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SHORT REPORT

Nasal/buccal midazolam use in the community

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A telephone survey was carried out to evaluate the effectiveness and convenience of nasal/buccal midazolam in terminating prolonged seizures in the community. A total of 33/40 (83%) families who had used it found it effective and easy to use; 20/24 (83%) preferred using midazolam to rectal diazepam.

Status epilepticus is a life threatening condition associated with long term morbidity that occurs mainly in childhood and becomes more refractory with duration.¹ Until recently standard treatment of children with a history of prolonged (>10 minutes) seizures has been to provide families with rectal diazepam to terminate the seizure as soon as possible.

Rectal diazepam has many problems when used outside the hospital setting: it is difficult to administer to wheelchair users; tonic seizures make administration difficult; constipation and bowel movements can interfere with absorption; it becomes more socially unacceptable with increasing age; and is detrimental to the self esteem of children and teenagers. In our experience schools are uncomfortable with rectal administration. Midazolam has been used nasally since 1988 as a preanaesthetic agent² and an anxiolytic in accident and emergency departments.³ Following a study in 1996 showing its effectiveness in abolishing epileptiform abnormalities in children with subclinical status epilepticus,⁴ we began to offer families the choice of midazolam or rectal diazepam for home and school use. The aims of this survey were to assess the effectiveness of buccal and nasal midazolam in terminating prolonged seizures in the community, evaluate how easy parents found it to use, and in the families who had previously used rectal diazepam, establish which was the preferred treatment.

METHOD

As nasal/buccal midazolam is unlicensed for use as an anticonvulsant, prescriptions were issued from the hospital. Copies of these prescriptions over a 16 month period were obtained and 53 children were identified (table 1). Their parents were then contacted by telephone (table 2).

We use the intravenous preparation of 10 mg/2 ml at a dose of 0.2 mg/kg. The different methods of administration are discussed with the parents and a decision made on the most appropriate route, taking into account previous seizure patterns, practical issues, and parental preference. The buccal surface area is greater and parents prefer this route as they turn the child onto one side during a seizure, which is the preferred position for buccal administration. We suggest nasal administration in the following situations, however: if copious saliva has been produced in previous seizures; if the child is resisting administration; and for focal seizures with altered awareness (the midazolam is usually swallowed in this situation).

After demonstration, parents and carers have supervised practice in breaking the ampoule, drawing up, and administering a solution on a doll. Written guidelines on administration are provided. Filter straws are used to draw up the medication and protective ampoule breakers are provided.

RESULTS

Midazolam had been used for 40 of the 53 children (74%) and 33 (83%) of those found it effective. Twenty four of the 40 families had also used rectal diazepam, and 20/24 (83%) of those expressed a preference for midazolam. The most commonly stated reasons for this preference were: personal dignity (all of the respondents); more socially appropriate; ease of administration in wheelchair users; and quicker response than rectal diazepam.

Analysis of the seven families who found it ineffective was as follows: two of the children were also unresponsive to rectal diazepam; one parent had only used it once as a "preventative" and not as recommended; and one mother thought it had been lost in saliva. In all but one case the midazolam had been given buccally.

Four families had expressed a preference for rectal diazepam. The reasons given by two were familiarity and ease of administration at night (although one of them carries midazolam for day use); one child was said to be euphoric after midazolam administration, and the fourth parent gave it buccally and felt some was expelled in saliva.

DISCUSSION

Midazolam given buccally and nasally is an effective treatment for prolonged seizures in the community and is preferred to rectal diazepam by most families in this cohort. Scott and colleagues⁵ showed that buccal midazolam was at least as effective as rectal diazepam in the termination of prolonged seizures in a residential school for young people with difficult epilepsy, and our study supports these findings when used by parents at home. Drawing up and measuring the contents of midazolam is a more complicated procedure than using a tube of rectal diazepam, but only one parent experienced difficulty with administration without help because of her daughter's resistance. For the majority the social benefits exceeded the disadvantages. Filter straws and ampoule breakers have made the process easier.

Table 1 Demographic and clinical details

Demographics	
No. of patients	53
Age range (years)	3–21
Special needs schools	30
Mainstream education	20
Seizure type	
Febrile status	1
Generalised	11
Symptomatic partial	30
Cryptogenic partial	11

Table 2 Telephone questionnaire

Has midazolam been used?
 Was it effective in stopping the seizure?
 How easy did you find it to use on a scale 1–5 (1 = very easy, 5 = very difficult)
 Have you previously used rectal diazepam?
 Which method was preferable?
 Any comments?

Midazolam allows families a choice in rescue medication and how they manage prolonged seizures in the community. Some families use either rectal diazepam or buccal/nasal midazolam depending on the social situation. There is no difference between the cost of rectal diazepam and midazolam.

The current preparation remains unlicensed for use in epilepsy, which can cause problems with prescribing. There is now a preparation of midazolam syrup for buccal use, which the manufacturers state can also be administered nasally. This preparation is more expensive but we intend to explore its use in the termination of prolonged seizures. It dispenses with the use of glass ampoules, filter straws, and ampoule breakers, simplifying administration.

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ARCHIVIST.....

Bicycle helmet campaigns and poverty

Bicycle helmet campaigns increase helmet use but there is uncertainty about their effect on head injuries. During and after a campaign in Quebec, Canada (Farley *et al. J Epidemiol Community Health* 2002;**57**:668–72) head injuries were reduced in children in both poor and more affluent communities.

The campaign took place in spring and summer during the years 1990 to 1993 and involved schools, police, community organisations, and retailers. It targeted 140 000 children aged 5–12 years. A different community with 83 500 children of that age but without a bicycle helmet campaign served as control. In the target community 24 of 210 municipalities were classified as poor (20% or more of households of low income) and in the control community 27 of 98. Previous reports from the study showed that the campaign increased helmet ownership and use but was three times more effective in these respects in more affluent municipalities than in poor municipalities. This paper reports that, despite this lesser response in poor communities, the effect on head injuries in cyclists was similar in both poor and non-poor municipalities. Before the campaign the incidence of head injuries in poor municipalities was three times greater in the target community than in the control community and in non-poor municipalities it was 50% greater in the target community. After the campaign the incidence fell in both poor and non-poor municipalities in the target community but did not change in the control community. In the target community the incidence of head injuries due to cycling accidents fell by 55% in poor communities and by 45% in non-poor communities when the 3 years before the campaign (1988–90) were compared with the 3 years after the campaign (1994–96).

The campaign was followed by a reduction in head injuries in both poor and non-poor municipalities despite a lesser uptake of helmets in the poor municipalities. The reasons for this apparent discrepancy are unclear.