Flying Squad response to medical emergencies

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SUMMARY

The Flying Squad of the Accident and Emergency Department, of the Derbyshire Royal Infirmary, was established in 1955 by Collins. The initial function was to provide emergency care to victims of industrial accidents. However, the spectrum of emergencies they now respond to has expanded and includes predominantly road traffic accidents and medical emergencies. Despite the proliferation of Flying Squads their benefit has been difficult to quantify even in a trauma setting (Robertson & Steedman, 1985; Gorman & Coals, 1983). The outcome in medical emergencies is reported as dismal (Robertson & Steedman, 1985; Rowley & Collins, 1979) yet the number of calls for the flying squad to attend medical emergencies are many. Previous reports have recorded 20–30% of Squad calls responding to medical emergencies (Gorman & Coals, 1983; Rowley & Collins, 1979; Steedman & Robertson, 1986; Harrop & Bodiwala, 1983).

INTRODUCTION

The theoretical advantages of Flying Squads are quite apparent. The provision of medical and nursing staff with an increasing array of equipment from the hospital to the community has obvious benefits. It is the selection of patients who would best utilize this facility, that is the problem. No hard criteria exist to aid this selection and some may argue none should. But there are disadvantages, it depletes the parent department of staff and may fail to achieve the objective of improving the patient’s condition prior to transfer. The two most significant prognostic factors in patients with cardiac arrest are the time lapse to cardiopulmonary resuscitation and the first direct current counter-shock (Weaver et al., 1986; Stults et al., 1984; Crampton, 1984; Royal College of Physicians, 1987). The mobilization time of a Flying Squad excludes intervention of a

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degree to affect mortality with regard to these factors. However, other considerations are discussed.

METHODS

We analyzed the records of all Flying Squad calls to medical emergencies between 1st January 1985 and 31st December 1987. The catchment area is approximately 25 square miles serving a population of 500,000.

RESULTS

There were 167 calls involving 168 patients. The male to female ratio was 2.6:1. The mean age was 53 years with a range from 5 months to 86 years.

Squad calls

On analysing the total number of Squad calls for the respective years it can be observed that in 1985 and 1986 approximately 50% of the calls were to medical emergencies with 36% in 1987 (Table 1).

<table>
<thead>
<tr>
<th>Table 1 Analysis of Flying Squad calls</th>
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<tbody>
<tr>
<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td>1985</td>
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<tr>
<td>Medical</td>
</tr>
<tr>
<td>Non-medical</td>
</tr>
<tr>
<td>Total</td>
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<tr>
<td>% medical</td>
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</table>

Caller

The Flying Squad can be activated from one or a combination of the Emergency Services and include, Ambulance Control, General Practitioners, the Police, Industrial nursing sisters and doctors. Over the study period Ambulance Control were responsible for 75% of the calls, GP’s 23% and the Police 2%.

Duration of call

The duration of call relates to the time period from receipt of the squad call to return to base and includes mobilization time, time to travel to the scene, treatment time at the scene and time to return to base. The average duration of call ranged from 35 to 40 min. In the latter part of the study further details of the timing of calls were recorded and a
Table 2  Criteria for call out of Accident Flying Squad

(1) Whenever a patient’s life is in danger regardless of reason (severe collapse, major burns, allergic shock) and the ambulance equipment is insufficient.
(2) Respiratory difficulty which cannot be alleviated by the ambulance crew.
(3) A patient suffering from circulatory shock due to blood loss or multiple injuries.
(4) A patient in severe pain that requires anaesthetic or analgesics before moving.
(5) When a patient is trapped for long periods of time with suspected injuries.
(6) Accidents where the patient already has a medical condition which could complicate the injury.
(7) Whenever a doctor, or one of the peripheral hospitals requires assistance.

response time from receipt of the squad call to arrival at the scene averaged 8.82 min per call (N = 57).

Distance travelled

The catchment area is approximately 25 square miles and includes both urban and rural communities. The shortest distance travelled was 1 mile and the longest 77 miles which involved the escort of a patient to the Regional Cardio-Thoracic centre. The average number of miles logged per call varied from 7–11 miles during the respective years. Thirty-six per cent of calls involved a return journey distance of 5 miles or less, 75% of calls were within a radius of 5 miles to the hospital.

Criteria for call out

The indications for call out include any condition where life is deemed to be threatened or at risk or where stabilization of the patient’s condition is required prior to transfer to hospital. It is a policy decision of this Flying Squad not to refuse any call for assistance, and to rapidly respond at all times to provide Advanced Life Support as a back up to the Emergency Services.

Complaint

The complaint diagnosis is that made by the medical staff comprising the squad team from evidence available at the scene. The most common complaint for call out was cardiac arrest which accounted for 82 (49%) of 167 calls. The team responded to a variety of other conditions as illustrated in Table 3.

Cardiac arrest

Analysing the cardiac arrest calls in relation to pre-existing cardiopulmonary resuscitation (CPR) we find that in 20 of 82 patients (24%) where no CPR was instituted prior to squad arrival, 19 (95%) were certified dead at the scene whilst the remaining patient (5%) succumbed to a delayed mortality in hospital.

Sixty-two of 82 patients (76%) had pre-existing CPR prior to squad arrival. Of these Ambulance Personnel of standard training in basic life support administered CPR to 32
Table 3

<table>
<thead>
<tr>
<th>Complaint</th>
<th>%</th>
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<tbody>
<tr>
<td>Cardiac arrest</td>
<td>82 (48)</td>
</tr>
<tr>
<td>Chest pain</td>
<td>20 (12)</td>
</tr>
<tr>
<td>Collapse</td>
<td>20 (12)</td>
</tr>
<tr>
<td>Epileptic fit</td>
<td>9 (5)</td>
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<tr>
<td>Overdose</td>
<td>6 (4)</td>
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<tr>
<td>Haematemesis</td>
<td>4 (2)</td>
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<tr>
<td>Hanging</td>
<td>3 (2)</td>
</tr>
<tr>
<td>Acute asthmatic attack</td>
<td>3 (2)</td>
</tr>
<tr>
<td>CCF</td>
<td>3 (2)</td>
</tr>
<tr>
<td>Fishbone in throat</td>
<td>3 (2)</td>
</tr>
<tr>
<td>Febrile convulsion</td>
<td>3 (2)</td>
</tr>
<tr>
<td>Cot death</td>
<td>2 (1)</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>10 (6)</td>
</tr>
</tbody>
</table>

patients (39%), 31 (97%) of whom were certified dead at the scene and 1 (3%) died in hospital. There were no survivors.

Twenty-five of this group of 82 patients (30%) had CPR performed by GP’s at the scene, 17 (68%) were certified dead at the scene and 5 (20%) succumbed to a delayed mortality in hospital. Three patients (12%) survived to be discharged home.

Only 5 patients (6%) had citizen CPR performed, 2 (40%) of whom were certified dead at the scene and 3 (60%) survived to discharge from hospital.

Treatment

The squad team administered treatment to 147 patients (87.5%). Full resuscitation was instituted in 78 (47%) cases. Twenty-one patients (12%) did not receive any treatment either because no benefit could be foreseen in continuing with resuscitation or the patient was stable.

CPR survival

It has been difficult to justify the existence of Flying Squads in terms of the benefit of on-scene life support facilities for the patient. In an attempt to validate this justification we selected a group of patients who survived cardiopulmonary resuscitation to be admitted to hospital.

There were 15 (9%) patients, 14 of whom had a diagnosis of cardiac arrest and one collapse. All but one had pre-existing CPR by various personnel.

Citizen CPR  In the case of patient 1, the collapse was intubated by the squad and had an iv infusion commenced, she died within 48 hrs of a sub-arachnoid haemorrhage.

Patients 2 and 3 were in ventricular fibrillation. Following resuscitation by the squad they were admitted to the Coronary Care Unit, one was discharged home, the other developed a stroke. Patient 4 dived into a swimming pool and on removal was found to have an absent pulse and respirations. On revival following basic CPR the patient survived.
Ambulance personnel CPR Patient 5 had vital signs present but was intubated, had an iv line established and transferred to the Coronary Care Unit. Patient 6 with Duchenne’s muscular dystrophy had absent vital signs but following resuscitation by the squad was transferred to the children’s hospital where he died within 48 h.

GP CPR Eight had prior resuscitation by GP’s (Patients 7–14), six of whom were alive on arrival of the squad. Patients 7 and 8 had absent vital signs, and required resuscitation which included intubation, one died within 48 h and one survived. Patients 9, 10 and 11 required escort only by the squad, two of whom died in hospital, the third survived. Patients 12, 13 and 14 had intravenous infusions commenced, two died in hospital and one survived to discharge.

Absent CPR Patient 15 did not have CPR prior to squad arrival and had absent vital signs. Resuscitation was commenced, the patient stabilized and transferred to CCU where he died within 48 h.

Of this group of fifteen patients the final outcome was six survived to hospital discharge, eight died, the fate of one transferred to another hospital is unknown. This represents a mortality of 57%.

Mortality

The mortality for the individual years ranged between 56–72%. The on-scene mortality was 48% with a delayed mortality in hospital of 12%. This gives an overall mortality for the study period of 60%.

Of the 82 (49%) patients who died at the scene, the most common provisional diagnosis was cardiac arrest in 68 (83%) patients.

DISCUSSION

The pattern of call of the Flying Squad has changed considerably since 1955 from industrial to road traffic accidents and increasingly medical emergencies, but the principle has not altered in its design to bring the resuscitation room to the pre-hospital arena. There are criteria laid down by the Accident and Emergency Department of the Derbyshire Royal Infirmary for the Emergency Services to request mobilization of the Squad (Table 2).

This study has shown that calling the squad to an unwitnessed cardiac arrest in the absence of bystanders, CPR is of no benefit. Such patients are certified dead at the scene in 95% of cases with an overall mortality of 100%. This is compared to a survival to hospital discharge of 9-6% when bystander CPR occurs. Using this argument perhaps even a 999 ambulance crew should not be used, as the chance of survival is zero, but this is a retrospective judgement. One problem is the method of mobilization of the Squad. It would be totally inefficient for the squad to respond to all 999 calls as a high proportion of such calls are not emergencies and a high proportion not serious. The practicalities require a compromise. The Squad can be activated by any of the emergency services who have first assessed the situation. Time is lost between the initial
Flying Squad response

collapse and the first 999 call, and by the Ambulance and Squad response times. The Ambulance response time in Derby meets national standards and frequently better them. The national standard states that response to 50% of 999 calls should be within 8 min and to 95% in 20 min. The Squad response time averages 8-82 min. The infrequent use of DC shock in this study (13%) reflects the time delay involved. Compare this to the situation in Seattle, USA, where an area of 18 miles × 6 miles is covered by 34 Fire Stations with Emergency Medical Technician and Paramedic backup. There are 5 ambulance stations in a comparable area of Derby and Extended Training of Ambulance Personnel commenced this year. The Seattle force has a response time of approximately 3 min to a 911 call with EMT staff, and 6–7 min for Paramedic support (Weaver et al., 1986).

The Paramedic has similar skills to the Extended Trained Ambulance person but not those of an experienced A&E Doctor—one of whom always attends a Squad call.

In Seattle the population has the advantage that 40% of cardiac arrest victims will have citizen CPR performed compared to 6% in this study (Weaver et al., 1986). It is of interest that prior to the introduction of citizen CPR training programmes their bystander CPR rate was 5%. However, factors associated with survival from cardiac arrest include not only bystander CPR, but a short time delay to the first DC countershock. The use of automatic external defibrillators by the first responder following a relatively short training programme has influenced survival (Cummins et al., 1987; Rowley et al., 1987).

This short specific training does not produce better all round patient care as provided by the full national Extended Training package for the Ambulance Service. Thus, bystander CPR and Extended Training of Ambulance crews offer a cardiac arrest patient the chance of survival. A Flying Squad then could be utilized to treat the unstable, hypotensive patient with a resistant arrhythmia in whom the journey to hospital could be associated with an increased morbidity and mortality. Further determined resuscitation efforts at the scene may improve the outcome for such patients (Kellerman et al., 1988). It should be noted that load and go or scoop and run policies have killed 25 EMT and paramedics in the US between 1983–1986 (Kellerman et al., 1988).

Thus, the Flying Squad does have a role. It will not save lives on its own without the support of other advances in pre-hospital care, namely bystander CPR and automatic defibrillation. The criteria for call out will not change following this study but we await the impact of other campaigns to improve pre-hospital survival.

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