Diazepam has continued to attract the interest of anaesthetists since its introduction in 1961 (Randall et al., 1961) and its use in anaesthesia has been reviewed by Dundee and Haslett (1970). Although the drug is seldom indicated as the sole anaesthetic agent, it is useful as an adjuvant to many types of intravenous and inhalation anaesthesia. Diazepam has few undesirable cardiovascular effects (Stovner and Endresen, 1966). Bradycardia occurs occasionally but is prevented readily by atropine. There are great individual variations in the response to the drug and in the dose required to induce sleep (Brown and Dundee, 1968). In addition, it has been noted that patients premedicated with opiates may become apnoeic as a result of muscular hypotonia and depression of the respiratory centre (Hunter, 1967).

Propanidid is widely used as an ultra-short acting anaesthetic (Wynards and Burfoot, 1965). In clinical use the drug causes characteristic changes in the respiratory pattern; a period of initial hyperventilation being followed by a period of hypoventilation (Harnick, 1964). In the series of Wynards and Burfoot the incidence of nausea with or without vomiting was 30%, but this may have been partially the result of the other drugs employed in their method of anaesthesia. These authors also observed a decrease in arterial pressure in 89% of their patients. Since 1965 we have used propanidid as the sole anaesthetic for short procedures (Mattila, Hakakelto and Babinski, 1966). However, in some patients, the duration of its effect has been too short and supplementary doses have been required. On occasions unco-ordinated movements by the patient have been troublesome. Nausea and vomiting have been rare except following operations for evacuation of the uterus. In a previous study on propanidid the frequency of nausea was found to be 32% and that of vomiting 17% (Mattila et al., 1972). In order to prolong the effect of propanidid we used diazepam as a supplementary drug, and as our clinical impression of this combination was favourable, it was decided to evaluate it in a double-blind trial.

**PATIENTS AND METHODS**

One hundred and two healthy young females undergoing surgery for legal abortion were studied. All were given morphine (average dose 0.2 mg/kg) and hyoscine (average dose 0.006 mg/kg) i.m. 1 hour before the operation. All the anaesthetics were given by either of two anaesthetists, one was senior and the other was a trainee. Atropine (0.01 mg/kg) was injected i.v. immediately before induction and was followed by 2 ml of a coded solution, containing either diazepam 10 mg or its solvent only. A sedative dose of propanidid was then given (average injection time 20 sec) and the uterine evacuation was begun during the hyperventilation phase. Supplementary doses of propanidid (100 mg) were administered when required. The sedative effect of premedication, the progress and duration of anaesthesia and all symptoms and signs were noted on a special chart, together with the anaesthetist’s opinion as to which drug (diazepam or placebo) he had given. The time to the recovery of consciousness and any post-operative difficulties were noted. The \( \chi^2 \) test was employed in the statistical analysis of the results.

**RESULTS**

Table I shows the age and weight of the patients and the duration of the procedures in the diazepam and placebo groups. The duration of anaesthesia

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DIAZEPAM AS AN ADJUNCT IN PROPANIDID ANAESTHESIA

TABLE I. Age, body weight and duration of procedure.

<table>
<thead>
<tr>
<th></th>
<th>Diazepam group (52 patients)</th>
<th>Placebo group (50 patients)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>Range Mean</td>
<td>Range Mean</td>
</tr>
<tr>
<td></td>
<td>16-48 28.8</td>
<td>16-45 28.7</td>
</tr>
<tr>
<td>Body weight (kg)</td>
<td>42-85 60.1</td>
<td>42-92 51.7</td>
</tr>
<tr>
<td>Duration of procedure (sec)</td>
<td>130-480 233</td>
<td>110-370 219</td>
</tr>
</tbody>
</table>

and the mean doses of propanidid in the two groups are presented in table II. The need for supplementary doses of propanidid and the frequency of unco-ordinated movements were significantly reduced by diazepam (table III) (P<0.001 and P<0.01 respectively). In the diazepam group the incidence of nausea and vomiting was significantly less than in the placebo group (P<0.001 and P<0.05 respectively) (table II). The accuracy of the anaesthetist's recognition of the drugs is presented in table III. The difference in favour of the senior anaesthetist was highly significant (P<0.001).

TABLE III. Recognition of used medication (diazepam/placebo) by senior and junior anaesthetist.

<table>
<thead>
<tr>
<th>Anaesthetist</th>
<th>Group</th>
<th>Recognition of used medication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior</td>
<td>Diazepam</td>
<td>17/23 74</td>
</tr>
<tr>
<td></td>
<td>Placebo</td>
<td>17/23 74</td>
</tr>
<tr>
<td>Junior</td>
<td>Diazepam</td>
<td>12/29 41</td>
</tr>
<tr>
<td></td>
<td>Placebo</td>
<td>16/27 59</td>
</tr>
</tbody>
</table>

DISCUSSION

By using diazepam in conjunction with propanidid anaesthesia a reduction in the total dose of propanidid, a more even course of anaesthesia and a prolongation of the recovery time were expected. In the diazepam group the course of anaesthesia was smoother than in the placebo group and the incidence of unco-ordinated movements and the need for supplementary doses of propanidid were reduced significantly (table II). Diazepam did not influence the hyperventilation and hypoventilation phases characteristic of propanidid anaesthesia. In this study there was a significant difference in the incidence of nausea and vomiting between the two groups in favour of diazepam (P<0.001 and P<0.05 respectively). In our previous series, with propanidid as the sole anaesthetic for evacuation procedures, the frequency of nausea and vomiting was 32 and 17%, respectively (Mattila et al., 1972).

In this study there was no difference in the propanidid dose between the nausea and no-nausea groups (mean doses: nausea group 8.45 mg/kg; no-nausea group 8.40 mg/kg). Thus the significantly decreased incidence of vomiting in the diazepam group was apparently the result of diazepam's direct anti-emetic effect rather than as a consequence of the reduced dose of propanidid. Dundee et al. (1970) observed in their series, using pethidine 100 mg with diazepam 10 mg, a significant reduction in nausea and vomiting as compared with pethidine 100 mg alone.

Routine monitoring of circulation and cardiac function did not reveal any abnormal effects of the drugs studied.

Patients admitted to hospital for an abortion are often under severe psychological stress and powerful premedication (morphine-hyoscine) is considered by us to be justified. Atropine is recommended as a premedication for propanidid anaesthesia (Zindler, 1965). The authors administered it intravenously.

On the basis of our clinical experiences and these observations with propanidid in combination with diazepam this technique is recommended by the authors for operations requiring anaesthesia of short duration. The anti-emetic effect of diazepam observed in this study is the subject of further investigation.

ACKNOWLEDGEMENTS

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REFERENCES


FACULTY OF ANAESTHETISTS
ROYAL COLLEGE OF SURGEONS OF ENGLAND

The Faculty of Anaesthetists is holding a 2-day Symposium in the Royal College of Surgeons on November 21 and 22, 1974. The subject of the meeting will be 'Problems of Metabolism in Anaesthesia and Intensive Therapy'.

Tickets are priced £8 per head, exclusive of refreshments.

Further details may be obtained from The Secretary, Faculty of Anaesthetists, Royal College of Surgeons of England, 35-43 Lincoln’s Inn Fields, London WC2A 3PN.