Although ketamine has a good safety record, the potentially disastrous side effects of laryngospasm and apnoea cannot be dismissed just because they are rare. Green et al found that laryngospasm occurred once in a hundred or so cases, but the incidence may be greater if patient selection is poor. Whoever administers ketamine, or indeed any drug which causes loss of consciousness, must be capable of managing the predictable complications. The doctor must have skills in airway management, there must be adequate assistance, tools (artificial airways, laryngoscopes, suction, etc), drugs (suxamethonium, adrenaline and others), monitorin apparatus and probably most important of all, the judgment that is gained by training and experience. These principles are, one hopes, accepted by those who treat infants regularly but they may not, I fear, be appreciated by others who use ketamine infrequently.

Taylor and Towey have demonstrated that radio-opaque dye placed in the pharynx of adults passes easily into the lungs during anaesthesia.3 The airway, therefore, should not be assumed to be secure from aspiration of gastric contents and it is safer to follow sensible principles of fasting. The protective reflexes of the airway may be able to cope with small volumes of gastric fluid but they are likely to be overwhelmed by large volumes. Gastric contents are difficult to predict and aspiration of solid matter into the lungs is particularly dangerous.

Airway intake, breathing and oxygenation are usually adequate, but this must not be assumed. Monitoring by pulse oximetry is mandatory for all patients under anaesthesia, even dentists and paediatricians.6-8 We have published their guidelines on safe practice for sedation and paediatricians should be aware they will be vulnerable to criticism if a child is damaged by hypoxia. Anaesthesia is managed best by anaesthetists.

Is ketamine a sedative or an anaesthetic? In my view, although it has unique properties, ketamine should be regarded as an anaesthetic drug, not as a sedative. Small doses may indeed be truly sedative but anaesthesia is easily caused by increasing the dose. One mg/kg intravenously usually causes anaesthesia. Consent should always be sought for this procedure in advance under anaesthesia and for anaesthesia itself.

The versatility in the route of administration is the main advantage of ketamine, but if intravenous access is not available, ketamine does not compare well with other intravenous anaesthetic drugs for use in normal children. Ketamine has a slow recovery profile and causes nausea and, because it can cause hallucinations, it would not be my first choice drug for a child who is already distressed and confused.11 There are, of course, special indications for ketamine anaesthesia such as for trauma, burns and cardiac cases, and in the intensive care units, but away from these scenarios ketamine should only be necessary in non-ideal and difficult circumstances.

When modern anaesthesia services are available anaesthetists should be responsible for anaesthesia.

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Dr Harari comments:

The correspondence about our article pertains to the choice of sedative agent rather than the principle of sedation itself. Our aim was to initiate an awareness of the occasional need for sedation in genital examination, not to champion the virtues of ketamine. The choice of sedating agent and who should administer it is indeed controversial. We chose ketamine in our three children because we are familiar with the drug. We have an ongoing, as yet unpublished study on ketamine administration in 150 children to date (age range 2-200 months, mean 60, SD 52), the main indication being muscle biopsy. We have not yet seen any major complications. Drs Rogers and Murdoch state that emergence phenomena are not rare. In our last 150 children, we have not observed rate their child's irritability on awakening. Ninety per cent rated their child as not being irritable, 9% had mild irritability, and 1% moderate. Doctors treating the children rated the child's irritability as either insignificant (93%) or significant such that a benzodiazepine was required (7%). It is likely that the younger the child, the less likely he is to have a distressing hypnopompic event. Nevertheless we have altered our protocols to give midazolam 0.1 mg/kg on induction and again at the end of the procedure. In addition we now give a smaller induction dose of ketamine of 0.5 mg/kg intravenously.

Undoubtedly attention should be paid to the child misinterpreting the examination itself as sexual abuse. In our ongoing unpublished study we routinely asked all children aged 3 years if they had any recollection of the procedure for which the ketamine was given. None had any recollection (n=54).

The amnesic properties of ketamine make it unlikely that the child would recall, let alone misinterpret the genital examination. This cannot be said of the un sedated child.

One cannot cavil at Dr Surry's sensible plea for pulse oximetry and fasting before ketamine administration. Another difficult issue however is the need for the anaesthetist to administer the drug. Virtually all sedative agents have serious, even potentially life threatening complications.1 It would be comforting to have an anesthetist available...
Carbon monoxide poisoning in two children riding in the back of a van

EDITOR.—A brother and sister aged 9 and 10 years, respectively, were both previously fit and well and were noticed to be abnormally drowsy after a 40 minute journey in the back of a Transit type van. On arrival at the accident and emergency department, both children were drowsy but orientated in time and space. Both complained of headache and both had vomited. Neither had abnormal neurological signs on examination.

Arterial blood gases revealed carboxyhaemoglobin (COHb) concentrations of 24-5% and 19-7% respectively by absorption photometry (International Laboratories 482 Co Oximeter). Both children were treated with 100% inspired oxygen at 6 litres/minute via a well fitting face mask. Symptomatic improvement was apparent at one hour and both were fully alert with normal intellectual function at two hours. Repeat blood gases six hours after admission showed COHb concentrations of less than 1% (normal range in urban non-smokers <2%). Three months after the poisoning, both children were reassessed. At this stage, there were no detectable intellectual or behavioural abnormalities noted by either parents or teachers. No neurological deficits were present.

Admission levels of COHb correlate poorly with short- or long-term sequelae. However, the levels measured in these children have been associated with long-term neuropsychiatric morbidity in some patients. Treatment with hyperbaric oxygen is recommended if COHb concentrations exceed 40% or if there is a history of loss of consciousness, persisting neurological or intellective deficits, or cardiovascular abnormalities. None of these features were present in these two cases and both made a complete recovery. However, the journey been of longer duration or the symptoms not recognised, a serious or fatal poisoning may have occurred.

The dangers of riding in the back of 'pick-up' trucks has recently been highlighted. In a series of 68 consecutive carbon monoxide poisonings, 20 occurred in children travelling in the back of pick-up type trucks, beneath canopies or soft covers, with defective or modified exhaust systems. In this case, the children were travelling in the back of a fully enclosed van. Subsequent inspection by the owner revealed a small crack in the exhaust system.

Carbon monoxide poisoning is a common cause of fatal poisoning. Clinicians must maintain a high degree of suspicion to recognise cases who frequently present with non-specific signs. Travelling in a vehicle with a damaged or non-standard exhaust system is a significant risk factor and travelling in the back of vans may be an additional risk for carbon monoxide poisoning.

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Quality of life in surgically palliated complex congenital heart disease

EDITOR.—Casey et al's review of patients after surgical palliation of complex congenital heart disease identifies the need to assess health status in children with chronic ill health. The ability to measure 'health related quality of life' (HRQL) in those with morbidity secondary to their disease, and any interventions performed by their clinicians, is increasingly being recognised as an essential facet of total patient care. A comprehensive identification of the core set of attributes which combine to provide an index of HRQL revealed the following key set of six: sensory and communication ability, happiness, self care, pain or discomfort, learning and school ability, and physical activity. The Feeny-Barr multivariate health assessment uses these domains to provide a utility score of HRQL, and is a simple, concise instrument which may well be an appropriate tool to measure the overall morbidity burden in patients with chronic conditions such as cardiac patients. This instrument's practicability and validity is currently being evaluated in Nottingham and Canada.


Central nervous system tumours lack national studies

EDITOR.—Thorne and Foreman raise a very important point when they highlight low entry of children with central nervous system tumours to national or international studies which for other diseases have clearly been demonstrated to confer considerable benefit for the sufferers. The Medical Research Council does not organise solid tumour protocols for children apart from the joint project on bone tumours. The United Kingdom Children's Cancer Study Group (UKCCSG), however, has a range of protocols already in operation or in the planning stage for a variety of different central nervous system tumours including primitive neuroectodermal tumour (medulloblastomas), brain stem gliomas, infants under 3 years with brain tumours, and, jointly with the International Society of Paediatric Oncology, a low grade glioma protocol. The problem is not the availability of protocols. Why paediatric oncologists, radiotherapists, and overwhelmingly neurosurgeons fail to participate in these studies is difficult to understand. The UKCCSG alone has run or actively participated in seven brain tumour studies since 1978, as many as for any tumour group. What the authors need to do along with the rest of us is to try to ascertain why we cannot persuade specialists in other disciplines to actively participate in the available studies.

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Genital examination under ketamine sedation in cases of suspected sexual abuse.

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Updated information and services can be found at: http://adc.bmj.com/content/71/5/481.2.citation

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