Issues around conducting prehospital research on out-of-hospital cardiac arrest: lessons from the TOPCAT study

Richard M Lyon, Gerry Egan, Paul Gowens, et al.

Emerg Med J 2010 27: 637-638 originally published online May 29, 2010
doi: 10.1136/emj.2009.087395

Updated information and services can be found at:
http://emj.bmj.com/content/27/8/637.full.html

These include:

References
This article cites 7 articles
http://emj.bmj.com/content/27/8/637.full.html#ref-list-1

Email alerting service
Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

Notes

To order reprints of this article go to:
http://emj.bmj.com/cgi/reprintform

To subscribe to Emergency Medicine Journal go to:
http://emj.bmj.com/subscriptions
Issues around conducting prehospital research on out-of-hospital cardiac arrest: lessons from the TOPCAT study

Richard M Lyon,1 Gerry Egan,2 Paul Gowens,2 Peter Andrews,3 Gareth Clegg1

ABSTRACT
Outcome from OHCA is primarily determined by prehospital events and meaningful clinical OHCA research must include data recorded in this setting. There is little evidence on which to base the practice of prehospital resuscitation and research in this area presents huge challenges but is required if survival from OHCA is to improve. This short report aims to provide a practical guide to performing prehospital research on OHCA, based on lessons learned from the Temperature Post Cardiac Arrest (TOPCAT) research; an observational study into OHCA.

BACKGROUND
Out-of-hospital cardiac arrest (OHCA) remains one of the leading causes of mortality across Europe.1 In the 1970s academic clinicians brought out-of-hospital cardiac arrest (OHCA) research into the prehospital arena, dramatically improving survival.2 3 Recent publications have highlighted the requirement for out-of-hospital clinical research if basic science is to translate into clinical benefit.4 This report presents a practical description of some of the challenges involved in United Kingdom prehospital research based on experiences with the Scottish Temperature Post Cardiac Arrest (TOPCAT) study.

In brief, TOPCAT is a prospective observational study of patients with OHCA during the prehospital phase of resuscitation, while in the Emergency Department, and through to the Intensive Care Unit. Measurements include core body temperature and serum markers of systemic inflammation and brain injury. So far, 137 patients have been enrolled from OHCA resuscitation events involving approximately 160 different ambulance service personnel (see Table 1).

PLANNING A PREHOSPITAL STUDY
Ethical approval and consent
The ethical considerations relating to prehospital research are challenging.5 6 Patients in cardiac arrest are unconscious, and in Scotland, the Adults with Incapacity Act strictly governs research involving these individuals. Ethical approval from a national Research Ethics Committee (REC) is required before undertaking research involving this patient group. For the TOPCAT study the REC agreed that consent should be sought from the participant’s next-of-kin at the earliest opportunity. Should the patient recover sufficiently, retrospective, informed consent is sought from them. This approach of waiving initial consent is being more widely adopted to facilitate research involving incapacitated adults in an emergency setting.6

Coordinating across agencies
For prehospital research to be successful, cooperation between members of the research team, Emergency Medical Dispatch Centre (EMDC), Emergency Medical Services (EMS) personnel, Emergency Department and Intensive Care Unit is vital. All EMS personnel likely to be involved in the study need to be informed and aware of the research protocol.5 7 Although EMS personnel may not be responsible for data collection on-scene, interaction between all members of the clinical and research team ensures optimum patient care and data collection.

Collecting prehospital data
Prehospital research requires excellent relations with the local ambulance service. EMS in the United Kingdom do not routinely task a prehospital doctor to OHCA but in the present study, an Emergency Medicine Specialty Registrar performs the field research. In order to gather data it may be necessary to perform clinical interventions not routinely carried out by EMS such as oesophageal temperature probe insertion or jugular vein cannulation to obtain enough blood for subsequent analysis. Blood samples are promptly transported back to the hospital, being kept cool with disposable chemical cooling packs.

Dispatch
In order to allow EMDC to track the registrar’s location and availability to respond the TOPCAT research, the registrar’s car is fitted with a compatible satellite transponder. On receipt of a possible cardiac arrest call, EMDC first dispatches an ambulance response then contacts the research registrar on a mobile phone, which is switched on only during on-call periods. A marked response car equipped with audible and visual warning systems is used, which has the authorisation of the local police.

Training, insurance and liability
The research registrar received formal response driver training from the Scottish Ambulance Service but such training is available from the police or commercial sources. A specific insurance policy is required to cover emergency driving. This is available through several motor insurance brokers adding approximately 10% to the regular car insurance policy (eg, Towergate MIA, London).
On-scene data recorded by the EMS crew and research doctor are correlated with electronic data from EMDC. Ambulance and doctor response, together with on-scene times are automatically recorded via the tracking systems, which update every 13 s. On arrival at the scene, the research registrar may be requested to assist the attending EMS crew. Clinical care of the patient always remains a priority and data collection only commences when life-saving interventions have been performed. Although no additional medical equipment is carried by the research registrar, he frequently assists with endotracheal intubation, intravenous cannulation and provides reassurance and encouragement. Only through novel, prehospital research studies involving close collaboration between clinical researchers and frontline EMS crews is outcome from OHCA likely to be improved.

### Table 1  Summary of prehospital activity for the temperature post cardiac arrest (TOPCAT) study (1/08/08—1/10/09)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Emergency Medical Dispatch Centre calls to TOPCAT to date</td>
<td>137</td>
</tr>
<tr>
<td>Calls attended</td>
<td>106</td>
</tr>
<tr>
<td>Cardiac arrest with attempted resuscitation</td>
<td>55</td>
</tr>
<tr>
<td>Mean response time ambulance</td>
<td>7.4 min</td>
</tr>
<tr>
<td>Mean research doctor response time</td>
<td>10.4 min</td>
</tr>
</tbody>
</table>

Acknowledgements The authors wish to thank Chest, Heart and Stroke Scotland for funding a Clinical Fellowship, allowing RL to conduct the TOPCAT study. We also wish to thank the Paramedics and Technicians of the Scottish Ambulance Service for their continued support. 

Funding Chest, Heart and Stroke Scotland.

Competing interests None.

Ethics approval This study was conducted with the approval of the Scottish Research Ethics Committee.

Provenance and peer review Not commissioned; externally peer reviewed.

### REFERENCES