, physiology and psychology change, impacting the anaesthetist's decision on matters such as the choice and administration of drugs, anaesthetic techniques, equipment and fluid management, amongst other things. Failure to appreciate the challenges that paediatric patients present may result in adverse outcomes. As such, children should always be managed by staff with the appropriate training and experience in a facility suitably equipped..

1. General Principles

Children with the following characteristics/ problems are best managed in hospitals with a full complement of paediatric specialists and intensive care units:.

i. Neonates (both term and premature) and young infants less than 6 months old
ii. Airway problems
iii. Significant acute or chronic medical problems (ASA 3 or greater) such as syndromes
iv. i.v.complex surgical problems

Health care organisation who care for children should consider the following:

1.1. Policies/ protocols on:

1.1.1. Credentialing and privileging of staff including anaesthetists who care for children in their hospitals.
1.1.2. Sedation in children
1.1.3. The types of pediatric operative, diagnostic and therapeutic procedures requiring anesthesia either electively or emergently
1.1.4. Pain management in children

2. Considerations for patient care units for paediatric patients undergoing anaesthesia:
   2.1. Access to paediatric resuscitation & life support resources should be ensured at all times in all patient care areas for children
      2.1.1. A resuscitation cart with equipment appropriate for pediatric patients of all ages admitted to the facility, including pediatric defibrillator paddles
      2.1.2. Vasoactive resuscitative drugs and dantrolene sodium should be immediately available with readily available written guides for paediatric resuscitations doses and dilutions
      2.1.3. These resources should be maintained regularly with oversight from the department of anaesthesiology
   2.2. Preoperative evaluation/ preparation
      2.2.1. Pre-anaesthetic clinic or specialist should be available for consult regarding the fitness or suitability of patients for anaesthesia/ surgery
      2.2.2. Preoperative blood investigations should be kept minimal and ordered only for specific clinical indications
      2.2.3. Operating theatre/ area where anaesthesia is administered
   2.3. Equipment
      2.3.1. Pulse oximetry should be the first monitor put on the child and is a suitable temporaryalternative to the electrocardiograph for heart rate monitoring till standard monitoring is applied
      2.3.2. Noninvasive monitoring equipment for the measurement of blood pressure, pulse oximetry, capnography, anesthetic gas concentrations, inhaled oxygen

concentration, electrocardiography and temperature as per ASA standards should be used

2.3.2.1. Airway equipment for all ages of pediatric patients must be available

2.3.2.2. Positive-pressure ventilation systems appropriate for infants and children must be available

2.3.2.3. Devices for the maintenance of normothermia must be available

2.3.2.4. Intravenous access and fluid administration equipment, including pediatric volumetric fluid administration devices, intravascular catheters in all pediatric sizes and equipment for difficult vas

2.3.2.5. Specialized equipment for management of the difficult pediatric airway by a variety of techniques for airway control, intubation and ventilation

2.3.2.6. Equipment for care of high-risk pediatric patients including

2.3.2.7. Equipment for invasive measurement of arterial and central venous pressures

2.3.2.8. Portable equipment for oxygenation, ventilation, monitoring and transport to the post anesthesia care unit (PACU) or intensive care unit (ICU)

2.3.3. Staff

2.3.3.1. Children should be anaesthetised by specialists with relevant paediatric experience and trained in paediatric resuscitation.

2.3.3.2. The anaesthetist must be assisted by nurses with adequate skills and training in managing paediatric patients and resuscitation

2.3.3.3. There should also be staff available to take care of the parent/guardian who may be present during induction

3. Post anaesthesia care unit
   3.1. Equipment
      3.1.1. Monitoring equipment including pulse oximeter, non-invasive blood pressure monitoring
      3.1.2. Suction equipment and oxygen should be available at each bedside
      3.1.3. Oxygen delivery system should be available for use in the transport of infants and children from the operating room to the PACU and/or ICU, when medically indicated
   3.2. Staff
      3.2.1. The child should be nursed on a one-to-one basis, by a designated staff who is experienced in the care of paediatric patients.
      3.2.2. An anaesthetist should be readily available to assess and manage post operative/ post anaesthesia complications such as pain and agitation
      3.2.3. staff should be trained in paediatric resuscitation

4. Support services
   4.1. There should be a paediatric pain service to manage acute post-operative pain, pain in oncology patients and children with chronic pain.
   4.2. Provisions for postoperative intensive care/ high dependency
      4.2.1. Facilities in which operative procedures are performed that anticipate postoperative intensive/ high dependency care should have an ICU/ high dependency (neonatal/ pediatric) appropriate for the age of the patient

4.2.2. Facilities in which operative procedures are performed that do not anticipate postoperative intensive or inpatient care should have workflows in place that allow for transfer to a designated hospital with paediatric inpatient or intensive care units.

4.3. On-site haematology, biochemistry, pathology and blood transfusion services should meet the requirements of infants and children with particular reference to the removal and analysis of small blood volumes.

4.4. Pharmacists should be able to provide advice for safe and effective management of drugs in children

5. Ambulatory surgery

5.1. Selection for day surgery should be made according to surgical, anaesthetic, medical and social criteria.

5.2. The parent or guardian of a patient should be provided with clear instructions, which includes fasting guidelines and what to do if the child becomes unwell before or after the operation.

5.3. There should be clear discharge criteria that must include drugs for pain relief and clear instructions for their use.

Reference

Statement on Practice Recommendations for Pediatric Anesthesia
American Society of Anesthesiologists
Developed By: Committee on Pediatric Anesthesia
Last Amended: October 13, 2021

Guidelines for listing of day surgery patients

The suitability of patients for day surgery procedures depend upon the type of procedure, the child's medical condition and social situation. The department of paediatric anaesthesia should be consulted regarding suitability of the child for day surgery if in doubt.

Procedures for day surgery should fulfill the following requirements:

1. minimal blood loss
2. minimal risk of post procedural airway compromise
3. postoperative pain that requires minimal use of opioids and can be controlled well with oral/ rectal analgesia
4. post procedure care that can be met by the caregiver at home
5. expected rapid return to normal food and fluid intake
6. not expected to take longer than 120min

Suitability of the child for day surgery:

1. ex premature infant should be at least 60 weeks post-menstrual age, medically well and free from episodes of apnoea
2. full term infant, medically well and post-menstrual age 46 weeks
3. not severely overweight (refer to BMI for age percentile chart)
4. child should have no or mild and well- controlled systemic illness i.e. ASA 1 or 2 patients
5. no pre-existing airway compromise or potential airway compromise. This includes patients with obstructive sleep apnoea.

(The Royal College of Anaesthetists: Guidelines for the Provision of Anaesthetic Services 20120196)

Social criteria

1. responsible caregiver who must be with patient for 24-48 hours post procedure and remain contactable by phone
2. the child should be transported home via private vehicle or taxi. The child should not be left unattended if placed in a car seat

3. clear instructions on what to do if the child becomes unwell after the operation
4. the caregiver must be able to carry out pre and post procedural instructions
5. the caregiver must be given written advice on when the child can resume normal activity
6. the child should be able to travel to the hospital within an hour should complications arise

Younger infants should be scheduled early in the day to allow sufficient time for full recovery and discharge
(ANZCA Guidelines for provision of anaesthesia care to children 2019)

Guidelines for Air Travel after surgery/ anaesthesia
Advice for KKH Health Professionals

This applies to the post-surgical/ anaesthesia patient who elects to take a commercial flight soon after the procedure, with no ready access to medical attention during the flight.
This does not refer to patients on professional medically escorted air travel.

Potential problems to consider:

- Dehydration from dry cabin air (humidity 20-30%). This may add to risk in patients with poor fluid intake post-surgery .
- Limited mobility leading to increase risk of deep vein thrombosis
- Pressurised aircraft cabins have lower O_2. This increases the risks of hypoxia from residual effects of GA especially in young infants or children with OSA or following chest surgery
- Effects on surgical wound e.g. gas expansion post GI surgery. Middle ear surgery during ascent and descent of flights
- Post-operative pain. No access to potent analgesics

Commercial Airlines:

- Have the right to prevent boarding if the patient is not 'medically cleared' according to their company policy.
- Onus on patient/care giver to declare status to airline.
- Medical staff can only advise the patient on best practice and recommendations.
- Mortality within 24 hours may be coroner's case.

Our department recommends waiting a minimum 24 hours after a general anaesthetic before flying. Please note that the child's condition and the type of surgery or procedure will determine

when it is safe to fly. It is best to obtain approval from the primary procedurist before confirming the flight.
Please refer to the Aerospace Medical Association/AsMA guidelines for specific surgery or conditions.
http://www.asma.org/publications/medical-publications-for-airline-travel

AsMA guidelines recommended 'no fly timing' time:

- Colonoscopy with polypectomy – 24 hours
- Laparotomy – 1-2 weeks
- Laparoscopic abdominal surgery – the next day if no bloating symptoms
- Tonsillectomy and Adenoidectomy, palatoplasty– 2 weeks
- Casted fracture- if applied within 24-48 hour to be bivalved

SUMMARY CHECKLIST

Issues to Consider for Air Travel after Surgery / Anaesthesia:

- Type of surgery
- Type of anaesthetic (e.g. Post spinal headache)
- Patient's background medical history and conditions
- Individual airline regulations: medical clearance
- Insurance policy cover– travel and medical
- Potential complications e.g. DVT, infections, air pressure changes, decreased oxygen partial pressure by 25%, dehydration, lack of access to emergency medical attention
- Urgency of travel plans
- Alternatives to air travel