TITLE: WOULD FIELD DEPLOYMENT OF PHYSICIANS REDUCE DEATHS WITHIN 24 HOURS OF ROAD TRAFFIC ACCIDENTS?

AUTHORS: Colin F. Mackenzie, M.B., Ch.B., FFARCS, Baekhyo Shin, M.D., Carl Sodestrom, M.D., R.A. Cowley, M.D.

AFFILIATION: Department of Anesthesiology, University of Maryland Hospital and Maryland Institute for Emergency Medicine, Baltimore, Maryland 21201.

Introduction. In attempts to reduce deaths during transport and early resuscitation, some states and foreign countries send anesthesiologists or other physicians (M.D.'s) to the scene of road traffic accidents (RTA's). The M.D.'s direct triage and may perform additional maneuvers not carried out by nurses, paramedics or emergency medical technicians (EMT-A's) including placement of cervical traction, pacemakers, cut-downs, and open cardiac massage, cross clamping of the thoracic aorta and on site limb amputation. To determine how frequently an M.D.'s skills might have been effective in reducing the number of patients dying within 24 hours of delivery by EMT-A's to a trauma center, four years of admissions from RTA's were analyzed.

Methods. Mortality data was obtained from autopsies performed at the Medical Examiner's Office, from notes made at weekly morbidity and mortality conference and clinical findings recorded in the patients records and discharge summary for all 305 RTA victims who died within 24 hours of admission between 1976-1980.

Results. There were 4,431 patient (pt) admissions to the trauma center, 2,579 were RTA'S (58.2%). 132 pts (5.1%) were dead on arrival (DOA) or declared dead within 30 minutes of admission in cardiac arrest after resuscitation was unsuccessful (Group I). One hundred seventy three of the 2,579 pts (6.7%) arrived alive but died within 24 hours of admission (Group II). Complete autopsy, including microscopic evaluation was performed on 248/305 (81.3%) pts dying within 24 hours and partial autopsy sufficient to establish a primary cause of death, was performed on 52/305 (17.0%) pts.

Table I: Primary cause of death identified at autopsy

Group I	#	%	Group II	#	%
Craniocerebral trauma	57	43.2	Craniocerebral trauma	66	38.1
Hemorrhage	27	20.5	Hemorrhage	65	37.6
Cerv. spine fx.	24	18.2	Cerv. spine fx	14	8.1
Aortic rupture	8	6.1	Aortic rupture	12	6.9
Heart injury	6	4.5	Chest injury	5	2.9
Airway/hypoxia	6	4.5	Heart injury/ tamponade	4	2.3
Cardiac/medical	4	3.0	Others	7	4.1
	132	100%		173	100%

Cardiac/medical in group I included one pt with ventricular fibrillation, one myocardial infarction, one malignant hypertension and in one patient, cause of death was unknown. Others in group II included 3 unknown, 2 abdominal trauma, 1 air embolus and 1 patient with myocardial infarction.

Potentially reversible findings and their incidence on admission are shown in Table II.

Table II

Group I		Group II	
Pneumothorax unilat.	15	Subdural hemorrhage	32
bilat.	18	Pneumothorax unilat.	28
Subdural hemorrhage	14	bilat.	14
Cardiac arrhythmia	4	Cardiac arrhythmia	5
Hypoxia	2	Airway problems	5
Airway aspiration	2	Transport delay	4
Transport delay	2	Hypoxia	3
Pulmonary edema	1	Cardiac tamponade	1
Hypovolemia	1	Hypothermia	1
(44.7%)	59	(53.8%)	93

Transport delays occurred in 1 Group I and 2 Group II patients because patients were trapped by vehicles.

Discussion. Head injury was the commonest cause of death within 24 hours of admission following RTA's. Subdural hemorrhage (SDH) was found in 10.6% of Group I and 18.5% of Group II patients. If large, SDH may be diagnosed in the field and relieved by burr holes, but rarely by non-neurosurgeons and SDH is not usually an isolated injury in high speed RTA's. The basic principles of head injury management at the scene and during transport require attention to the airway, adequate ventilation and oxygenation and maintenance of perfusion, all of which are achievable with nurse, paramedic or EMT-A's intervention. Preventable findings noted on admission that may have been avoided if M.D.'s had been present include pneumothorax and airway/hypoxia problems. Twenty-five % of group I and 34.7% of group II patients had pneumothorax which was identified on admission or during early resuscitation. Three patients could have benefitted if on-site limb amputation had enabled them to be extracted from the wreck and more rapidly transported to the trauma center. Other problems, such as cardiac arrhythmias may be diagnosed and treatment directed by telemetry without M.D.'s physical presence in the field. Cervical fractures may be adequately immobilized by EMT-A's using sandbags, a backboard and tape. Cervical tongs applied by M.D.'s are unlikely to be of additional benefit. The outcome from thoracotomy and open cardiac massage is poor even in the emergency room and one group using field deployment of M.D.'s for RTA's never used open thoracotomy in 108 patients who had cardiopulmonary resuscitation.[1]

Conclusion. The only clear indication that M.D.'s field participation in RTA management might be beneficial in comparison to EMT-A's was in the diagnosis and treatment of pneumothorax. Paramedics and nurses may be trained to needle the chest and place chest tubes. EMT-A's delivering patients to the trauma center would benefit from expertise in identification and management of pneumothorax. The results of this study do not support use of M.D.'s in the field as a means of reducing deaths following RTA's.

References.

[1]Fischer RP, et al: Urban helicopters response to the scene of injury. J. Trauma, 1984, in press.