EFFECTS OF PREOPERATIVE FASTING ON MORBIDITY AND GASTRIC CONTENTS IN PATIENTS UNDERGOING DAY-STAY SURGERY

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Outpatient surgery is, increasingly, an important part of clinical anaesthetic practice. Outpatients, and particularly pregnant outpatients, are considered to be a high risk group for gastric regurgitation and pulmonary aspiration which still remain major causes of anaesthetic-associated morbidity and mortality (Ong, Palahniuk and Cumming, 1978; Lunn and Mushin, 1982; Tomkins et al., 1982). Although pharmacological methods have been studied, and have been shown to have variable success in reducing the risks of aspiration, adequate preoperative fasting is still the mainstay of attempts at minimizing the risks of regurgitation and aspiration during elective anaesthesia (Morgan, 1984).

The role and extent of preoperative fasting has been questioned recently following studies on inpatients requiring elective surgery (Miller, Wishart and Nimmo, 1983). Starvation invokes complex metabolic and physiological changes in the body. These changes include the concentration of the urine, a decrease in insensible water loss through peripheral vasoconstriction and a reduction in energy consumption. Symptoms of hunger and thirst develop as basic protective mechanisms. This study was designed to assess the effects of starvation in two groups of female outpatients presenting for elective day-stay surgery. Symptoms of fasting were assessed and gastric volumes and pH were correlated with those symptoms and the duration of fasting.

PATIENTS AND METHODS

One hundred and thirty-two adult female patients were studied. The study was approved by the institutional review committee, and informed consent was obtained from each patient. Patients were divided into two groups. Group A (n = 66) were patients in the first trimester of pregnancy scheduled, on a separate afternoon operating list, for therapeutic abortion. Group B (n = 66) were elective female patients, younger than 40 yr, scheduled for minor gynaecological surgery lasting less than 30 min. Routine outpatient instructions stated that no oral intake was permitted after 22.00 h on the night before the surgery. All patients were unpremedicated and any with known gastrointestinal disease or who were taking medication known to affect gastric physiology were excluded.

SUMMARY

The effects of overnight fasting on gastric contents and on the symptoms associated with fasting were studied prospectively in female outpatients. Group A (n = 66) were patients scheduled for first trimester therapeutic abortion; group B (n = 66) were scheduled for minor gynaecological surgery. It was demonstrated that overnight fasting (15±3 h) did not guarantee an empty stomach (volume 22±13 ml) and that gastric acidity was high (pH 1.6±0.5). Gastric volumes and pH were the same in both groups. Group A patients had a higher incidence of preoperative nausea and vomiting (P < 0.001).

Before anaesthesia, 50% of all patients had symptoms of moderate to severe hunger, while 44% of patients had symptoms of moderate to severe thirst. Neither the severity of symptoms of fasting nor the duration of fasting correlated with gastric volume or pH. Patients in group A had significantly greater symptoms of hunger; however, they also had fasted for significantly longer (P < 0.002).
PREOPERATIVE OUTPATIENT FASTING

### Table I. Patient characteristics (means ± SD). *P < 0.001

<table>
<thead>
<tr>
<th></th>
<th>Age (yr)</th>
<th>Weight (kg)</th>
<th>Gestation (weeks)</th>
<th>Duration of fast (h)</th>
<th>Nausea and vomiting (%)</th>
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</thead>
<tbody>
<tr>
<td>Group A (n = 66)</td>
<td>23 ± 5</td>
<td>58 ± 10</td>
<td>9 ± 2</td>
<td>17 ± 2</td>
<td>38</td>
</tr>
<tr>
<td>Group B (n = 66)</td>
<td>28 ± 6*</td>
<td>60 ± 10</td>
<td>0</td>
<td>13 ± 3*</td>
<td>8*</td>
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Symptoms of hunger and thirst were graded into four categories (nil, mild, moderate or extreme) in the day-care area just before the patient was transferred to the operating suite. Details were recorded of type and time of last oral intake; symptoms of nausea, vomiting or heartburn in the preceding 2 weeks; smoking history; age and weight.

Anaesthesia was induced with thiopentone 3–5 mg kg⁻¹ i.v. and fentanyl 1–2 µg kg⁻¹ i.v. and maintained with nitrous oxide and isoflurane in oxygen. After completion of the procedure, a No. 18 Salem sump oro-gastric tube was passed into the stomach. Gastric contents were aspirated in three positions—lithotomy with Trendelenberg tilt, supine and left lateral—to facilitate maximal emptying. The pH of the aspirate was measured using a calibrated Radiometer PHM82 pH meter and the volume was recorded.

Data were analysed using one-way analysis of variance and Student’s *t* test. Correlations were measured using Chi-square analysis and linear regression analysis. Differences were considered significant when *P* values were less than 0.05. Data were independently analysed for each group and for the total group of patients.

### RESULTS

There were significant differences in mean age, duration of fast, and incidence of preoperative nausea and vomiting between group A and group B (Table I).

Overnight fasting (15 ± 3 h) produced significant morbidity with 50% of patients experiencing moderate to severe hunger and 44% of patients experiencing moderate to severe thirst. Group A patients had higher hunger scores (*P < 0.002*). Thirty-four percent of patients had gastric volumes greater than 25 ml and only 10% of patients had gastric pH values greater than 2.0 (Table II).

There was no difference in gastric volume or pH between the pregnant and non-pregnant groups. There was no correlation between either duration, or symptoms, of fasting and the resulting gastric volume or pH. There was no correlation between hunger and duration of fasting within either group or overall. Group A patients, however, whose surgery was routinely performed in the early afternoon, had significantly higher hunger scores and also had a longer duration of fast.

### DISCUSSION

The results of this study again call into question the optimal duration of preoperative fasting. This study in outpatients confirmed the results from inpatients, that prolonged fasting of greater than 4 h does not decrease gastric volumes or acidity (Hester and Heath, 1977). The lack of efficacy in producing a "safe" gastric environment is hardly surprising, considering that the stomach normally secretes up to 50 ml h⁻¹ of highly acid fluid in people under emotional stress; hunger indepen-
dently tends to increase that acid secretion (Guyton, 1980). Preoperative morbidity in the form of severe hunger and thirst can only increase anxiety. It may also encourage non-compliance with preoperative fasting instructions, which could have more serious consequences—particularly in unsupervised outpatients.

A recent study in elective adult inpatient surgery where patients were given a “theatre breakfast” of tea and toast 2–3 h before surgery showed no difference in gastric pH and volume when compared with a similar group fasted for 13 h (Miller, Wishart and Nimmo, 1983). However, some questions were raised as to the ability to recognize residual food debris using a sump aspiration method. Since gastric emptying and orally administered drug absorption in unpremedicated patients presenting for elective surgery have been shown to be normal, it would seem that the guidelines concerning administration of preoperative fluids need to be examined more closely (Marsh, Spencer and Nimmo, 1983).

Prolonged fasting also promotes a state of relative dehydration which increases the consequences of postoperative vomiting, particularly in day care patients. Studies in outpatients, and particularly those undergoing therapeutic abortion, have shown that more than 50% of patients suffer from postoperative nausea and vomiting (Cohen, Woods and Wyner, 1984). Compared with inpatient anaesthesia, routine i.v. fluid replacement in outpatients is much less common. Regional anaesthesia, which is becoming more common—particularly to provide extended analgesia in outpatient surgery—is also more hazardous in volume-depleted patients (Bromage, 1978).

Prolonged fasting carries a significant preoperative morbidity, does not improve the “safety” of the gastric environment, and may increase the risks after operation, particularly in day-stay patients. The value of fasting, the optimum duration of fasting and the possible role of preoperative fluid intake have yet to be defined, particularly for elective outpatient surgery. We believe that there are no grounds for the overnight fasting of patients who are scheduled for elective surgery the following afternoon.

REFERENCES