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Paediatric ambulatory anaesthesia

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The tenth annual general meeting of the Society for Ambulatory Anesthesia was held on 27-30 April, 1995 in Indian Wells, California, USA. The 2 h session addressed five different current concerns in paediatric ambulatory anaesthesia.

The first lecture, entitled controversies with muscle relaxants, was presented by Dennis M Fisher MD of San Francisco, CA. Dr Fisher's presentation was primarily concerned with the current controversy with the use of succinylcholine in paediatric anaesthesia. Dr Fisher reviewed the current US FDA labelling of succinylcholine and reminded the audience that this was the first instance when the FDA has agreed to re-revise a label for a drug within a period of 2 yr. The current label for succinylcholine includes a 'boxed warning' which indicates that the use of the drug can be associated with cardiac arrest in a small number of patients due to hyperkalaemia.

Dr Fisher, who is known to take the position that succinylcholine should not be used in children, reviewed the current understanding of the potential problem of succinylcholine being associated with malignant hyperthermia especially when a volatile anaesthetic such as halothane is also administered. He also indicated that there may be up to 1% incidence of masseter muscle rigidity which can, in some patients, be associated with malignant hyperthermia. Dr Fisher noted that when an intravenous anaesthetic such as sodium thiopentone is used, the incidence of masseter muscle spasm is greatly decreased. Dr Fisher also emphasized that cardiac arrest due to hyperkalaemia was mostly observed in a small number of patients with an undiagnosed myopathy.

Dr Fisher presented data to indicate that with the availability of the newer intermediate- to short-acting muscle relaxants, namely mivacurium and rocuronium, the need for succinylcholine in his own practice is virtually nil. He indicated that the very brief duration of mivacurium makes it his drug of choice for elective intubation, and that the short onset time of rocuronium

makes it his drug choice for rapid sequence inductions in infants and children. (Editor's comment: rocuronium is not universally accepted as a substitute for succinylcholine for rapid sequence inductions.)

Dr Fisher then presented data to review attempts at finding drugs that can be effective intramuscularly to replace succinylcholine. Currently succinylcholine is the only drug that has been known to be clinically effective following intramuscular administration and has a quick onset. Mivacurium has been found to be disappointing in that regard because it has a very long onset time even with extremely high doses. Dr Fisher indicated, however, that im rocuronium may be a useful drug for that purpose because twitch and ventilatory depression can occur in approximately 2 min, which would make the drug clinically useful for intramuscular administration.

The second lecture dealt with the issue of fasting before or after surgery. This was presented by Dr Mark Schreiner MD from the Children's Hospital of Philadelphia.

Dr Schreiner reviewed the current literature and indicated that for the past 5 yr or so clinical investigators began to question the necessity for a prolonged pre-operative fast. Numerous studies have shown that ingestion of clear liquids up to 2 or 3 h before surgery had no deleterious effect on gastric emptying time, and no increased risk of pulmonary aspiration. The main benefit of drinking clear liquids before surgery was that it made the wait for surgery more tolerable and pleasant for the children. With that practice followed since 1989 in his hospital, over 40 000 children have been anaesthetized after 2 h of fasting. He was not aware of any complications as a result of the shortened fast.

Dr Schreiner then addressed the current practice in his institution of keeping children NPO after surgery. He indicated that vomiting is the most common post-operative complication of anaesthesia and surgery, and it is one of the main reasons why patients are not discharged home soon following high risk procedures such as eye muscle surgery, orchiopexy and so on. He reviewed studies performed in his institution indicating that children who are forced to drink fluids before they are allowed to go home have more vomiting and therefore stay in the hospital longer than children who are kept fasting and are allowed to drink only when they

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request to do so. He therefore advocates that otherwise healthy elective ambulatory patients drink clear liquids up to 2 h before surgery, get proper intravenous hydration during the perioperative period, and are then encouraged to remain fasting after surgery so that there is minimal vomiting and no delay in discharge home.

The third lecture dealt with premedication/preinduction techniques in paediatric ambulatory patients and was presented by J Lance Lichtor MD from the University of Chicago.

Dr Lichtor started by addressing the issue of preoperative screening that should be conducted before the day of surgery. He indicated that the methods of screening can include telephone calls to the patients and parents at home or a visit and tour of the facility some time prior to the day of surgery. He quoted studies showing that the rate of cancellation of elective surgery is significantly lower in patients who undergo this kind of screening than in patients who are not screened. Dr Lichtor also reviewed the reasons for cancellation on the day of surgery. These included upper respiratory infection (URI), wheezing, fever of unknown aetiology and violation of NPO status. He also indicated that there is a continuing controversy about the need for preoperative haematocrit determinations in these patients and he is of the opinion that haematocrit is a test that should only be done when there is a medical indication for its performance. For example, patients with a history of prematurity who are undergoing surgery shortly after birth, since in these patients low haematocrit can predict postoperative apnoea.

Dr Lichtor then reviewed the use of premedication in ambulatory patients. He indicated that premedication is usually used to minimize separation anxiety and to facilitate the induction of anaesthesia. Currently the use of oral midazolam in a dose of 0.5 mg kg⁻¹ orally is a fairly popular technique in the United States. Because of its very bitter taste, midazolam should be mixed with a sweet solution such as liquid Tylenol or melted frozen fruit juices. Currently the oral transmucosal fentanyl citrate preparation known as Oralet is becoming available for preoperative administration in children. Although it results in sedation 25–30 min following its consumption, there are some opioid-related side-effects such as increased nausea, vomiting, itching, etc. With Oralet, postoperative analgesic requirements are decreased. Dr Lichtor also reviewed the use of antiemetics in ambulatory patients. He indicated that although droperidol in a dose of 50–70 µg kg⁻¹ is useful to control postoperative nausea and vomiting, it results in a high incidence of sedation which can delay discharge from the hospital. Metoclopramide continues to be a very popular drug for that purpose and has few side-effects. Other drugs such as ondansetron are now available and are extremely effective in combating nausea and vomiting, however they are significantly more expensive than droperidol.

The fourth lecture addressed the role of parents in paediatric ambulatory anaesthesia and was presented by Raafat S Hannallah MD from Children's National

Medical Center in Washington DC. Dr Hannallah noted that although the issue is still controversial, the practice of allowing parents to be present during the induction of anaesthesia in their children is becoming fairly popular in the US at the present time. Actually, when he asked for a show of hand, approximately 80% of the attendees at the meeting indicated that they would consider allowing parents to be present during anaesthesia induction in children. The presence of parents is claimed to decrease the anxiety of the children, especially pre-schoolers, at the time of induction and therefore minimize the use of preoperative sedation in these patients. Dr Hannallah indicated that there are some institutions where there are special induction rooms to allow the parents to be present during induction without having to change into hospital attire which is less threatening for the children and much more convenient for the parents. Alternatively, when induction rooms are not available, many practitioners allow the parents to change into OR attire or wear a coverall-type gown and actually accompany the children into the operating room itself and be present during induction. With this approach the parents can be present during any kind of induction, for example, intravenous, inhalational, and so on. In some places where parents are not generally allowed to be present during the actual induction, the anaesthesiologist may allow the parents to be present during the administration of preinduction drugs. The most common and most popular technique for that purpose is either rectal methohexital, rectal or nasal administration of midazolam in a holding area that is outside the operating room suite and is equipped with a source of oxygen and a bag and mask. The parents can be present until the child starts to fall asleep and is wheeled into the operating room to continue the induction. Dr Hannallah reviewed the studies that showed that the presence of the parents actually decreased anxiety and crying during the induction of anaesthesia. There is very little evidence, however, that there are any long term benefits in children who have their parents with them during induction or long-term psychological complications in children who did not have their parents with them during the induction.

Some authors have indicated that parents who are extremely anxious should not be encouraged to accompany their children during induction. Those who are invited to watch their children must be told exactly what to expect and must agree to leave the induction area if so asked by the anaesthesiologist. Very anxious parents can actually result in increased anxiety in their children and should not be allowed to be present.

The last presentation in that session was by Steven C Hall MD who is from the Children's Memorial Hospital in Chicago. That session dealt with postanaesthesia care units (PACU) in paediatric patients. Dr Hall discussed the problem of the child who has delayed emergence. He indicated that beyond the usual catastrophic causes of hypoxaemia, airway obstruction, pneumothorax, metabolic disturbances, hypothermia is a commonly overlooked cause of delayed emergence in children. He

emphasized the need for keeping infants and children warm during surgery.

Dr Hall also indicated that there is a wide variability in children's response to the anaesthetic agents. Some children awake immediately while others are slow to respond and take longer to become completely alert. He also indicated that younger children tend to wake up and then nap for the rest of the day and although there is a great emphasis in our system on having children 'street ready' as quickly as possible after surgery, it should be remembered that the normal response of some children to the stresses of hospitalization and surgery would be to nap. He suggested that in those instances we try to resist efforts to arouse the child prematurely.

Dr Hall then addressed the problem of a child with emergence delirium. He indicated that when this occurs it can be due to potentially hazardous and treatable conditions that should be evaluated first, such as hypoxaemia, hypoventilation, acidosis, hypotension and increased intracranial pressure. Once these life-threatening conditions are eliminated the other possibilities can be pain or fear and these should be considered. Pain should be treated as aggressively as possible. Awakening in a strange environment may also result in agitation. Lastly, agitation may be related to agents given in the operating room. For example, the use of scopolamine or the new inhalational agent desflurane may be associated with such a response.

Dr Hall then discussed the problem of a child with postintubation croup, which is more common in children than it is in adults because of the narrowness of the airway at the level of the cricoid. Postintubation croup usually becomes symptomatic within the first

hour after extubation. It characteristically presents with a barking cough, retractions and tachypnoea. The initial therapy is usually humidified oxygen with face mask. Nebulized racemic epinephrine is commonly administered by face mask to vasoconstrict the laryngeal mucosa. Because of the short duration of action, the patient must be examined after 1 h to see if there has been a rebound re-occurrence of oedema and obstruction. Although a single treatment is usually adequate, there may be a need to repeat racemic epinephrine and some children may require admission to the hospital for overnight observation if the need for treatment persists.

Finally, Dr Hall addressed the problem of the risk of postanaesthetic apnoea in premature infants. He indicated that although several studies have shown that infants who are born prematurely continue to have a risk of apnoea until they are 44 to 46 weeks postconceptual age, recent examination of the same data suggests that if we are to decrease the risk of post-discharge apnoea significantly it may be necessary to admit to hospital infants who are born prematurely, if their age at the time of surgery is less than 55 weeks (postconceptual age). Central nervous system stimulants such as intravenous caffeine have been shown to result in a significant decrease of apnoea in these high risk infants. Although the results of these studies are encouraging, only small numbers of patients have been studied and confirmation will be needed before caffeine can always be assumed to be effective. In most practices, even if caffeine is administered intravenously to prevent postoperative apnoea, infants with a history of prematurity who are still under 55 weeks postconceptual age are still admitted to the hospital for postoperative monitoring for apnoea and bradycardia.