Paramedic interventions increase the rate of return of spontaneous circulation in out of hospital cardiac arrests

C J Mann, H Guly

Abstract

Objective—To determine whether paramedic interventions increased the rate of return of spontaneous circulation in the victims of out of hospital cardiac arrest.

Methods—A retrospective analysis of 276 out of hospital cardiac arrests was made. Data analysed included age, sex, presenting rhythm, ambulance response time, presence of a pulse at any point, interventions performed by the ambulance crews, and survival to discharge.

Results—146 patients were treated by paramedics and 130 by technicians. There was no difference in the rate of return of spontaneous circulation or survival to discharge in patients presenting in ventricular fibrillation (VF). In non-VF arrests there was no increase in survival to discharge, but 15% of patients in non-VF arrests achieved a return of spontaneous circulation when treated by paramedics compared to none treated by technicians. There were no other significant differences in any of the variables assessed.

Conclusions—Out of hospital cardiac arrests presenting in VF are managed equally well by paramedics and technicians. However, in non-VF arrests there is a significantly increased rate of return of spontaneous circulation in those patients attended by paramedics.

Methods

Paramedics were introduced in the study area in 1992 and the percentage of ambulances manned by paramedics rose from 20% to 90% during the study period.

The clinical records of all out of hospital cardiac arrests were studied retrospectively for the three years 1993 to 1995. The outcome measures used were return of spontaneous circulation and survival to discharge from hospital.

If a cardiac arrest was attended by ambulance technicians and subsequently by paramedics, it was excluded from this study. Similarly, arrests occurring in ambulances were also excluded.

Results

Two hundred and seventy six patients were entered into the study: 146 patients received treatment from paramedics (102 men, 44 women), median age 71 years (33 to 89); 130 patients were treated by technicians (88 men, 42 women), median age 70 years (29 to 88), P > 0.5. The median response time for the paramedic group was 9 minutes (4 to 26) and for the technician group 8 minutes (3 to 30), P = 0.8.

Table 1 shows the cardiac rhythms at the time of ambulance arrival. There was no significant difference in the age, sex, ambulance response time, or presenting rhythms in the two groups.

Of the patients treated by paramedics, 59 (42%) survived to return of spontaneous circulation. In the ambulance technician treated group, 34 patients (26%) survived to return of spontaneous circulation (χ² = 3.95: P = 0.05).

In patients in whom the presenting rhythm was VF there was a return of spontaneous circulation in 40 patients treated by ambulance
Table 1  Presenting rhythms

<table>
<thead>
<tr>
<th></th>
<th>Paramedics</th>
<th>Technicians</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asystolic arrests</td>
<td>50</td>
<td>43</td>
<td>&gt; 0.5</td>
</tr>
<tr>
<td>EMD arrests</td>
<td>33</td>
<td>30</td>
<td>&gt; 0.5</td>
</tr>
<tr>
<td>VF arrests</td>
<td>63</td>
<td>57</td>
<td>&gt; 0.5</td>
</tr>
<tr>
<td>Total arrests</td>
<td>146</td>
<td>130</td>
<td>&gt; 0.5</td>
</tr>
<tr>
<td>Return of spontaneous circulation</td>
<td>59</td>
<td>54</td>
<td>0.05</td>
</tr>
<tr>
<td>Survival to discharge</td>
<td>4</td>
<td>5</td>
<td>&gt; 0.5</td>
</tr>
</tbody>
</table>

EMD, electromechanical dissociation; VF, ventricular fibrillation.

Table 2  Return of spontaneous circulation

<table>
<thead>
<tr>
<th></th>
<th>All arrests</th>
<th>VF</th>
<th>Non-VF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paramedics</td>
<td>59 (42%)</td>
<td>40 (27%)</td>
<td>19 (15%)</td>
</tr>
<tr>
<td>Technicians</td>
<td>34 (26%)</td>
<td>34 (26%)</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

VF, ventricular fibrillation.

Discussion

The decision by the Department of Health to put at least one trained paramedic on the crew of each emergency ambulance was not the result of research showing any specific benefits. In North America the use of ambulance technicians using defibrillators rather than full paramedic skills has been advocated. 7,8

The prognosis for non-VF arrests is very poor. 9,10 To date there is no evidence that paramedics have altered this.

Guly et al in Edinburgh 9 found that paramedic attendance did not improve outcome from prehospital cardiac arrest when compared to a defibrillation trained technician. Their study has, however, been criticised 11,12 because the participating paramedics were not allowed to give cardioactive drugs (that is, adrenaline and atropine) and therefore could not be said to have performed advanced cardiac life support, as defined by the United Kingdom Resuscitation Council. This was not the case in this study.

This study confirms the results of an earlier study 5 in showing that the outcome for VF arrests is not improved by paramedic attendance. However, in non-VF arrests there was a significant increase in the number of patients with a return of spontaneous circulation when treated by paramedics, although this did not lead to an increased rate of survival to discharge.

CONCLUSION

At present, advanced cardiac life support as performed by paramedics has no advantages over basic life support with early defibrillation in the treatment of victims of out of hospital cardiac arrest. However, further research should be done to determine whether the return of spontaneous circulation in a significant number of non-VF arrests attended by paramedics represents the first step for better long term survival in these patients or merely prolongs dying.

The primacy of early defibrillation for VF arrests is again emphasised, and better management of out of hospital cardiac arrest may demand more radical methods of providing early defibrillation.
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