Activated charcoal is a preparation commonly used in the first line treatment of overdose in accident and emergency (A&E) departments. Its use can reduce the absorption and aid the elimination of certain drugs by adsorbing the drug in the gastrointestinal tract. Recent evidence has lead to more restricted indications for the use of gastric lavage and has rendered the emetic, ipecachuanha obsolete. Both can produce a “wash through” of drug into the duodenum, in theory leading to faster absorption and circulation within minutes. Activated charcoal therefore often forms the main, non-specific gut decontamination treatment available in A&E.

It is advised that charcoal should be administered within one hour of ingestion of a potentially toxic amount of most poisons. This objective is difficult to attain because of the time taken to contact emergency services or to transport the patient to hospital where the charcoal can be prescribed. The aim of this study was to assess the proportion of patients in which prehospital administration was feasible, so improving compliance with current guidelines.

METHODS

The study took place in the Accident and Emergency Unit in Raigmore Hospital, Inverness. This unit sees approximately 26,000 new patients per annum and covers a geographical area the size of Wales. The study started in June 1999 and continued for a period of nine months. All patients who were transferred to A&E by ambulance having taken an oral overdose of medication were included in the study. A case note review was conducted with data extracted on a standardised sheet by an unblinded abstractor. Data were collected from emergency department case notes and ambulance records completed at the time of the attendance. Patients were excluded if times were missing from the clinical documents.

The following data were collected: time of ingestion of overdose, time of call to ambulance service, time of arrival of the ambulance, time of arrival in A&E, time seen by doctor, time of charcoal administration. From this, it was possible to calculate the time from ingestion to pick up by the ambulance crew, the journey time to A&E and the time from ingestion to assessment by medical staff. A judgement was made as to whether activated charcoal was indicated in each case by referring to current guidelines from the National Poisons Centre.

RESULTS

A total of 201 patients records were reviewed. Twenty six were excluded because of incomplete data on report forms or case notes. The median time between ingestion and pick up by an ambulance crew was 77 minutes. This compares with a median of 140 minutes for the time to assessment by medical staff. Seventy three patients were picked up by an ambulance within one hour of overdose, only 11 (15%) of these were seen by medical staff within an hour of ingestion. Forty nine of these 73 patients would have been suitable candidates to receive activated charcoal.

Conclusions: The prehospital administration of charcoal provides an opportunity to comply with international guidelines on reducing the absorption of a potentially fatal overdose. The administration of charcoal results in few side effects provided the patient can adequately protect their airway and ambulance staff could be trained in its use. Further studies would be necessary to investigate if this would effect clinical outcome.

The potential role of prehospital administration of activated charcoal

S Thakore, N Murphy

PREHOSPITAL CARE

Objectives: Activated charcoal is now the mainstay of non-specific treatment for self poisoning in accident and emergency (A&E) departments and should be administered within one hour of ingestion of an overdose. This study aimed to investigate if compliance with treatment guidelines may be improved by the prehospital administration of activated charcoal.

Method: Ambulance report forms and case notes were reviewed in all patients presenting to A&E by ambulance after self poisoning. Information was gathered using a standardised abstraction form. The times collected were: time of ingestion, time of call to ambulance control, time picked up, time of arrival in A&E and time seen by doctor.

Results: 201 patient records were reviewed. Twenty six were excluded because of incomplete data on report forms or case notes. The median time between ingestion and pick up by an ambulance crew was 77 minutes. This compares with a median of 140 minutes for the time to assessment by medical staff. Seventy three patients were picked up by an ambulance within one hour of overdose, only 11 (15%) of these were seen by medical staff within an hour of ingestion. Forty nine of these 73 patients would have been suitable candidates to receive activated charcoal.

Conclusions: The prehospital administration of charcoal provides an opportunity to comply with international guidelines on reducing the absorption of a potentially fatal overdose. The administration of charcoal results in few side effects provided the patient can adequately protect their airway and ambulance staff could be trained in its use. Further studies would be necessary to investigate if this would effect clinical outcome.

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median time from pick up to medical assessment was 49 minutes with a mean of 46 minutes (interquartile range, 32 to 65 minutes). Seventy three (41.7% of all patients) patients picked up within an hour, only 35 (48%) arrived in A&E and 11 (15%) were seen by medical staff within an hour, as illustrated in figure 1.

Journey times to A&E show a median of 27 minutes and a mean of 29 minutes with an interquartile range of 17 to 40 minutes. Of the 73 patients picked up within an hour of ingestion of their overdose, 49 (67%) would have been suitable candidates for activated charcoal according to National Poison Centre guidelines.

DISCUSSION
Traditionally, the three options for gut decontamination after overdose have been gastric lavage, an emetic or activated charcoal. In recent years evidence has mounted in support of activated charcoal and it is now the mainstay of non-specific, load reduction treatment in A&E departments. This is the first study to examine the potential role of the prehospital administration of charcoal in the United Kingdom.

Activated charcoal adsorbs a poison in the gastrointestinal tract and therefore reduces its absorption into the systemic circulation. Its use as a method of gut decontamination is supported in the Position Statement of the American Academy of Clinical Toxicology, European Association of Poisons Centres, and clinical toxicologists. This suggests that it is administered within an hour of ingesting a potentially toxic overdose. It may also be considered in cases that present over an hour after ingestion, however data on efficacy are insufficient. Volunteer studies suggest that activated charcoal reduces absorption of ingested drugs. However, these results may not be applicable to the situation of acute overdose because of: variable delays in the administration of charcoal, differences in the adsorptive properties of charcoal in the empty stomach of a human volunteer compared with the

Figure 2 A suggested protocol for the prehospital administration of oral activated charcoal.

<table>
<thead>
<tr>
<th>Has the patient presented within one hour of ingestion of overdose?</th>
<th>No</th>
<th>Not suitable for charcoal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the patient alert?</td>
<td>No</td>
<td>Not suitable for charcoal</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the patient able to protect their own airway?</td>
<td>No</td>
<td>Not suitable for charcoal</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has the patient ingested a heavy metal? For example, iron, lead, mercury</td>
<td>Yes</td>
<td>Not suitable for charcoal</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has the patient ingested a corrosive or volatile agent?</td>
<td>Yes</td>
<td>Not suitable for charcoal</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Give 50 g of activated charcoal orally</td>
<td></td>
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</tbody>
</table>
The continued use of activated charcoal will depend on evidence of improved clinical outcome. Prehospital administration has not been a part of previous studies into clinical outcome; however, this setting provides the potential to significantly reduce the interval between ingestion and administration. This could bring greater reductions in bioavailability of the drug, in theory leading to improved clinical outcome. To reduce the time interval to administration, greater priority needs to be directed towards the early management of self poisoning. The requirement for medical assessment in hospital before charcoal administration should be questioned. It should be remembered that activated charcoal is not a prescription medication. Treatment should be provided by the first person attending the patient, whether this is the paramedic, triage nurse, nurse practitioner or general practitioner. In conclusion, it may be argued that attention should be paid to the “ingestion to charcoal” time in the same way that “door to needle” times are emphasised in the administration of streptokinase. Further research looking at the impact of early use of activated charcoal on the subsequent need for supportive or interventional treatment may underpin the cost effectiveness of this proactive approach.

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References