SHORT REPORT

A study of police operated dispatch to acute coronary syndrome cases arising from 112 emergency calls in Aarhus county, Denmark

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Background: The accuracy of the Danish police operated "112" emergency call system was studied. Dispatch of the anaesthesiologist staffed mobile emergency care unit (MECU) to acute coronary syndrome (ACS) cases was used as an indicator of accuracy of dispatch to life threatening emergencies.

Methods: This was an observational cohort study of patients given a 112 system report of heart attack and patients with a provisional diagnosis of ACS made on scene by the MECU. Sensitivity, specificity, and positive predictive value with 95% confidence intervals (CI) were calculated.

Results: There were 341 reports of ''heart attack'' and 205 patients with ACS. Sensitivity was 75% (95% CI 68% to 80%) specificity 90% (89% to 92%) and positive predictive value 45% (40% to 50%).

Conclusion: The accuracy of 112 dispatch of the MECU was found to be moderate. We suggest more training of dispatch staff and medical supervision.

The common emergency phone number in Denmark is "112".[1] The police operate the 112 alert, except in Copenhagen; this is unique among European countries.[2] Studies on dispatch of emergency medical services (EMS) are few, and a systematic review found only 20 studies containing original data.[3]

In Aarhus, an anaesthesiologist staffed mobile emergency care unit (MECU) is called in addition to an ambulance to life threatening cases, including acute coronary syndrome (ACS).[4] The MECU enables us to achieve an early provisional diagnosis.

We wanted to study the accuracy of dispatch of the MECU to acute coronary syndrome (ACS) cases. ACS was used as an example of a life threatening emergency.

METHODS

Following consultation with the ethics committee, permission was not required for the project to proceed. The study was designed as an observational cohort study based on consecutive data collected in Aarhus (330 000 inhabitants) during a 6 month period in 2002. Inclusion criteria were: (*a*) patients with a chief complaint of ''heart attack'' on calling 112, and (*b*) patients with an on scene provisional diagnosis of ACS.

The report of ''heart attack'' as the main complaint from the emergency 112 call was compared with the provisional diagnosis of ACS made by the MECU physician. A 12 lead electrocardiogram was performed on scene. Sensitivity, specificity, and positive predictive value were calculated with 95% confidence intervals (CI).

RESULTS

There were 341 reports from 112 of ''heart attack'', and 2154 MECU responses during the study period, with ACS diagnosed in 205 patients (9.5%) (table 1). Sensitivity was 75% (95% CI 68% to 80%) specificity 90% (89% to 92%) and positive predictive value 45% (40% to 50%).

There were 188 false positive cases with provisional diagnoses (table 2) and 52 false negative cases with the 112 reports (table 3).

DISCUSSION

This is the first study to present data from police operated 112 alarm centres in a country with 112 as the single unique number for all emergencies. The MECU enabled us to retrieve a provisional diagnosis made by a physician on scene, giving us an early evaluation and provisional diagnosis. This level of on scene skill was thought to be appropriate for comparison purposes.

Our study showed moderate accuracy in dispatch. Studies from Belgium, the Netherlands, Sweden, and California of firefighter, nurse, and paramedic dispatchers give different answers, and comparisons are thus difficult.[5–9]

Most of the false positive cases were non-serious cases representing overtriage and over-response of the highly specialised MECU. The predictive value of only 45% responses to ''heart attacks'' indicated that accuracy could be improved. Only a single ambulance was dispatched to the false negative cases. These cases represented potential undertriage of the MECU. One third of false negative cases, including seven cases of cardiac arrest, were reported as unspecified ''illness''. Our results indicate limited questioning on symptoms and signs. We suggest more training of dispatch staff with medical input and close medical supervision of the 112 dispatch system.

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Table 1 On scene physician provisional diagnosis

	ACS		
"112" reports	Yes	No	Total
''Heart attack''			
Yes	153	188	341
No	52	1761	1813
Total	205	1949	2154

ACS, acute coronary syndrome.

Abbreviations: ACS, acute coronary syndrome; EMS, emergency medical services; MECU, mobile emergency care unit

Table 2 False positive cases

Provisional diagnosis by on scene physician	n
Cerebrovascular event	31
Cardiovascular event	32
Adominal and bleeding	15
Respiratory	14
Vertigo malaise hyperventilation	35
Fever, discomfort	21
Syncope	18
Alcohol intoxication	12
Psychiatric disorders	10
Total	188

Table 3 False negative cases

	Provisional diagnosis by EMS physician				
"112" reports	Patients (n)	Angina pectoris	Possible MI	MI	Cardiac arrest
Illness (unspecified)	18	8	2	1	7
Possible death	12	0	0	0	12
Unconsciousness	11	1	2	1	7
Breathing difficulties	6	2	1	1	2
Seizures	2	1	0	0	1
Asthma	1	0	0	0	1
Traffic accidents	1	0	0	0	1
No report	1	0	0	0	1
In total	52	12	5	3	32

EMS, emergency medical services; MI, myocardial infarction.

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