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## Delayed vomiting after papavaretum in paediatric outpatient surgery

*The contribution of papavaretum to the incidence of vomiting observed in the 24 hours after paediatric outpatient anaesthesia was assessed in 129 children undergoing circumcision. Postoperative analgesia in all patients was achieved using caudal extradural blockade. The incidence of vomiting in the 24 hours after discharge from hospital was 56 per cent in those receiving papavaretum, compared with 15 per cent in those who did not ( $p < 0.0001$ ). The significance of this finding and the use of opiates in paediatric outpatient anaesthesia are discussed.*

The ideal management of paediatric patients undergoing outpatient anaesthesia remains a contentious issue with much debate about the use of drugs for preoperative sedation<sup>1-4</sup> and the most suitable agents for the management of postoperative pain.<sup>5,6</sup> Narcotic analgesics are widely used for both purposes, and although the side effects of these agents in the early postoperative period have received widespread attention, there have been few studies into the problems associated with these drugs after the patient is discharged from the hospital.

All paediatric surgical patients from this hospital are visited on the day following surgery by a trained

nurse, and these nurses felt that a high but undocumented number of the children were vomiting once they returned home. All paediatric surgical outpatients over the age of two years at this time were receiving a premedication of papavaretum and atropine IM one hour prior to surgery.

Papavaretum is a mixture containing all the water soluble alkaloids of opium, standardised to contain 50 per cent anhydrous morphine.<sup>7</sup> The presence of alkaloids other than morphine is thought to give the drug more sedative properties than an equivalent dose of morphine,<sup>8</sup> which is of use when the drug is being used for premedication. The incidence of nausea and vomiting with papavaretum is similar to an equivalent dose of morphine when used in adult patients.<sup>8</sup>

This study was designed to assess the contribution of the opiate premedication to late postoperative vomiting. Pain itself may be associated with nausea and vomiting,<sup>9</sup> so it was decided to use a pre-selected population in whom analgesia could be provided by other means. Patients undergoing circumcision in whom analgesia was provided by caudal extradural blockade were studied.

### Methods

One hundred and twenty-nine paediatric surgical outpatients over the age of two years presenting for circumcision were studied during a six-month period.

Anaesthesia was induced with thiopentone, halothane or cyclopropane depending upon the personal preference of the anaesthetist. Anaesthesia was maintained using 66 per cent nitrous oxide, 33 per cent oxygen plus halothane, with all patients allowed to breath spontaneously. All patients received caudal extradural injection of 0.25 per cent bupivacaine, the dose being calculated from the

### Key words

ANALGESICS: opium; ANAESTHESIA: paediatric;  
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TABLE I Relative use of induction agents

Agent	Group 1 (n = 64)	Group 2 (n = 65)
Cyclopropane	11	12
Halothane	13	14
Thiopentone	40	39

Difference between groups: p = ns.

patient's age using a formula of 1 ml per year plus 1 ml extra for those patients under five years of age.

Three staff anaesthetists supervised several trainees during the study period, as has been standard practice at the hospital for several years. No change in their practice occurred during the study period.

During the first three months of the study the children received a premedication of papavaretum  $0.3 \text{ mg} \cdot \text{kg}^{-1}$  plus atropine  $20 \mu\text{g} \cdot \text{kg}^{-1}$  IM approximately one hour prior to the operation (Group 1). During the last three months papavaretum was omitted from the premedication (Group 2).

All patients were visited by one of four district nurses depending on geographical location 24 hours after the operation and enquiry made as to whether the patient had vomited in the period since discharge from hospital. The nurses were unaware of the change in premedication.

Statistical analysis of the data was performed using chi square analysis, and Student's t test for paired data, as appropriate.

## Results

The mean age ( $\pm$  SD) of the papavaretum group was  $5.5 (\pm 2.9)$  and the control group  $5.1 (\pm 2.8)$  years.

The relative use of the different induction agents used is shown in Table I. There is no statistical difference between the relative use of the agents between the two groups.

The incidence of vomiting in the 24-hour period after discharge from hospital for the two groups is shown in Table II. The incidence of vomiting in those patients receiving papavaretum (Group 1) of 56 per cent is significantly higher than the 15 per cent incidence in those who did not (Group 2) ( $p < 0.0001$ ).

## Discussion

Outpatient surgery for paediatric patients is becoming increasingly popular as it minimises psycholog-

TABLE II Incidence of postoperative vomiting during 24 hours after surgery

	Group 1 Papavaretum + atropine		Group 2 Atropine	
	number	(%)	number	(%)
Vomitters	36	(56)	10	(15)
Non-vomitters	28	(44)	55	(85)

Difference between groups:  $p < 0.0001$ .

ical disturbances to the child and parents,<sup>10,11</sup> is more economical for the institutions concerned,<sup>12,13</sup> and decreases the waiting list for surgery.<sup>12</sup> Provision of such a service requires a regular review and reappraisal of existing techniques in order to minimise any anaesthetic contribution to postoperative morbidity. Techniques and drugs that may successfully be used during inpatient surgery may not be appropriate when the patient is returned home shortly after an operation.

Narcotic analgesics, papavaretum in particular, are widely used during inpatient surgery both as part of the preoperative medication and for the management of postoperative pain. Such drugs, however, possess many properties that render them less suitable for use with the surgical outpatient, most notably their ability to cause dizziness, nausea and vomiting.<sup>5,8</sup>

The problem of late postoperative vomiting after outpatient anaesthesia and surgery in paediatric patients has been addressed before but these studies included a variety of premedication,<sup>4</sup> different operation times and sites,<sup>1</sup> with little or no control of postoperative analgesia.<sup>17</sup> These factors may all affect the incidence of vomiting.<sup>5,9</sup> Davenport *et al.*<sup>17</sup> reported a 21 per cent incidence of late vomiting in a series of 184 outpatients. Although narcotics were not used in the premedication an unspecified number of patients received meperidine for postoperative analgesia. Steward<sup>1</sup> found vomiting to be the most frequent complication following paediatric outpatient anaesthesia, with an incidence of 15 per cent in 206 patients. No premedication was given to these children, but the series included operations of differing times and sites. Booker and Chapman<sup>14</sup> have shown a greatly increased incidence of late postoperative vomiting in paediatric patients given morphine as part of their premedica-

tion. All patients were intubated and ventilated as part of the anaesthetic technique. The incidence of vomiting in their study of 55 per cent in the group that were given morphine, and 15 per cent in the group that were not, is strikingly similar to the results presented in this study, even though operative site and duration were not controlled.

Although it was not possible to randomly allocate the premedication in the present study, no other aspect of the routine management of children undergoing circumcision was altered during the study period. The nurse observers were unaware how or when the premedication was altered and so were effectively blinded. The different agents used for induction could possibly have influenced the incidence of vomiting but as the relative use of these different agents was the same in both groups, clearly this is not so. Despite the above limitations, the difference in the incidence of vomiting in the two groups, 56 per cent in those who received papavaretum and 15 per cent in those who did not ( $p < 0.0001$ ) is so obvious that the result is unlikely to be affected by the trial design.

Postoperative vomiting in paediatric surgical outpatients is more common than their adult counterparts,<sup>1,16-18</sup> although the reasons for this are not known. Opiates produce their emetic effects by direct stimulation of the chemoreceptor trigger zone located in the area prostroma of the medulla,<sup>19</sup> but also act to increase the sensitivity of the labyrinthine system.<sup>20</sup> Both the journey home and the early ambulation of the surgical outpatient may then contribute to the high incidence of emetic symptoms observed.

The role of premedication in paediatric outpatient anaesthesia continues to cause controversy, as any advantage from preoperative sedation tends to be associated with delayed postoperative recovery and increased postoperative morbidity.<sup>4,5,14</sup> Although opiates have been recommended for preoperative sedation in the paediatric outpatient,<sup>2</sup> the greatly increased incidence of late postoperative vomiting associated with the administration of papavaretum as demonstrated in this study, outweighs any possible preoperative advantage. Vomiting in paediatric outpatients is not just an unpleasant experience but may be a major factor in upsetting the fluid balance of a small child already dehydrated by a period of preoperative fasting.<sup>15</sup> The high incidence of vomiting after discharge from hospital is particu-

larly disturbing as many of these patients did not vomit while in hospital, so there is no obvious way of identifying those at risk.

In summary, papavaretum and probably morphine should be avoided in paediatric surgical outpatients whenever possible as they cause an unacceptably high incidence of vomiting after discharge from hospital.

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### Résumé

*La contribution de papavaretum dans l'incidence de vomissements observés 24 heures après anesthésie chez des patients externes était évaluée chez 129 enfants subissant une circoncision. L'analgésie postopératoire chez tous les patients était faite avec un block caudal extradural. L'incidence de vomissements en dedans de 24 heures après le congé de l'hôpital était de 56 pour cent chez les enfants ayant reçu du papavaretum comparative-ment à 15 pour cent chez les patients qui n'en n'ont pas reçu ( $p < 0.0001$ ). L'importance de cette trouvaille ainsi que l'utilisation des opiacés pour l'anesthésie pédiatrique des patients externes est discutée.*