

Residual gastric content after gastric lavage and ipecacuanha-induced emesis in self-poisoned patients: an endoscopic study

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Summary

Flexible endoscopy was used to assess the intragastric residue after either ipecacuanha-induced emesis or gastric lavage in 30 self-poisoned patients.

Of the 13 patients treated by induced-emesis, five (38.5%) had residual solid in the stomach; 17 patients were treated by gastric washout, and 15 (88.2%) of these had residual intragastric solid.

The study provides direct evidence that the gastric decontaminating procedures employed, and especially gastric lavage, do not remove stomach contents completely.

Introduction

Gastric emptying is a conventional treatment of the self-poisoned patient, and is practised routinely in most centres. Its injudicious use in the initial treatment of acutely poisoned patients, has been challenged^{1,2}.

The value and efficacy of gastric lavage has long been the subject of debate^{3,4}; a recent study has shown no benefit in the clinical outcome of self-poisoned patients, unless gastric lavage was employed within one hour of poisoning in the *mentally obtunded* patient⁵.

Recent comparative studies of gastric emptying procedures have shown disparate results. Danel and associates⁶ failed to show a real difference in the recovery of urinary salicylate when induced emesis, lavage and activated charcoal were compared; however, Curtis *et al.*⁷ demonstrated superiority in using activated charcoal instead of ipecacuanha in salicylate poisoning.

Other studies have indicated the need for adding activated charcoal in addition to a gastric emptying procedure⁸. Some authorities support the use of activated charcoal as the sole, orally administered, gastrointestinal decontaminating procedure^{9,10}.

To date there is no direct evidence as to the efficiency of gastric clearance by lavage or emesis. Therefore, we decided to endoscope patients after the completion of treatment to assess the completeness of gastric emptying.

It was not the intention of this study to make comparisons of possible reductions in drug absorption by the methods employed; there are numerous such studies available in the published literature.

Patients and methods

Patients over the age of 16, who had a clinically significant overdose thought to require gastric emptying, and who had stable vital signs, were randomized to receive gastric lavage or ipecacuanha-induced emesis. Randomization depended on whether they

presented on odd- or even-numbered days. The study was carried out in the Accident and Emergency Department of the Leicester Royal Infirmary.

Informed consent was obtained from the patients or their relatives. The patients received routine emergency treatment for poison ingestion. The study was approved by the local Ethical Committee for research purposes.

The type of drugs ingested, and the patients' best assessments for the quantity ingested, was accurately recorded in all cases, taking into account any additional information available from ambulance men, witnesses and examination of drug-bottle contents. Note was taken of the time of ingestion of the poison and the time elapsed before starting gastric-emptying.

A urine drug-screen was obtained on all patients; drug levels, measured from serum taken at least 4 h post-ingestion, were performed in paracetamol and salicylate overdoses only.

For patients receiving gastric lavage, the procedure described by Matthew and Lawson¹¹ was employed, with the difference that a larger bore, Faucher tube (size 33), was used. Lavage was carried out using 200–300 ml aliquots of tap water, which was continued until the return was clear for three consecutive cycles.

For ipecacuanha-induced emesis, the patients received 30 ml of ipecacuanha mixture (containing 1.8 ml of ipecacuanha liquid extract), followed by as much oral fluid as could be tolerated (usually half to one litre), until vomiting occurred.

The amounts of lavage water and oral fluids used in the gastric-emptying procedures were measured. The amount of solid in the lavage effluent/vomit was described as small, moderate or large. Assessment was made by one of the investigators (JPS).

Following the gastric-emptying procedure, all patients were endoscoped using a fiberoptic instrument (Olympus P2 Gastroscope, Keymed, Southend), the procedure being carried out by one of the authors only (JPS). A visual assessment was made concerning the amount of solid (food and/or tablets) and liquid residue in the stomach into slight, moderate or large. Tablets, when seen through the gastroscop, were described as whole, fragments (ie in a degree of dissolution), concretions or an emulsion. Samples of gastric aspirate were sent for a confirmative qualitative analysis.

Statistical assessment of the collated results was carried out by computerized multivariate analysis.

Results

Thirty patients were included in the study. Seventeen patients were randomized to receive lavage (age

range 16-72 years, mean 30.9 years; M:F=3:14). Emesis was induced in 13 patients (age range 16-72 years, mean 33.7 years; M:F=2:11).

The time from ingestion of the drug(s) to treatment was accurately known in 28 of the patients. The remaining two patients were unable to give a clear history and the time of self-poisoning remained unknown. The elapsed time varied between 1 and 4 h (mean of 2.22 h) in the patients treated by gastric lavage, while that in the patients treated by induction of emesis varied between 1 and 4.35 h (mean of 3.02 h). There was no statistically significant difference between the two groups of patients with regards to age, sex, and elapsed time from self-poisoning at presentation. The gastric-lavage group of patients ingested more tablets in terms of quantity (mean 44 tablets) than the ipecacuanha-treated group (mean 27.9 tablets).

There was no statistical relationship between the number of tablets ingested and the likelihood of finding a residuum of either food or tablets present in the stomach on endoscopy in both groups of patients. There was no statistical significance between elapsed time since self-poisoning and the presence of a gastric residuum on gastroscopy.

Ipecacuanha-treated patients (Table 1)

All patients had emesis induced with a single 30 ml dose of ipecacuanha. Vomiting started between 11 and 25 min post dose (mean of 23 min). The volume of liquid imbibed varied between 0.4 and 1.2 litres (mean of 0.6 litres). Volume of vomitus varied between 0.5 and 1.35 litres (excluding any solid in the vomitus).

Six patients had solid - food and/or tablets - in the vomitus. Of these, only one had an empty stomach on gastroscopy; four patients retained an intragastric, solid residuum (tablets seen in three patients). The remaining patient had a moderate liquid residue in the stomach.

The remaining seven patients in the group had no solid evident in the vomitus; on endoscopy, one of these patients (paracetamol poisoning), had a small amount of tablet, while the remainder had an empty stomach.

There was no evidence of gastric or oesophageal lesions on endoscopy, and no late complications resulting from the treatment.

Gastric lavage-treated patients (Table 2)

The amount of fluid used in gastric lavage varied between 2.5 and 5.5 litres (mean of 3.6 litres).

Thirteen patients had a solid constituent in the lavage effluent. Of these, three patients had tablets only in the effluent, seven patients had a mixture of food and tablets, and three patients had evidence of food only. At gastroscopy, it was discovered that none of these patients had an empty stomach; there were tablets remaining in five patients, food residue in three patients and a mixture of both in five. There was a tendency for the residual quantities in the stomach to be on a level less than that obtained at lavage, ie if moderate quantities of solid were obtained by lavage, a small residuum was retained in the stomach.

The remaining four patients in this group had no evidence of any solid in the lavage effluent. At endoscopy, two of this group had small quantities of residual tablets in the stomach, while one patient had a moderate liquid residuum. Only one patient had an entirely clean, empty stomach.

Four of the patients in this group had bruising at the cardia of the stomach; none had any long-term complications referable to the treatment or endoscopy.

Discussion

Inducing emesis appears to have been the method of choice for many years, until Jukes described gastric lavage in 1822¹². Bush, in the same year, described a method of aspirating gastric content¹³. It is ironic that Bush described his method by reference to its use in a patient who perished from the effect of ingested tincture of opium; Jukes was later overcome by the narcotic effects of the same drug in an experiment which he conducted on himself, when, aided by an assistant, he performed gastric lavage immediately after swallowing 'ten drachms of laudanum'.

Although recommended by a number of recent textbooks, the need for gastric-emptying procedures must be viewed against a background of evidence³⁻⁶, which points towards a less aggressive approach in the initial treatment of the self-poisoned patient. There is a strong impression that gastric-emptying procedures do not alter the clinical outcome, and this is fortified by results of studies like Kulig's and Neuvonen's^{5,7}. Proudfoot² expressed his belief that

Table 1. Findings in the vomitus and stomach in 13 patients treated by ipecacuanha-induced emesis

Time lapse	Drug(s)	Plasma level (mg/dl)	No. of tablets	Solid content of vomitus	Quantity	Stomach content	Quantity
1.00	Prothiaden	—	39	None	—	Empty	—
1.30	Paracetamol	5.9	25	Food	Small	Fluid	Moderate
2.00	Paracetamol	6.3	19	Tablets	Moderate	Tablets	Moderate
2.00	Ponstan/ Flagyl	—	21 10	Food	Small	Empty	—
3.00	Naproxen	—	14	None	—	Tablets	Small
3.00	Paracetamol	10.6	50	None	—	Empty	—
3.00	Paracetamol	2.3	34	Food	Small	Food	Small
3.20	Sudafed	—	8	None	—	Empty	—
3.30	Paracetamol	3.2	20	None	—	Empty	—
4.00	Aspirin	11.3	50	Food & tablets	Moderate	Food & tablets	Small
4.00	Co-proxamol	2.8	40	Food	Large	Food	Large
4.30	Paracetamol	10.3	15	None	—	Empty	—
4.35	Co-proxamol	2.0	18	None	—	Empty	—

Table 2. Findings in the gastric effluent and on endoscopy in 17 patients treated by gastric lavage

Time lapse	Drug(s)	Plasma level (mg/dl)	No. of tablets	Solid content of vomitus	Quantity	Stomach content	Quantity
?	Nifed/Barb	—	30+35	Food	Moderate	Food	Small
?	Prothiaden/ Gamanil	—	35 40	None	—	Tablet	Small
1.00	Aspirin	22.6	50	None	—	Tablet	Small
1.00	Paracetamol	4.7	16	Food & tablet	Moderate	Food & tablet	Small
1.25	Aspirin	40.3	50	Food	Small	Food	Small
1.30	Paracetamol/ Lorazepam	7.8	40 10	Food & tablet	Moderate	Food & tablet	Small
1.30	Paracetamol	4.3	60	None	—	Fluid	Moderate
1.30	Gamanil/ Other	—	98	Food & tablet	Moderate	Food & tablet	Moderate
1.40	Paracet/Tem	2.3	20	Food	Moderate	Food	Moderate
2.00	Aminoph/ Nifed	—	10 10	Tablet	Moderate	Tablet	Moderate
2.45	Septin	—	30	Tablet	Large	Tablet	Moderate
3.00	Cocod/ Erythrom	4.2	40 30	Tablet	Small	Tablet	Small
3.00	Paracetamol	11.4	30	Food & tablet	Small	Tablet	Small
3.30	Gamanil	—	40	Food & tablet	Moderate	Food & tablet	Moderate
3.45	Naprosyn	—	30	Food & tablet	Large	Food & tablet	Small
4.00	Aspirin	37.7	30	None	—	Empty	—
4.00	Paracetamol	2.3	20	Food & tablet	Moderate	Tablet	Moderate

the clinical outcome in self-poisoned patients relies more on the expected toxicity of the poison, and not on a gastric emptying procedure. In addition, it has been suggested that the use of syrup of ipecacuanha in managing ingested poison be reconsidered¹⁴.

Studies into the efficacy of gastric-emptying procedures are complex. The quantity of drug retrieved from the stomach is most often negligible compared with the amount ingested. Any anecdotal account of fantastic quantities of drug retrieved from the stomach, must be tempered by the knowledge of the quantity ingested. Matthew *et al.*¹⁵ describe recovery of 20.3 g (equivalent to 67.8 tablets) of salicylate from one of their patients using lavage, a remarkable amount by all means. However, this same patient took a total of 60 g aspirin, with the equivalent of 132.2 tablets remaining for absorption!

Our study has demonstrated that, most often, the stomach contains solid when the vomitus or effluent also contains solid, and in a couple of cases gastric-emptying failed to produce any solid, despite endoscopic evidence of such in the stomach. The inference is that although some solid is removed by gastric-emptying procedures, significant residue may still remain for absorption; indeed, 12 (70.6%) of the 17 lavaged patients still had a residual quantity of tablets in the stomach after the procedure. In total, an intragastric residue (food and/or tablets) was still present in 88.2% in the lavaged patients, while ipecacuanha failed to clear the stomach in 38.5% of the patients.

Moreover, the clinician must contemplate the hazards of the gastric emptying procedure, and weigh these against the potential harm caused by the ingested drug. Prolonged vomiting following ipecacuanha has been associated with Mallory-Weiss tears of the cardia, pneumomediastinum, retroperitoneum, diaphragmatic rupture and aspiration pneumonia¹⁶. Gastric lavage, although rarely associated with serious injury, eg oesophageal

perforation, has a definite morbidity associated with the procedure, put at 3% by Matthew in 1966¹⁵.

Gastric-emptying procedures must receive more scrutiny by their prescriber, who must resist the urge to call on these methods without deliberation. In the face of a lack of clinical evidence showing effectiveness, and this study showing poor gastric clearance with these methods, more emphasis should be placed on other avenues of treatment. These include specific antidotes and orally-administered multiple-dose activated charcoal. Use of gastric-emptying procedures must be tempered against the facts that they cause the patients distress, they do not deter against repeated self-poisoning, they do not treat the underlying psychological or psychiatric problem, and, particularly with gastric lavage, are a staff- and time-onerous procedure of dubious efficacy.

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