PRE-HOSPITAL CARE

Pre-hospital aspirin for suspected myocardial infarction and acute coronary syndromes: A headache for paramedics?

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Abstract

***Objective*—To ascertain the frequency with which paramedics follow protocols for the administration of aspirin to patients to whom an ambulance is called for chest pain associated with suspected ischaemic heart disease.**

***Methods*—Ambulance services in England and Wales who had conducted a recent aspirin administration audit were identified through the National Clinical Effectiveness Programme for the Ambulance Service Association. Data were requested from each of these services with a 100% return rate.**

***Results*—Nine services out of a total of 35 had collected appropriate data. The proportion of patients who were given aspirin by a paramedic varied from 11% to 74%. The range of proportions of patients receiving pre-hospital aspirin increased after adding those patients who had already received aspirin from an alternative health provider, to 19% to 78%. It is estimated that at least 15% to 74% of patients who should have been given aspirin by the various ambulance services did not receive it. The proportion of patients for whom aspirin was judged to be inappropriate ranged from 4% to 35%. The reason for these widely varying and generally poor levels of compliance is not known. However, the range of indications and contraindications to the administration of aspirin varied considerably by ambulance service. This also made the comparison of data from different sources difficult.**

***Conclusions*—Aspirin has been shown to be beneficial after a myocardial infarction and for other acute coronary syndromes. However, variances in the proportion of patients with suspected ischaemic heart disease given aspirin in different ambulance services indicates the need for a re-emphasis on the importance of this treatment. A standard protocol for all UK ambulance services should be devised that minimises the number of contraindications to aspirin and otherwise requires its administration to all patients with acute coronary syndromes or suspected myocardial infarction. Regular, standardised audits of compliance should also be conducted and their results widely disseminated.**

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Aspirin was first shown to be life saving in 1974[1] and since then its value in the reduction of risk after myocardial infarction (MI) and in other vascular diseases has been confirmed in over 150 randomised controlled trials.[2]

The ISIS-2 study[3] identified that giving aspirin in the first 24 hours after MI resulted in a reduction in mortality at five weeks of 23%. This was similar to the 25% reduction achieved with streptokinase. Importantly, the combined administration of aspirin and streprokinase reduced mortality by 42% when compared with placebo.

A recent review of trends in treatment and survival from myocardial infarction[4] concluded that "The greatest effect of any given therapy was that of aspirin, which accounted for 34% of the decrease in mortality, followed by thrombolytics (17%) . . ."

Aspirin is now widely accepted as an essential component in the early treatment of acute MI.[5] The giving of aspirin by a health professional on first contact with a patient who has chest pain and who is suspected to have a MI or acute coronary syndrome is therefore recommended,[6 7] and has become accepted practice. Recommendations for the pre-hospital administration of aspirin by paramedics[8] and by doctors[9] have also been made.

In this study we have attempted to ascertain the frequency with which paramedics follow protocols for the administration of aspirin to patients to whom an ambulance was called for chest pain believed to be related to ischaemic heart disease.

Methods

Ambulance services in England and Wales that had conducted a recent audit of aspirin administration were identified through the National Clinical Effectiveness Programme for the Ambulance Service Association.

Nine services out of a total of 35 had collected appropriate data and made these

Table 1 Proportion of patients receiving pre-hospital aspirin

			Proportion administered aspirin					
Ambulance service	*Audit date*	*Number of patients*	*% given by ambulance staff*	*% given by other health professional*	*% self administered by patient*	*Total % given aspirin (95% CI)*	*% in which aspirin was contra-indicated*	*% patients on maintenance aspirin*
1	Not stated	89	42%	6%	19%	66% (55.5% to 76.0%)	6%	Not stated
2	Not stated	342	74.3%	Not stated	Not stated	74.3% (69.3% to 78.8%)	26%	Not stated
3	01/09/97 to 30/11/97	1117	37.6%	*10.8%		48.4% (45.5% to 51.4%)	5.1%	Not stated
4	Not stated	721	44.1%	Not stated	Not stated	44.1% (40.4% to 47.8%)	20%	Not stated
5	04/98 to 12/98	929	Not stated	Not stated	Not stated	40.2% (367.0% to 43.4%)	Not stated	Not stated
6	10/99	Not stated	Not stated	Not stated	Not stated	34%	Not stated	Not stated
7	10/99	250	11%	3%	5%	19% (14.5% to 24.6%)	4%	Not stated
8	24/01/00 to 20/02/00	110	62.8%	21.5%	1.7%	78.2% (69.3% to 85.5%)	21.8%	41% Yes 57% No 2% Unsure
9	Summer 2000	618	64.8%	0%	0%	64.8% (60.8% to 68.5%)	35.2%	Included in total given aspirin
10	01/01/00 to 31/08/00	11 905	24.6%	Not stated	Not stated	24.6% (23.8% to 25.4%)	Not stated	Not stated

* GP or self.

available to us. The data that had been recorded differed considerably from service to service. Relevant comparable data were extracted where possible from each services response.

The survey was completed in December 2000.

Results

Table 1 shows the results of the audits conducted by each ambulance service. Several organisations supplied figures from more than one study, but only the data from the most recent audit are given.

The proportion of patients receiving pre-hospital aspirin from a paramedic or alternative health provider ranged from 19% to 78%. It is estimated that 15% to 74% of patients who should have been given aspirin before hospital admission did not receive it.

Table 2 shows the range of indications and contraindications to aspirin administration for each ambulance service.

Discussion

It is widely accepted that aspirin is of value after MI. However, it is of even greater efficacy in the treatment of unstable angina. Platelet aggregation and embolisation are the important factors in this condition.[10] Evidence suggests that the reduction in relative risk for subsequent non-fatal MI or death after aspirin administration is greater for unstable angina than it is for MI (51%,[11 12] compared with 25%[2]).

While the proportion of patients eligible for aspirin in hospital who receive the drug is high, there remains room for further improvement. The gap between the need for aspirin and the proportion of patients who actually receive it could, therefore, be reduced via pre-hospital administration by paramedics. A 1992 to 1993 inhospital study of aspirin administration to 10 108 patients with MI and aged 65 or over found treatment rates of only 61% in the first two days. However, it also determined that aspirin administration was significantly associated with a lower mortality (odds ratio 0.78; 95% confidence intervals 0.70 to 0.89).[13] Other authors have reported inhospital aspirin administration rates ranging from 45.1% (4052 elderly Medicare patients, USA, 1992/1993)[14] to 87.8% to 91.3% (1737 patients,

Table 2 A comparison of indications and contraindications by ambulance service

Service	*Indications*	*Contraindications*
1	Signs and symptoms consistent with acute myocardial infarction (AMI) or angina Medical history of MI and the ECG indicates the possibility of the same	Peptic ulcer, allergy to aspirin Taken aspirin within last 24 hours
2	Adult patients who are suspected of having an MI, who do not fall into risk groups listed in CI Clinical signs and symptoms of MI	Receiving treatment for duodenal or peptic ulcer Known allergy to aspirin
3	One or more of the following had to be present: Cardiac related pain as the chief complaint Indication on the PRF that the patient was suffering cardiac related chest pain Patients presenting with signs and symptoms of ischaemic chest pain	Known allergy to aspirin Patients with gastrointestinal bleeds Pregnancy Haemophillia and other bleeding related disorders Patients on anticoagulants Unconscious patients
4	Chest pain believed to be ischaemic cardiac pain	Anticoagulant therapy Known sensitivity to aspirin Current histroy of gastritis or peptic ulceration Bleeding disorders Pregnancy Aspirin given/taken within previous 2 hours Refusal by patient
5	Patients suffering from suspected AMI	Not stated
6	Not stated—no guidance provided by Ambulance Service	Not stated
7	Not stated—no guidance provided by Ambulance Service	Not stated
8	Patients suffering definite/possible MI	Not stated
9	PRF forms stating patient suffering from "chest pain" of probable cardiac origin Patients with actual or potential MI	Not stated
10	Patients with suspected cardiac chest pain	Patient taking maintenance doses of aspirin History of ulcers Allergy to aspirin Patient has asthma

USA, 1997).[15] European authors have reported similar aspirin administration rates after MI.[16] But administration rates of aspirin after episodes of unstable angina are much lower. A review of practice against guidelines in nine European countries reported antiplatelet administration rates of only 70.2%.[17] While inhospital compliance rates are high after MI, pre-hospital administration of aspirin by paramedics does, therefore, have the potential to help reduce the number of eligible patients who do not receive it and who forgo its benefits. It is not possible to definitively diagnose MI in the pre-hospital arena according to standard criteria, and consequently administration of aspirin to all patients with chest pain suggestive of ischaemic heart disease seems to be a reasonable recommendation.

The data we present come from ambulance services that had conducted an audit of aspirin administration to patients with chest pain suspected to be associated with ischaemic heart disease. The proportion of patients who received aspirin from any source varied from 19% to 78%. These figures are disappointing, but the reasons for these low levels of compliance to protocol are unclear. The proportion of subjects with chest pain for whom aspirin is contraindicated is likely to be around 5%–7%.[18] Typically, therefore, 93% of patients with chest pain arising from suspected ischaemic heart disease might safely be given aspirin. This implies that, in the samples reported in this study, from 15% to 74% of suspected ischaemic chest pain patients who were potentially eligible for aspirin did not receive it.

The protocols followed by each ambulance services differed, but the description of patients to whom aspirin is to be given is typically "a patient presenting with signs and symptoms of ischaemic chest pain". One service gives a more detailed list of signs and symptoms and required evidence of infarction from an ECG before aspirin was given. This is of some concern, as it has been shown that early in the infarction process diagnostic ECG changes may not be present initially, but might develop later.[19] Perhaps even more importantly, aspirin is also of benefit (and is recommended) for patients suffering from a range of acute coronary syndromes, not just those with confirmed MI.[20]

The protocols from each ambulance service all listed criteria that defined patients to whom aspirin should not be given, but these differed greatly. Allergy to aspirin, current use of anticoagulants, haemophilia and other bleeding disorders were present in all the protocols. But in two protocols the taking of aspirin within the previous 24 hours constituted a contraindication. The wisdom of this criterion can be questioned as, even if a prophylactic dose of aspirin had been taken earlier, fresh platelets may have entered the circulation since this time and it is important to reduce the proportion of un-acetylated platelets and maintain these at the lowest possible level. A further dose of 300 mg of aspirin may therefore be beneficial and is unlikely to do harm; it should not be withheld. It seems reasonable to argue that contraindications should be kept to an absolute minimum in a situation where a relatively safe drug could be life saving.

The variability identified between the various services indicates the need for an UK standard protocol based on the available evidence from trials. In formulating this it should be borne in mind that a rigid approach, restricting aspirin only to those patients with definitive evidence of acute MI may deprive many others of the benefits of aspirin treatment. Patients who report having had chest pain but who are later judged not to have had an infarct do, in fact, have an increased mortality.[21] Undoubtedly some of these will indeed not have had an infarct, but even in those in whom the pain is muscular aspirin may have a useful role. In a small proportion the chest pain may arise from a stomach lesion, and there is a risk that the questions which paramedics ask may not reveal this. Nevertheless, while aspirin would be best withheld in such patients, it could be argued on the basis of relative risks that where the diagnosis is uncertain, aspirin should be given.

Further UK wide standardised audits of aspirin administration should be conducted, as poor compliance to this aspect of paramedic treatment protocols may indicate poor compliance to other aspects of the treatment of chest pain. While early administration of aspirin is important there is no strong evidence to suggest that its effectiveness is increased by giving it at the earliest possible time. Other forms of treatment may be considerably more time sensitive (such as the administration of fibrinolytics). The Royal College of Physicians (RCP) has developed a core dataset for documenting the treatment of MI, and has collaborated with the Joint Royal Colleges Ambulance Liaison Committee and the Ambulance Service Association in defining its ambulance related aspects. The RCP is also conducting a national audit of MI (MINAP). Ambulance services must audit and report every administration of a thrombolytic by a paramedic, and may be required to audit other treatments in the future. These initiatives may well meet the need for ongoing audit.

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Contribution

Peter Elwood conceived the study, and helped write and edit the paper. Anna Smith collected and analysed the data, and helped write and edit the paper. Malcolm Woollard developed the study methodology and wrote and edited the paper.

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