PREMEDICATION IN CHILDREN UNDERGOING DAY-CARE SURGERY

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SUMMARY

An oral preparation of dichloralphenazone and paracetamol (Paedosed) was used as an alternative premedication to i.m. morphine and atropine in 562 children undergoing day-care surgery. From a series of observations made, both in hospital and at home, it appears that morphine has several disadvantages when compared with this mixture, provided that the latter is supplemented with i.v. analgesia for the more painful procedures.

There are differing views about the importance of premedication for children undergoing day-care surgery. Some argue that premedication is unnecessary (Steward, 1975), while others feel that heavy sedation is desirable (Shah et al., 1972). In an attempt to throw some light on this problem two contrasting premedication regimens were studied: morphine and atropine by i.m. injection v. an oral mixture of dichloralphenazone and paracetamol (Paedosed, Pharmax).

METHODS

Five hundred and sixty-two patients aged between 6 months and 10 years admitted for elective surgery as day-cases were randomly allocated to one of two groups. Group 1 (211 patients) was given morphine 250 \( \mu \text{g kg}^{-1} \) and atropine 20 \( \mu \text{g kg}^{-1} \) i.m. and group 2 (351) dichloralphenazone 40 mg kg\(^{-1}\), paracetamol 20 mg kg\(^{-1}\) and atropine 15 \( \mu \text{g kg}^{-1} \), by mouth. Group 2 was further subdivided: (a) 243 patients in whom pain after operation was considered unlikely and (b) 108 in whom it was likely. During induction of anaesthesia, patients in group 2b received either pentazocine 300 \( \mu \text{g kg}^{-1} \) or fentanyl 3 \( \mu \text{g kg}^{-1} \) i.v. The timing of premedication was variable (see Results).

The day ward is a separate ward within the main hospital with its own nursing staff. Parents are encouraged to stay with the children, although they do not accompany them to theatre. An anaesthetist and surgeon see each child and parent before the operation and before discharge, usually about 4 h after surgery.

Anaesthesia was induced with i.v. thiopentone 4 mg kg\(^{-1}\), the trachea was intubated with uncuffed oral or nasal Magill tubes following either suxamethonium chloride 1.5 mg kg\(^{-1}\) or tubocurarine 800 \( \mu \text{g kg}^{-1} \) or pancuronium bromide 120 \( \mu \text{g kg}^{-1} \), and the lungs were ventilated with 70\% nitrous oxide in oxygen, the fresh gas flow calculated according to body weight (Nightingale and Lambert, 1978). Some patients received additional atropine 10–20 \( \mu \text{g kg}^{-1} \) during induction, if the anaesthetist so wished, for example when intermittent suxamethonium was used. After the use of a non-depolarizing relaxant, residual neuromuscular block was antagonized with a mixture of neostigmine 80 \( \mu \text{g kg}^{-1} \) and atropine 20 \( \mu \text{g kg}^{-1} \).

Assessment. A questionnaire was provided for the anaesthetist, and a member of the day ward nursing staff as appropriate. The parents took home a simple questionnaire which they posted back on the following day. The patient's demeanour in the anaesthetic room was scored on a descriptive scale from 1 to 5, and the demeanour in the recovery room, assessed at 5-min after extubation, was scored similarly. The scores were simplified for analysis to unacceptable and acceptable. Oropharyngeal secretions at induction and antagonism of block were scored as unnoticed, moderate or troublesome. Difficulties in intubation and stridor or vomiting in the recovery room were noted. On return to the day ward, the patients were assessed regularly by the nursing staff with regard to pain, stridor, sore throat, vomiting and level of sedation. The pain stated was scored as uncomplaining, discomfort only or severe (requiring analgesia). If the nursing staff thought that analgesia was required after operation, Paedosed 0.4–1 ml kg\(^{-1}\) was given by mouth.
From within the main series of 562 patients, a number of subgroups were examined, matched for age and type of operation. One hundred from group 1 (morphine) were compared with 100 patients from group 2a (Paedosed + atropine only). These are referred to as groups 3 and 4. Three matched groups of 54 patients each, who had “painful” operations, were examined: group M = morphine; group P = Paedosed premedication and pentazocine supplement; group F = Paedosed premedication and fentanyl supplement.

Statistical analysis. Student's t test was used to evaluate the difference between groups 1 and 2 and between groups 3 and 4. The difference between groups M, P and F was analysed using the Chi-square test. A probability value of less than 0.05 was considered statistically significant.

RESULTS

Eighty-five per cent of parents returned the questionnaires.

Fig. 1. Demeanour before □ and after ■ operation in groups 1 and 2.

Demeanour. There was no significant difference ($P>0.05$) in the proportion of patients with an acceptable demeanour before and after operation in groups 1 and 2 (fig. 1). Of those with an unacceptable demeanour in the anaesthetic room, 25% in group 1 and 38% in group 2 had received premedication less than 40 min before induction. Only 10% of patients with an acceptable demeanour in either group had received premedication so late.

In groups 3 (morphine) and 4 (Paedosed) the proportion of children with acceptable demeanour after operation were 89% and 80%. In the smaller matched groups M, P and F, the percentages were 81, 85 and 94 (fig. 2). In all groups, approximately 30% of the patients who had unacceptable demeanour in the recovery room also had an unacceptable demeanour in the anaesthetic room.

Secretions. Three per cent of patients in group 2 (Paedosed + oral atropine) had troublesome secretions at induction. There were no cases in group 1 (i.m. atropine). Of those patients in the Paedosed subgroups (2a, P and F) who were given additional parenteral atropine at induction only 3% had troublesome secretions at the time of antagonizing the myoneural block. However, when additional atropine was not given, this figure increased to 17%. Excessive secretions at antagonism were seen in only 1% of patients in group 1. Ten (90%) of those in group 2 with troublesome secretions at induction had been given premedication less than 50 min before induction. A relationship with time of administration was not evident in patients with troublesome secretions at antagonism, nor in patients who received i.m. atropine.

Intubation difficulties. In 13% of the series as a whole more than one attempt at intubation was necessary, mainly because the size of the tracheal tube required differed from that predicted (Browne, 1969). There were no other intubation difficulties in any children.

Stridor and sore throat. Twelve per cent of patients complained of sore throat while in hospital, but only 2% did so at home. Eleven per cent complained of hoarseness or had mild stridor in hospital, but only one patient complained of this at home. No patient had to be detained in hospital because of stridor.

Pain after operation, in hospital and at home (fig. 3). There was no significant difference between groups 3 and 4 in the proportion of children complaining of pain while in hospital (12% and 8% respectively); no child in either group required analgesia after
operation. Twenty-seven per cent of both groups complained of pain at home, 80% of these complaining of pain for the first time. Fifteen per cent (seven patients) in group M and 13% (six) in group F complained of pain in hospital, although only one child in the morphine group (M), as opposed to three children in the fentanyl group (F), required analgesia after operation. Twenty-four per cent of patients (12) in group P complained of pain in hospital and of these, seven required an analgesic. The differences between the groups were not statistically significant. Approximately 50% (26) of patients in all three groups complained of pain at home, of whom the majority (approximately 20 in each group) were complaining for the first time.

**Sedation after operation.** Eleven per cent of patients in group 1 and 3% in group 2a were still drowsy 4 h after extubation. The figures in groups 3 and 4 were 10% and 2% respectively.

**Vomiting in hospital and at home.** Forty-seven per cent of patients in group 1 and 11% in group 2a vomited while in hospital (fig. 4) \((P<0.01)\). This difference was evident at home also (group 1, 55%; group 2a, 16%). Overall, 65% in the morphine group vomited at some time, but only 22% in the Paedosed group. In the matched groups 3 and 4 this difference was even more obvious.

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Sleep at home (fig. 6). In groups 1 and 2a, 82% of patients were able to sleep quickly, but of those children unable to sleep, 54% were also complaining of pain. In groups 3 and 4, 78% and 75% went off to sleep quickly. Of those who found difficulty in sleeping, 45% in both groups were in pain. In the smaller matched groups, the highest percentage of patients sleeping quickly was in the morphine group (M), but of those with difficulty in sleeping, 85% in groups M and P also complained of pain; 44% in group F.

Anorexia. Twenty-six per cent of patients in group 1 and 13% in group 2a were anorexic on the following day. These proportions were similar in groups 3 and 4. Twenty per cent of the morphine group (M), 29% of the pentazocine group (P) and 12% of the fentanyl group (F) were anorexic on the next day.

**DISCUSSION**

The combination of moderately heavy premedication (oral trimeprazine and i.m. morphine), i.v. induction, muscle relaxation and controlled ventilation with nitrous oxide and oxygen is one which has proved itself over the years to be safe and trouble-free (Rees, 1959). However, many children, especially those admitted for repeated minor procedures, remark that their i.m. injection before operation is the worst thing that happens to them in hospital (Doughty, 1959; Boyd and Manford, 1973). An ideal premedication would have analgesic and sedative properties, without emetic or other serious side-effects. Paedosed appeared to offer most of these qualities, and atropine was added as an antisialagogue.

It is often presumed that premedication has a major influence on the patient's demeanour in the anaesthetic room. However, in this study, it would appear that the premedication itself was of only minor importance. Other factors, such as the patient’s personality, the attitude of the ward staff and parents, and previous hospital experience, may be of greater importance.

In group 1, a very dry oropharynx was common, which is undesirable and unpleasant for many patients. The amount of atropine added to the Paedosed was 15 μg kg⁻¹. However, up to 17% of patients who had been given this mixture had troublesome secretion on antagonism of myoneural blockade; this high figure was reduced substantially by giving additional atropine at induction, but rather than advising this as a routine, it was decided that the oral dose should subsequently be increased to 20 μg kg⁻¹. This avoids complicating the technique and possibly increasing the frequency of side-effects (Riding, 1975).

The significant difference (P < 0.01) between the morphine and Paedosed groups with regard to drowsiness after operation is worth emphasizing; it is neither necessary nor desirable for any child undergoing a pain-free procedure to remain sedated for hours after the operation has finished.

Pain in children is notoriously difficult to evaluate and was assessed by parents and the nursing staff. Perhaps surprisingly, Paedosed proved to be very effective in all 15 patients requiring analgesia after operation. The number of patients complaining of pain while at home is rather disturbing. Our figures may contain a proportion of those seeking attention or with only very minor discomfort. Nonetheless, it would seem advisable to issue to the parents an analgesic for use at home, with appropriate instructions. The successful use of Paedosed in the period after operation within the hospital suggests that only a relatively mild analgesic may be required.

A high proportion of children in group P (pentazocine) complained of pain while in hospital, more required analgesia after operation, and more had difficulty in sleeping, than in any other group. This may reflect the low dose of pentazocine administered.

In this study morphine had a pronounced emetic effect which lasted into the period following surgery, with many patients vomiting for the first time at home. This long duration of action contrasted with that of fentanyl, where the peak emetic effect was within the first hour of administration. The small percentage of children vomiting after Paedosed was increased following supplementation by fentanyl or pentazocine, but did not reach the much higher value produced by morphine. It is worth emphasizing that repeated vomiting is not only an unpleasant experience, but may also be a major factor in the fluid balance of an already dehydrated child (Holden and Maker, 1965).

The proportion of children complaining of sore throat after operation compares favourably with other series (Ahlgren, Bennett and Stephen, 1971; Steward, 1975). Incomplete antagonism of blockade may explain some of those cases with temporary stridor after operation, but the number of children (11%) with hoarseness in hospital is greater than that quoted in other series (Shah et al., 1972). All but one patient had recovered the normal voice at the time of discharge from hospital. There was no obvious relationship between complaints of mild hoarseness and repeated attempts at tracheal intubation.
It is reassuring to note that a narcotic analgesic (fentanyl) can be administered to children without necessarily increasing the frequency of anorexia after operation. The figures for the Paedosed and fentanyl groups compare well with those quoted in other series (Ahlgren, Bennett and Stephen, 1971; Steward, 1973).

We conclude that parenteral morphine premedication is far from ideal for children undergoing minor surgery as day patients, and the combination of a mild sedative oral premedication with i.v. analgesic supplementation merits further study.

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REFERENCES

PREMEDICATION ADMINISTREE A DES ENFANTS SUBISSANT UNE INTERVENTION CHIRURGICALE SANS SEJOUR HOSPITALIER

On a utilisé une préparation orale de dichloralphénazon et de paracétamol (Paedosed) comme prémédication de rechange à l’injection intramusculaire de morphine et d’atropine, sur 562 enfants subissant une intervention chirurgicale sans séjour hospitalier. D’après les observations qui ont été faites, aussi bien à l’hôpital qu’à la maison, il semblerait que la morphine présente plusieurs inconvénients par rapport à ce mélange, mais à la condition toutefois que ce dernier soit renforcé d’une injection analgésique intraveineuse pour les interventions les plus douloureuses.

VORBEHANDLUNG VON KINDERN FÜR AMBULANTE EINGRIFFE

ZUSAMMENFASSUNG

PREMEDICACION EN NINOS SOMETIDOS A CIRUJIA AMBULATORIA

SUMARIO
Se usó una preparación oral de dichloralfenazona y paracetamol (Paedosed) como premedicación alternativa en vez de morfina y atropina i.m. en 562 niños sometidos a cirugía ambulatoria. A raíz de una serie de observaciones realizadas tanto en el hospital como en la casa, parece que la morfina tiene varias desventajas cuando se la compara con esta mezcla, siempre y cuando a esta última se la acompañe por una analgesia i.v. para las intervenciones más dolorosas.