Correspondence

{}

I also teach that where it is anticipated that secretions or blood may impede fibreoptic vision, a right-sided Robertshaw should be available in case the left-sided tube persists in entering the right main bronchus.

Thus where protecting a good lung is paramount, my preferred technique continues to involve the Robertshaw double-lumen tube inserted ‘blind’, but I do intend to modify my regular practice to include seeing the inflated bronchial cuff before rather than after the routine of individual lung ventilation.

J. Pfitzner
Department of Anaesthesia
North Western Adelaide Health Service
Adelaide, South Australia


Editor.—We are grateful to Dr Pfitzner for his interest in our study. We agree that the use of our technique is hampered in cases where copious secretions or blood are present in the trachobronchial tree. In these cases, we merely withdraw the bronchoscope and proceed with blind placement as practised conventionally. Our experience with the Robertshaw double-lumen tube is limited and this type of endobronchial tube has not been available for some time in our institution. As such we would like to thank Dr Pfitzner for his helpful hints. The bronchoscope can only be an aid to placement of double-lumen tubes; it cannot replace conventional techniques in all cases.

K. F. Cheong
K. F. Koh
Department of Anaesthesia
National University Hospital
Singapore

Paediatric Resuscitation Guidelines

Editor.—Dr Zideman’s article concerning paediatric resuscitation and the ILCOR guidelines,1 including the current experimental and clinical evidence on which such recommendations are based, provided an excellent and concise review of the subject. However, a recent case has led me to question two statements made in the ILCOR guidelines. After four doses of epinephrine, ventricular fibrillation developed which proved very resistant to treatment. Eventually, after the sixth attempt at defibrillation and following a fifth dose of epinephrine, a slow, broad complex rhythm associated with a spontaneous cardiac output returned. Atropine 20 μg kg⁻¹ produced rapid and sustained improvement in both heart rate and cardiac output. The baby made an excellent recovery and was subsequently discharged home with no signs of neurological impairment.

In his review, Dr Zideman stated that ‘no children have survived to discharge who have received more than two doses of epinephrine’. The references used to support this statement studied the results after ‘out of hospital’ arrests where long ‘down times’ and relatively inadequate resuscitation could be confidently expected.2,3 Dr Zideman also stated that in the ILCOR guidelines, atropine is ‘not indicated during resuscitation as the adrenergic effects of epinephrine are considered to over-ride the parasympathetic (vagal) effects of atropine’. The exact cause of this infant’s cardiac arrest is not known but was probably secondary to relative hypovolaemia with pre-existing impaired ventricular function. Before operation, this baby had been hypertensive requiring treatment with α and β blockers. Residual adrenergic block may have played a role in the aetiology of the cardiac arrest, in addition to the requirements for high doses of epinephrine. The effective response to atropine with such high circulating concentrations of catecholamines is also surprising. Perhaps residual β block was a contributory factor? The prompt recognition and treatment of this asystolic arrest was undoubtedly responsible for the eventual successful outcome. Clearly, such a short period between onset and effective treatment is highly unusual, especially in an ‘out of hospital’ situation and only adds strength to the emphasis placed on the early recognition and treatment of the critically ill child, as taught in resuscitation courses (e.g. Paediatric Advanced Life Support and Advanced Paediatric Life Support).

The guidelines recommended by the ILCOR and Resuscitation Council (UK) should be used but not rigidly adhered to without consideration of each individual case. Indeed, within the current guidelines, flexibility in therapy is ‘allowed’ when you ‘consider and correct reversible causes’. Of course, this also requires flexibility of thought on the part of those leading the resuscitation. The potentially huge disparity in outcome between individual resuscitation cases depending on their aetiology and location, as illustrated by the case report here, must surely encourage a more cautionary approach to the use of such sweeping statements when associated with such widely read and important guidelines.

H. Hack
Royal Manchester Childrens Hospital
Manchester, UK


Editor.—I am delighted that Dr Hack has reported this unusual event where a 3.8-kg baby survived multiple doses of epinephrine and ventricular fibrillation without severe neurological damage. At the beginning of my article1 and in the ILCOR statement2 it is explained that both are based on specific evidence where available, or supported on the basis of common sense or ease of teaching and skill retention. The paediatric ILCOR statement includes recommendations reached by consensus of an expert multinational panel. The specific published evidence was declared in the reference list. Dr Hack, by presenting this letter for
publication, has therefore added to the data source and the results that he has reported would be considered, together with those reported via published paediatric Utstein template reports, at the next review.

The paediatric resuscitation guidelines should not be considered as rigid protocols. I note that in his report, Dr Hack adhered to the recommended guidelines initially. In some events, especially when the cause is treatable and there is little or no monitored hypoxia, it is appropriate to continue resuscitation and to use any reasonable resource or treatment available. In this case, multiple administrations of epinephrine (dose not reported) were successful in restoring a spontaneous circulation. The use of atropine in the treatment of the resulting peri-arrest bradycardia was appropriate, despite the anomaly of the previous multiple doses of epinephrine. Finally, may I suggest that the success of this event was a result of sustained maintenance of tissue oxygenation. It cannot be emphasized sufficiently that sustained delivery of oxygen to this infant’s tissues was critical to the successful outcome.

I would hope that the publication of this letter will encourage others to report their paediatric resuscitation events, either as individual case reports or using the Utstein template, so that we can continue to improve the practice of paediatric life support.

D. A. Zideman
Department of Anaesthesia
Hammersmith Hospital
London, UK


Which is better in children: edrophonium or neostigmine?

Editor.—We read with interest the review article by Fisher on neuromuscular blocking agents in paediatric anaesthesia. It was a concise summary of the use of these agents in paediatric practice today. The author’s preference for edrophonium over neostigmine, however, did not seem to be a true reflection of what is known about antagonism of neuromuscular block in children.

There have been few comparative studies in children of the speed of action of edrophonium and neostigmine. In comparable mg per kg doses, recovery from an intense atracurium-induced neuromuscular block in children is faster after neostigmine than edrophonium. In adults, it has been shown that in the reversal of profound block produced by vecuronium or atracurium, neostigmine is more effective than edrophonium and its maximal effect is reached more quickly, even though edrophonium is faster in its initial onset. Monitoring of the depth of neuromuscular block in infants and children is technically more difficult and not perhaps as widespread as in Dr Fisher’s department. This suggests that the chance of profound neuromuscular block at the end of surgery is greater in paediatric anaesthetic practice. Neostigmine would therefore be a better choice than edrophonium.

In his article, Fisher stated that less neostigmine is needed in children than in adults, and quoted Fisher and colleagues. Quoting the same article, he then stated that the ED50 of neostigmine for antagonism was greater for children than for adults. It is possible that this is a typing error and that the author means to suggest that edrophonium has a higher ED50 in children than in adults.

For this reason, the author suggests the use of higher doses of edrophonium for antagonism in infants and children. These studies, however, were carried out under steady-state infusion of tubocurarine and not during the recovery phase from the newer non-depolarizing agents. Moreover, there was no significant difference in the dose of edrophonium required to antagonize tubocurarine-induced neuromuscular block in children and adults.

In contrast, several studies have shown that neostigmine antagonizes residual non-depolarizing neuromuscular block more effectively in children than in adults. Debaene, Meistelman and d’Hollander showed that, when twitch height recovered to 10% of control after vecuronium, neostigmine 30 μg kg−1 had a more rapid onset in children than in adults, and that a TOF of 0.7 was obtained in less than 10 min in all patients, including infants. The dose of neostigmine to effectively antagonize 90% block produced by rocuronium is indeed smaller in children (mean 7 μg kg−1) than in adults (56 μg kg−1). The effects of 2 × ED50 of rocuronium could effectively be antagonized in infants with neostigmine 20 μg kg−1.

With mivacurium there may be an argument for the use of edrophonium as it slows the hydrolysis of mivacurium by plasma cholinesterase less than neostigmine. However, until this issue is resolved, we agree with the author’s recommendation of not antagonizing profound mivacurium-induced block.

In summary, we feel that there are little convincing scientific data to prefer edrophonium to neostigmine in paediatric patients. Indeed, with the new shorter acting neuromuscular blocking agents, there may be some advantage to the use of neostigmine over edrophonium.

J. J. Driessen
E. N. Robertson
L. H. D. J. Booij
Department of Anaesthesiology
Academic Hospital Nijmegen
Nijmegen, The Netherlands

9 Leuwer M, Motsch J, Schledt U, et al. Dose–response, time course of...