Case report

Induction of anesthesia in a combative child; management and issues

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Summary
A developmentally delayed, 13-year old autistic boy required management of multifocal cerebral and pulmonary tumors, involving several anesthetics over a 4-month period. At each anesthetic he refused premedication, displayed increasing anxiety and became more combative. With parental guidance and involvement, a variety of anesthetists tried a range of techniques to achieve induction, each ultimately resorting to the use of physical restraint. Principles essential to the care of such a child include early recognition, parental support, multi-disciplinary planning of procedures requiring general anesthesia, continuity of anesthesia care, and clear guidelines about the perioperative management of uncooperative children, including the ethical use of restraint.

Keywords: induction; anesthesia; combative; children; restraint; treatment refusal

Introduction
Induction of anesthesia in children is usually smooth, due to the skills of the anesthesia team and the set up and practices of the institution. Lack of cooperation by a child may be predictable, so that a management plan is made in advance. Sometimes a child’s cooperation unexpectedly evaporates in the anesthetic room and the anesthetist must rapidly decide between distraction, coercion, premedication, restraint or postponement. Induction is witnessed, and is therefore open to scrutiny, by a wide variety of people, from differing backgrounds; for parents the event can be a highly stressful experience (1). The recent hunger for reality television has even lead to operating theater work being televised live (2). Dentists, nurses and mental health colleagues regularly manage noncompliant children (3,4) and there may be lessons to learn from them. It may be prudent to consider this special group of children and to reflect upon our position, and the ethical and medicolegal issues involved.

Case report
A 13-year old, 38 kg autistic boy with epilepsy and global developmental delay required urgent management of multifocal plasma cell granulomas. He had always been ‘uncooperative’ at home and his parents were well practiced in restraining him, if required. He had previously been managed by both a psychiatrist and a psychologist and had undertaken an intensive intervention program in the past, but had had no recent contact with these services. During this illness he presented eight times for...
general anesthesia over a 4-month period for diagnostic imaging and excision of tumors. He initially required craniotomy for tumor resection, and was subsequently diagnosed with pulmonary involvement. In both instances, the time between diagnosis and resection of tumor was extremely short. Lengthy preoperative discussions with his parents and review of the patient notes indicated previous problematic anesthesia inductions. As a younger child, he had undergone general anesthesia for minor surgery; he had refused EMLA and had required restraint for induction, despite taking premedication. He appeared frightened and withdrawn and lacked understanding of his condition. Because of the nature of his underlying disability and the requirement for expedient surgery, he was not referred for preanesthetic psychiatric consultation. His parents indicated that obtaining intravenous access would be very difficult and they expressed a preference for premedication, then rapid inhalational induction with restraint. On all but one occasion, he arrived for anesthesia without intravenous access. Long-term central venous access may have been helpful but was not required for tumor management and, it was felt, would probably have been removed by the patient. Over the following 4 months, various techniques were used, in varying locations, by different anesthesia teams. Oral premedication, even disguised as a favorite drink, was either refused or spat out. Intranasal midazolam and clonidine were effective in sedating him, but their administration required restraint. All inductions were combative and distressing and were worsened by list delays. Inhalational induction with sevoflurane or intramuscular induction with ketamine were equally successful, with restraint being applied by the father and staff, with appropriate regard taken for everyone’s safety. During the course of his management however, he showed worsening anxiety and by the last admission became agitated upon the sight of a hospital bed. Although the parents were satisfied that the inductions were in line with their expectations, some staff members, including the authors, were very uncomfortable during the proceedings. This patient made a good postoperative recovery and has since remained asymptomatic. The tumors were completely resected and he did not require chemotherapy.

Discussion

The ‘perfect’ induction is rewarding for everyone and helps allay parental anxiety. The special demands of inducing anesthesia in children, given the confines and logistics of a busy practice, place an added importance on the perioperative environment and the techniques used. In the last 30 years we have seen drastic changes in the care of children and consequently in the hospital environment (5,6). Concepts now accepted as the gold standard include facilities for parental presence in hospital 24 h-day\(^{-1}\). Other features include a child/family friendly ward, holding area, anesthetic room, operating theater and recovery area, with toys, games and reading material for a range of ages. Outpatients may be allowed to retain their normal clothing with minimal interference from staff and all children may wish to bring personal comfort objects to theater. The use of child-friendly theater scrubs and hats, and colorful or scented anesthesia equipment may also help. These goals may be easier to achieve in a dedicated pediatric unit.

Important also is awareness and recognition of the ‘difficult child’ profile and the appropriate management of such children. Children who are combative at home or resist other therapeutic interventions are likely to also resist anesthesia. This group includes children with neurological or developmental disabilities (7), behavioral disorders (8), autism (9), mental health or personality problems and children with a history of combative behavior or recent physical or psychological trauma. Some otherwise cooperative children may be unwell or just overwhelmed by the hospital experience and thus refuse anesthesia. This second group may tend to have a certain demographic profile, involving anxious temperament, previous distress, age 3 or 4 years old and with parental anxiety (10,11), and this group may be more amenable to persuasion or distraction. Both groups can be further influenced by repeated interventions (12), recent stress or painful procedures (10).

For children who appear uncooperative preoperatively, various strategies may be discussed with the parents, whilst recruiting their help and support. Management options can be discussed by telephone, at a preoperative assessment clinic or at the routine preoperative visit and should be documented. Interventions may include basic explanation or teaching.
(13), a theater visit (14), play therapy, mock inductions, rewards, premedication and family counseling. Postponement of the procedure may be appropriate to institute these measures; in our case a rapidly progressive malignancy required expedient treatment. Multidisciplinary discussions about the indications, urgency and timing of interventions requiring anesthesia may be of benefit, as well as placing difficult children first on the theater list to minimize waiting or starvation periods and list delays. An early start also allows an early recovery and return home, if suitable.

Oral premedication may help and should be both acceptable and effective. Not all current formulations are pleasant to taste. Acceptance may require coercion by a trusted companion, disguise in a drink and ingestion in an unthreatening environment, perhaps even offsite (9). Oral midazolam (15,16), clonidine (17,18), ketamine (9,19) or sublingual fentanyl (20) can be effective. Optimal oral dosage clonidine (17,18), ketamine (9,19) or sublingual perhaps even offsite (9). Oral midazolam (15,16), and ingestion in an unthreatening environment, coercion by a trusted companion, disguise in a drink. Acceptance may require this practice may be problematic.

Various techniques of distraction may be used for both intravenous and inhalational induction techniques, including music, television, DVD and video games, play, lucky dip baskets, toys or hypnotherapy. Application of topical anesthetic cream helps achieve intravenous access. Both types of induction can be safe and pleasant, and their success depends upon the regular practice of appropriate methods and protocols. Some children aged 4 years or over may express a preference, whilst others may find the choice difficult. Either technique may be applicable for the uncooperative child.

Very few children violently resist interventions or procedures after careful preparation. These are a challenging group of patients, who risk damage to themselves, disruption and delays to theater lists and stress to their families and staff. Very occasionally after careful preparation the anesthetist is confronted with a child that requires and refuses anesthesia and physical restraint appears to be the only option. Our dental, nursing or mental health colleagues are regularly required to perform procedures on the unwilling or frightened young, and they, along with the community at large, have mixed views about the use of restraint (3,4,27), some considering physical restraint an unacceptable practice (28,29). With increasing scrutiny of medical practices by media and public, anesthetists need to work within social and legal boundaries.

In Australia, guidelines for the management of ‘out of control’ children have been drawn up by a multidisciplinary editorial board, with suggested protocols that do include the ethical use of restraint (30). If parents believe that careful restraint is used in their child’s best interest, they are likely to be supportive (31). In addition, certain nursing groups have developed clinical guidelines and protocols for the use of procedural restraint (32). These include involvement of the parent, alternatives to and use of appropriate methods of restraint when necessary, and accurate documentation.

Provided the conditions are appropriate and the indications sufficient, it is our view that appropriate degrees of restraint can be justified as a last resort with parental and staff consent, in spite of the documented disadvantages (33). In this situation, the authors prefer inhalational or IM induction. Restraint, once started, must be decisively, speedily and effectively applied by a sufficient number of staff...
and continued until induction is completed. Restrainment techniques should be performed by staff after individualized instructions and not left to a terrified parent (30). Skilled technique minimizes the risk of harm to child and staff. Technically it involves restraining the legs in particular at the hips and possibly also above the knees, holding the arms down in extension and holding the head. If restraint is not thought to be achievable or safe the procedure should be postponed or abandoned, until adequate help is obtained or an alternative plan made. Indications for restraint may include anesthesia for the highly uncooperative child, emergency life saving maneuvers, a baby or toddler, and combative during stage-2 anesthesia. Relative contraindications include lack of consent by parents or staff, failure to exhaust all other techniques and when crying or stress is contraindicated. In the acute unexpected setting a multidisciplinary approach, requesting help from colleagues, including other anesthetists, may limit stress and diminish risk.

Consideration must also be given to the mode and place of recovery. Emergence distress may be more common during recovery in this group, and recent recommendations to minimize this risk may be relevant; this includes the avoidance of low solubility inhalational anesthetics and the administration of intravenous clonidine intraoperatively (34).

Children cannot legally consent to any procedure, but their cooperation and approval is important and highly valued. Their rights are enshrined in the constitution and require that health workers act in their perceived best interests (35). If a child refuses anesthesia and is deemed competent to judge, their rights should be respected. Guardians or practitioners, in unclear situations, may refer this decision to the family courts. In the future, there may be preoperative educational programs for patients via the Internet, hospital websites or computer software and pharmacological or pharmaceutical advances with new benzodiazepines, atypical antipsychotics (risperidone, olanzapine) (36), antihistamines, opioids or volatile agents. Possible routes of administration of these may include pleasant tasting syrups, lollipops, aerosols or sprays, patches or single breath inhalations. Further work is required on premedication mixtures and the optimal timing of their administration. Despite this, it is likely there will be a small group of children who remain uncooperative and difficult to manage [autistic spectrum disorders are being increasingly diagnosed (37)]. Further audit is required, with the establishment of a database, in order to ascertain the incidence of difficult inductions, to identify other possible risk factors such as the increasingly diagnosed and treated Attention Deficit Hyperactivity Disorder and to discover present practice. It would also be helpful to develop closer contact with the professionals involved in the long-term care of difficult children, to create evidence-based perioperative guidelines and an effective documentation and flagging system, and to examine postoperative emergence phenomena and delayed behavioral disorders in this difficult and special group.

References

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