Short reports

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Premedication for jejunal biopsy in childhood using intravenous diazepam and metoclopramide

Small bowel biopsy is essential for the diagnosis of coeliac disease (Anderson, Gracey, and Burke, 1972), as well as being useful in the investigation and follow-up of a number of other enteropathies. The technique should preferably be used by those who will have continuing experience and who are backed up by expert help in the histological and biochemical analysis of the mucosal specimens. The Watson Paediatric Capsule* has proved its quality and safety over many years (Townley and Barnes, 1973). Good fluoroscopy facilities are also essential. The test obviously remains a worrying procedure to the child, with unpleasant memories, as we often find from referred patients and mothers. We do not share the experience of Townley and Barnes (1973) that sedation is unnecessary in many patients. An unco-operative patient will sometimes mean failure to obtain a mucosal specimen with refusal of a repeat performance.

We have therefore tried to find the most suitable premedication to achieve both sedation and adequate motility of the gut so that the mucosal specimen may be obtained with minimum child disturbance, in the shortest time, and with minimal exposure to radiation. Many drugs were tried but it became apparent that the most useful premedication was a combination of intravenous diazepam and metoclopramide both given immediately before intubation. We report our experience with these drugs in a prospective study.

Materials and methods

During a 4-month period, 56 consecutive jejunal biopsies were carried out on 24 girls and 32 boys aged between 5 months and 17 years. 12 of those studied were proven to have coeliac disease. 22 of the biopsies were carried out on children who were first-degree relatives of known coeliacs as part of a family study and at the request of or with the agreement of the parents. 7 were carried out to exclude the diagnosis of coeliac disease in patients who had had a period of treatment with a gluten-free diet before complete investigation, and 15 for various other diagnostic purposes. The paediatric sized Watson modification of the Crosby capsule was used in every case.

Each patient was fasted for at least 4 hours. Immediately before the introduction of the capsule, diazepam 0·5 mg/kg body weight (with an absolute maximum of 10 mg) was administered slowly, intravenously. In almost every case 0·5 mg/kg was sufficient to induce sedation. After a pause of about two minutes, metoclopramide 0·3 mg/kg (with a maximum of 10 mg) was injected through the same intravenous needle. Within one minute the capsule was passed by means of an introductory tube (children over the age of 2 having had the throat sprayed with up to four metered doses of aerosol lignocaine 10%). The capsule itself was attached to a very soft tube (Portex radio-opaque 800/023/150 shore 85). The introducing tube (Portex radio-opaque 800/023/300 shore 90) had sufficient rigidity to be used as a guide to place the capsule in the first third of the oesophagus. The introducing tube was then secured in position and the capsule passed into the stomach.

By means of actively positioning the child and by frequent brief *x*-ray screening, the capsule was followed to the biopsy site in the region of the ligament of Treitz. The total intubation time up to the removal of the capsule with the specimen and the total screening time were recorded.

The quality of the sedation was classified into four grades. (1) Very good; no resistance to intubation. Child not distressed. (2) Good; no resistance to intubation. Slight distress. (3) Fair; slight resistance and lack of co-operation. Moderate distress. (4) Inadequate; strong resistance to procedure. Severe distress.

Results

A mucosal specimen was obtained from every child. The quality of sedation was very good in 34 patients (61%), good in 10 (18%), fair in 6 (11%), and inadequate in 6 (11%). In patients under 2 years of age and in those over 14 years, all but 1 had very good or good sedation. Between the ages of 2 and 14, 21% were inadequately and 17% were only fairly sedated (Fig. 1).

The mean intubation time of the whole group was 18 minutes; in 20 patients (36%) the total intubation time was less than 10 minutes, and in 43 patients (77%) less than 20 minutes. All intubations were completed within one hour. The mean intubation time was shorter, on the one hand, the younger the child, and on the other hand, the better the sedation (Fig. 2). However, in all age groups, especially between 2 and 14 years of age, the range was very

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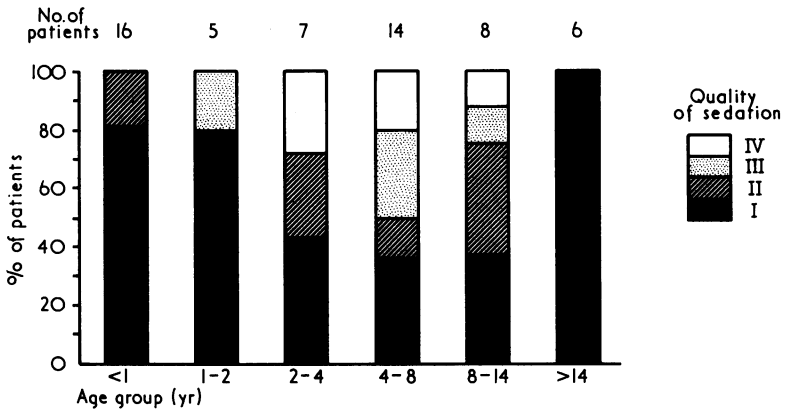

FIG. 1.—*Quality of sedation according to age group.*

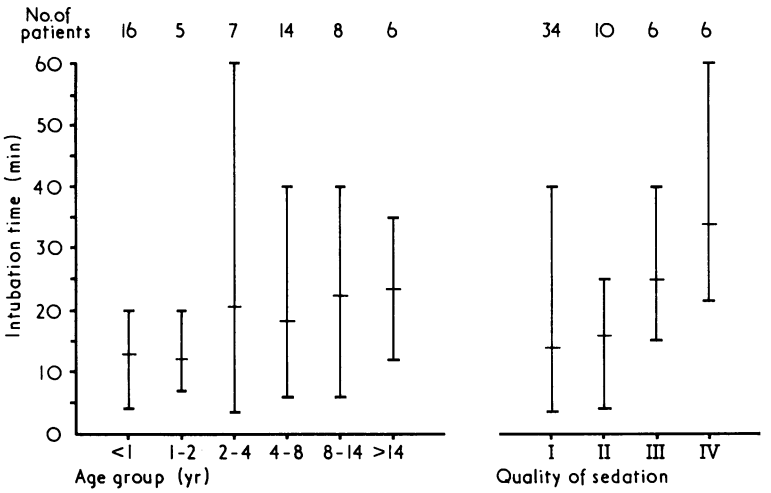

FIG. 2.—*Intubation times related to age and to the quality of the sedation. The total range and the mean are shown in each age group and for each grade of sedation.*

large, containing variations between 3 and 60 minutes within the same age group. Independent of age, the mean intubation time was nearly three times longer when the investigation was undertaken under inadequate conditions of sedation, compared with the well-sedated group.

The mean screening time of the whole group was 1·6 minutes; in 26 patients (46%) the total screening time was less than 45 seconds, and in 36 patients (64%) less than 90 seconds; no child required more than 6 minutes. The age of the child and the quality of sedation showed the same relation to the mean screening times as they did to the intubation times. There was also a wide range within each age group and each quality of sedation. Under the age of 2 years the mean screening times was less than 1 minute. Independent of age, duration of screening was directly related to quality of sedation: with inadequate sedation the mean screening time was 4·2 minutes and with very good sedation was 1·2 minutes.

There was no difference in the mean intubation and the mean screening times between coeliac and noncoeliac patients.

Discussion

Diazepam (Valium), a benzodiazepin tranquillizer, is widely used in many branches of medicine (Dundee and Keilty, 1969), including gastroenterology, and is already well described as a premedication in paediatrics (Romagnoli, Cuison, and Cohen, 1968). Metoclopramide (Maxolon), an orthochlorprocainamide, has a selective action on the area prostrema of the fourth ventricle (Tarpila and Wiljasalo, 1966). About 6 minutes after intravenous injection, it produces hypermotility of the prepyloric region of the stomach and relaxation of the pylorus, thus making it especially useful for intubation of the small bowel (Mitchell and Parkins, 1969; Shmerling, 1970).

In our experience, the combined use of diazepam and metoclopramide was preferable to premedication with barbiturates, chloral hydrate, promazine, pethidine, chlorprothixene (Taractan), or various combinations of these drugs.

Many of our biopsies were prolonged slightly for teaching purposes, but in spite of this our intubation and screening times compare favourably with other published data (Shmerling, 1970; Townley and Barnes, 1973). Good results in terms of quality of sedation were obtained in all but 1 of the children under the age of 2. Excluding family studies, this age group comprises the majority of children investigated for coeliac disease. In the children between the ages of 2 and 14 sedation was usually satisfactory, but in 6 out of 29, poor results were obtained. In this age group, therefore, the quality of sedation is somewhat less predictable.

Several other advantages are gained using this premedication. The combination of drugs given intravenously immediately before the procedure allows the dose of diazepam to be increased according to individual need and also allows the capsule to be passed when metoclopramide activity is maximal. The duration of sedation is usually short enough to allow subsequent feeding within one hour. This may be especially important in an already malnourished child who has to be fasted for the intubation. Nearly all patients, including those in grades 3 and 4, subsequently showed complete amnesia of the procedure. This desirable side-effect of diazepam is well documented (Dundee and Keilty, 1969).

A practical advantage of this method is the elimination of waiting time while oral or intramuscular premedication becomes effective. This is particularly useful when the biopsy is carried out on outpatients. By giving the metoclopramide before the intubation rather than when the capsule is at the pylorus, we avoid a second injection which may interfere with the procedure and the quality of sedation. This means, however, that after the injection the capsule should be positioned in the prepyloric area without delay to allow its further progression during the maximal effect of the drug, which, in our experience also, begins about 6 minutes after injection.

Undesirable side-effects of metoclopramide in the dose used are unknown. Transient apnoea occurring after intravenous diazepam has been described (Bailey and Fenichel, 1968). Therefore, it is essential that full resuscitative facilities are immediately available. There were no complications in our series.

In conclusion, we feel that the combination of diazepam and metoclopramide given in the method described is a particularly suitable premedication for intestinal biopsy in childhood.

Summary

The combination of intravenous diazepam and metoclopramide was given immediately before intubation for small bowel biopsy in 56 infants and children. Analysis of the quality of sedation produced and resulting intubation and screening times shows this to be a particularly useful premedication in this procedure.

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