Outcome of diabetic patients treated in the prehospital arena after a hypoglycaemic episode, and an exploration of treat and release protocols: a review of the literature

K Roberts, A Smith

Objectives: This review examines current treat and release protocols adopted by the ambulance service, and factors that may predispose patients to hypoglycaemia.

Methods: Online database searches and hand searches of journals led to 241 articles being found, of which eight were used for this article.

Results: Out of hospital treatment of hypoglycaemia is safe for most patients, but further studies are needed if positive improvements are to be made.

Discussion: There is potential for further research in this area and clarification is needed in the treat and release debate. A definitive set of protocols would be beneficial to the ambulance service.

Methods

Search methods

The information research process included:
- A literature search
- Research and location of periodical articles, books, and reviews
- Hand searching of various journals deemed relevant to the review

Search strategies

Various sources were searched to gather relevant keywords and MeSH (Medical Subject Headings) terms together. A search was set up on Medline. This search strategy was then adapted to each database (table 1).

Articles considered relevant to the review were retrieved and critically appraised according to a set of guidelines. The research findings were collated and discussed below.

Results

Table 2 gives a summary of papers found in searches.

Recherche and evidence of treat and release protocols

A six month retrospective study was carried out of patients who refused prehospital transport or treatment in an American EMS system. Seven per cent of refusals were associated with hypoglycaemia. In addition, leaving the scene against medical advice was associated with various factors including treated hypoglycaemia (p<0.05). Around the same time a report was published on “no-patient runs” (NPR). Carried out in Alaska, during the study period of 12 months, 2698 call outs (26.1% of all call outs) consisted of (NPR, but of all NPR only 2.2% (59) were diabetes related. The study does not concentrate exclusively on diabetes related illness, but does reveal the extent of NPR in the ambulance service.

The literature search uncovered several other pieces of research discussing treat and release protocols and the outcome of hypoglycaemic patients. The earliest of these was a retrospective study carried out in the USA in 1991. The authors developed and tested criteria regarding which patients can safely be released without transportation to hospital. On the basis of their findings, they proposed five criteria that patients should meet before being released from prehospital care without the need for further treatment:

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Example of the search strategy used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Search no</td>
<td>Search term used</td>
</tr>
<tr>
<td>1</td>
<td>Patient:</td>
</tr>
<tr>
<td>2</td>
<td>Refus:</td>
</tr>
<tr>
<td>3</td>
<td>“treat and release”</td>
</tr>
<tr>
<td>4</td>
<td>Treat: adj2 release:</td>
</tr>
<tr>
<td>5</td>
<td>or/2-4</td>
</tr>
<tr>
<td>6</td>
<td>1 and 5</td>
</tr>
<tr>
<td>7</td>
<td>Emerenc:</td>
</tr>
<tr>
<td>8</td>
<td>(prehosp: or pre-hosp:)</td>
</tr>
<tr>
<td>9</td>
<td>7 and 8</td>
</tr>
<tr>
<td>10</td>
<td>6 and 9</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Table 2</th>
<th>Summary of papers found in searches</th>
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</thead>
<tbody>
<tr>
<td>Total number of papers found</td>
<td>241</td>
</tr>
<tr>
<td>Papers ordered for review</td>
<td>107</td>
</tr>
<tr>
<td>Papers used in this article</td>
<td>8</td>
</tr>
</tbody>
</table>
Hypoglycaemia seems to be safe and effective independent of diabetes. Ninety-four per cent of the total number of patients treated were discharged from hospital and most of these were discharged from A&E. One patient was found unresponsive the following morning and required long-term care for hypoglycaemic encephalopathy. Treatment and release protocols were developed in another study (A Billitier, SAEM 1998 Annual Meeting). However, on the basis of a review of research and an extensive audit, the authors made some recommendations for protocols, which may serve as a starting point for further research. Some of these recommended protocols include the emphasis of clinical indications of hypoglycaemia to avoid misdiagnosis and under-treatment. Another suggests that insulin dependent patients can be left at home after a hypoglycaemic episode, providing a follow-up letter is sent to the GP or primary care provider. These protocols, if applied, could help standardise the treatment of diabetic hypoglycaemia and ensure uniform practice throughout the ambulance service as a whole.

DISCUSSION
Hypoglycaemia is not considered a serious side effect of diabetes by many patients. They think it unnecessary to be admitted to hospital once the emergency services have treated the patient and the danger has passed. In many research papers follow up was either not carried out, carried out on a very small sample, or on patients who had to be re-admitted for treatment. The research does suggest that on the basis of the evidence, out of hospital treatment for hypoglycaemia is safe for about 90% of patients. A set of recommendations for the safe follow up of patients could include:

- Adding a request to the patient release form that the patient be woken every two hours for checks
- A follow-up letter be sent to the GP or primary care provider after each hypoglycaemic episode
- However, patients who fall into the following categories should be transported to hospital:
  - Older (though a precise definition is not supplied)
  - Taking oral hypoglycaemic medication
  - Comorbid disorders
  - No previous history of diabetes
  - Post-treatment blood glucose is less than 4.4 mmol
  - Normal mental status not achieved within 10 minutes of treatment
  - Treatment with glucagon

The presence of additional complicating factors including changed mental status, perceived head trauma, and symptoms indicating stroke or epilepsy

The success of the review is limited by the fact that much of the literature is outdated. Very little has been published recently that is directly relevant to emergency and prehospital treatment of hypoglycaemia. There is potential for further research in the form of a large multicentre randomised controlled trial. Considerable benefit could be gained from research into the treat and release protocols that exist already and whether or not they could be improved and standardised. Further research would be useful in establishing definitive protocols for use across the field of prehospital emergency medicine, and to affirm current rules and regulations regarding the treatment and release of people with diabetes who experience hypoglycaemic episodes in the community.

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Authors’ affiliations
K Roberts, A Smith, Pre-hospital Emergency Research Unit (PERU), Lansdowne Hospital, Cardiff, UK

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REFERENCES