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Do ambulance crews triage trauma patients?

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SUMMARY

Objective. To determine whether ambulance crew triage trauma patients appropriately. *Design*. A retrospective descriptive study. *Settings*. Cornwall County Ambulance Service. *Variables studied*. On-scene times, injury severity, establishment of intravenous infusion and time from scene to A&E department. *Subjects*. Patients with compound fracture of the lower limb taken to Truro Accident and Emergency department. *Outcome measures*. Ambulance service on-scene times and mission times. *Results*. Ambulance crew do not appear to be triaging patients appropriately. Excessive time is being spent on pre-hospital stabilization. Delivery of patients to a casualty department is delayed. *Conclusion*. At present the activities of paramedics are poorly supervized, and pre-hospital management by paramedics may be jeopardizing patient care.

INTRODUCTION

Background. Whilst ambulance crews can become proficient in the provision of Advanced Life Support skills it is much less certain that crews use these skills appropriately in field conditions (Border *et al.*, 1983). An important pre-hospital triage skill is identifying when 'scoop and run' or 'stay and stabilize' management is indicated (Champion, 1989). This paper reports studies which sought to assess whether paramedics demonstrated this skill when they dealt with trauma cases.

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MATERIALS AND METHODS

Location of Study. The study was confined to patients treated at the Royal Cornwall Hospital (City), Truro.

Case Selections. Patients were needed with injuries which both ambulance and medical personnel accepted as requiring prompt attention (Rains & Richie, 1981; Browne, 1988). Cases also had to be readily identifiable from casualty department records and occur with reasonable frequency. Patients with compound limb fracture meet these criteria.

Case Identification Casualty Department registers were examined and 83 cases of compound fracture of the lower limb transported by ambulance to City hospital Truro between April 1987 and March 1989 were identified.

Measures of Interest. On-scene times: mission times. Figure 1 shows the separate phases of pre-hospital emergency care

Variables Studied Distance from A&E department, establishment of intravenous infusion (IV) access and seriousness of injuries.

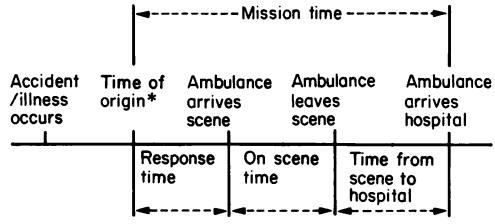

Fig. 1. Phases of pre-hospital emergency care.

RESULTS

Injury severity

All the patients identified had injuries requiring surgical intervention: all 83 patients needed operation under general anaesthesia and 20 of the patients studied were very seriously injured: they had multiple other injuries, vascular compromize, shock and amputations.

Pre-hospital deaths

There were four instances of ambulance service involvement with trauma victims who died prior to reaching hospital. All four had injuries incompatible with life.

Relationship between long on scene times and mission times

If the principal objective of a pre-hospital trauma service is to deliver patients to hospital rapidly (Champion, 1989), the findings shown in Table 1 are disturbing.

Table 1. Times in minutes for the various phases of pre-hospital care (data from 83 emergency ambulance missions).

	Arrival at scene time	On scene time	Time from scene to hospital	Mission time
Median (50%)	8	28	20	61
90 percentile	15	53	43	100

Table 2. To show association between on scene times and mission times.

	*Number of missions lasting more than 61 min	*Number of missions lasting less than 61 min
Number of missions more than 28 min on scene**	33	8
Number of missions less than 28 min on scene**	10	32
Median on-scene time	42 min	20·5 min

* Long missions are greater than the median mission time (61 min).
** Long on scene times are greater than the median on scene time (28 min).

These data suggest that mission times can only be reduced appreciably by shortening on-scene times, and that very little time (and by implication only limited interventions) should be spent on-scene. Table 2 shows very clearly that it is missions with long on-scene times that result in long overall mission times.

On-scene times and the establishment of IV's

In these 83 patients no 'advanced skill' other than insertion of IV's was practised. Undoubtedly some of the on-scene time is accounted for by attempts to set up IVs and stabilize patients. For 57 patients, ambulance service and medical records had information recording whether IV access was established. In 53% of these 57 patients IV access was established. The data presented in Table 3 was obtained by categorizing the severity of injuries using criteria of shock, amputation, crush or other injury. It suggests that severity of injury did not influence whether or not an IV was set up. Longer on-scene times are associated with the establishment of IVs, and the more seriously traumatized patients were no more likely to receive an IV than the less traumatized.

Table 3. To show on scene times and establishment of IV access.

20 seriously traumatized patients.	37 less seriously traumatized patients.	
IV set up on 11 patients 55%	IV set up on 19 patients 51%	Median time on scene = 40 min
IV not set up on 9 patients	IV not set up on 18 patients	Median time on scene = 26 min
Median on scene time = 33 min	Median on scene time = 33 min	

Data for 57 patients carried by the ambulance service whose ambulance service records contain information on IV usage.

Table 4. To show relationship between on-scene times and distance from hospital. Distances from hospital expressed in min.

	Number of missions with travel times from scene to casualty department	
	More than 20 min*	Less than 20 min*
On scene time more than 28 min**	18	23
On scene time less than 28 min**	23	19
	Median on scene time 28 min	Median on scene time 27 min

* Median travel time to A&E department from scene of incident was 20 min.
** Median on scene time was 28 min.

On-scene time and distance from casualty department

Table 4 shows that on-scene times are similar for emergencies occurring close to, or far away from (in time) the casualty department.

DISCUSSION

There is agreement that the success of any pre-hospital care system depends on the ability of paramedics to 'triage' patients. For instance, a major triage skill is

recognizing when a patient needs to be taken to major casualty department *quickly*, even if this means bypassing smaller hospitals (Redmond, 1984). However whilst all authorities are agreed that the role of paramedics dealing with patients suffering cardiac arrest is of the greatest importance, some feel that their role in the management of trauma victims is limited (Lewis *et al.*, 1983). There is controversy on whether on-scene stabilization is more appropriate for the trauma patient or if 'scoop and run' management serves the patient better (Redmond, 1984; Alexander, 1989). It is important that the correct management is offered to the patient as the initial hour in the care of the victim of multiple injuries is the critical time for life and limb salvage, and has been termed the 'golden hour of trauma' (Harviel & Champion, 1989).

Effect of insertion of IV's

Without proper training and supervision, endotracheal intubation and IV fluid administration can become life-threatening rather than life saving, because they delay the initiation of effective treatment in hospital. Indeed (Alexander, 1989).

> '...transport should never be delayed to start intravenous infusion...' (MacKenzie *et al.*, 1988).

In this study the extra on-scene time associated with the insertion of IV's (14 min) is similar to the 10–12 min noted by others (Lewis *et al.*, 1983). However it need not take long to insert IV's. In Denver, USA. mean on-scene times for missions in which an IV was inserted were only 9·9 min (Alexander, 1989). Ambulance crews need to be assessed on their ability to insert IV's *quickly* before they are certified as 'IV trained'. A secondary issue is that crews should be inserting IV's only if there is a clear indication to do so. Attempts to insert IV's should be abandoned if delay in transporting the patient to hospital will result. To do so will probably require the development and implementation of patient management algorithms. Such algorithms have been developed and implemented elsewhere and have been found to be useful. An example is shown in Figure 2.

Discussion with the ambulance service training officer suggests that about 50% of crews were trained in IV skills, and these crews would invariably have started IVs. Thus it appears that it is the skill level of the ambulance crew and not the clinical need of the patient which decides whether IV access is attempted. In only one instance was more than 500 ccs fluid given. Records were reviewed on the three patients transported by the ambulance service who subsequently died. Their deaths could not be attributed to lack of pre-hospital care.

To conclude, it is unlikely that attempts at on-scene stabilization benefited any

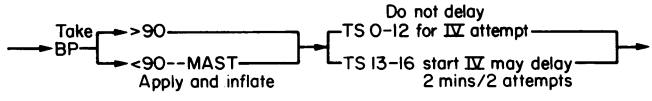

Fig. 2. Example of patient management algorithm Alexander, 1989. BP = blood pressure; MAST = Military anti shock trousers; IV = intravenous infusion and; TS = trauma score.

patient; rather they delayed their admission to casualty. Almost certainly on-scene times could be reduced with no detriment to patient care.

Why is on-scene time so long?

There is little evidence to explain why on-scene times (median time 28 min) are so long. Only in three cases was a cause for delay at the scene noted (awkward access and fire brigade extracting patients). If all the on-scene times were reduced to 15 min 72% of patients compared to the 48% observed would have been delivered to hospital within 1 h from time of origin of the call. It must also be remembered that time spent on-scene reduces correspondingly the ambulance service's ability to respond in a timely way to other emergency calls. The problem of overuse of paramedic skills to the detriment of overall service performance has been noted by others (Litterman *et al.*, 1983).

Distance from hospital

Senior ambulance personnel agree that when emergency trauma incidents occur close to the casualty department it is generally inappropriate for crews to spend much time on-scene; scoop-and-run management should prevail. Conversely, stay-and-stabilize management (with associated longer on-scene times) may be appropriate at more isolated locations. It is very perturbing that Table 4 shows no evidence to suggest that this very basic triage principal is used. It would appear that ambulance crews need to be monitored on the time they spend and the treatments they offer at-scene, preferably within the context of compliance with an 'algorithm for pre-hospital treatment'. Distance from hospital needs to be a criteria in this algorithm. Other investigators have noted the necessity of making:-

> '..the distance to hospital... a variable incorporated into the decision-making process..' (Litterman *et al.*, 1983).

Role of Medical Directors

'The quality of pre-hospital triage, treatment and transport systems is largely based on the ability of those systems to be responsive to the state-of-the art medical direction' (Champion, 1989). 'There must be some medical control in the emergency department to assure that the skills used at the scene are appropriate and are not causing delay' (Lewis *et al.*, 1983). At present the activities of paramedics are not satisfactorily monitored by the medical director because a satisfactory crew activity surveillance system is not in place. Attempts are being made to establish such a system.

CONCLUSION

At present the activities of paramedics are poorly supervised, and pre-hospital management by paramedics may be jeopardising patient care.

RECOMMENDATIONS

The ambulance service needs an improved monitoring system which pays special attention to time spent on-scene and usage of higher skills. Very specific management algorithms need developing, implementing, monitoring and updating.

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