



Issues for treatment of acute time-critical conditions in rural areas

This fact sheet highlights the problems in providing time-critical treatment in rural areas, particularly for AMI (acute myocardial infarction), stroke and head injuries.

Recent key developments include lay people being trained as voluntary First Responders which have helped save lives by undertaking defibrillation, and pre-hospital thrombolysis helping to increase the one hour deadline for such treatment. However, more research is required in all areas of time limited treatment in rural areas, especially in cases of serious trauma and illness.

Medical and surgical (including obstetric) emergencies are all time constrained in the sense that speed of treatment will improve patient outcome. Whilst speed of treatment is important for all medical emergencies there are a number of conditions for which a designated therapy must be given within a certain time frame in order to optimise patient outcome. Outside this window of opportunity there is no benefit to be gained through the therapy, and whilst the patient may not die, the patient outcome will be worse. Acute myocardial infarction, stroke and some head injuries are examples of such conditions.

Emergency response times

In England the standard response time set for Category A (Immediately Life Threatening) 999 calls is within 8 minutes for 75% of all occasions. In 2006-2007 all ambulance services responded to Category A calls within 8 minutes in over 70% of cases (eight out of thirteen ambulance services did so in 75% or more calls)¹. However, this varies within ambulance service areas and research shows that in the rural parts of their area ambulance trusts consistently find it difficult to meet the 75% target.

Treatment of time critical conditions in rural areas

Acute Myocardial infarction

The National Service Framework (NSF) for coronary heart disease lays down standards of treatment for acute myocardial infarction (AMI). Standard 5 requires that a defibrillator, and somebody to use it, should be available within 8 minutes of a patient calling for help. Standard 6 requires that thrombolysis should be given within 60 minutes (within hospital) and opiate given prior to hospital treatment^{2,3}. These time limits are important because thrombolysis will greatly limit cardio-necrosis and for every hour thrombolysis is delayed, mortality is increased by 20%⁴. If thrombolysis is received within 15-30 minutes of symptom onset it is possible to prevent any permanent damage⁵.

Myocardial Infarction National Audit Project (MINAP)¹⁷ showed that in 2006/7, 2,942 patients received pre-hospital thrombolytic treatment compared with 2,231 patients in 2005/6, an increase of 32%. 91% of patients in England and 90% of patients in Wales who received prehospital thrombolytic treatment received this within 60 minutes of calling for help. This was largely through Ambulance Services.



For AMI in rural areas, studies have shown that in 72% of cases the GP is the first to arrive but many do not have defibrillators. In one area only 9% of GPs carried a defibrillator with them and only 13% had access to a one in their surgery⁶. In another area 54% had access to a defibrillator in a surgery⁷. In most cases, therefore, there is a significant delay because defibrillation only takes place when the ambulance arrives.

Where a patient needs to travel to hospital, travel times are crucial. One study, for example, found a strong correlation between distance travelled and survival to admission, with the distance of 12 miles being the cut off point for survival⁸.

There is good evidence that the treatment of choice now is primary angioplasty which an increasing number of hospitals now provide as an emergency treatment for heart attack. In England, 35 hospitals have a primary angioplasty service and 21 of these also provide a service for 41 other hospitals. The numbers having primary angioplasty have doubled in the past 12 months. This is a particularly important issue for remote and rural residents as it is not possible to offer a pre-hospital angioplasty service – patients must be in a hospital that provides the service.

Head injuries (critical care)

For severe head injuries the recommendation is that following trauma, treatment (including an MRI scan followed by life saving decompressive surgery) is needed within four hours. Without this a significantly poorer outcome is more likely⁹.

However, a study based in East Anglia, found that it was rare to reach a neurological unit and receive surgery within 4 hours in a rural area. This was mainly due to time spent in the referring hospital before contact has been made with the neurological surgeon⁹.

A further study in Scotland found that pre-hospital time for trauma was longer for rural patients¹⁰.

Solutions to address treatment of acute time critical conditions in rural areas

In remote rural areas, since it is not always possible to meet the time limits to give treatment in hospitals for critical conditions, initiatives have focussed on providing treatment for the patient prior to reaching hospital.

Such initiatives include BASICS trained health professionals BASICS – The British Association for Immediate Care – is a registered charity which co-ordinates BASICS members who provide support of the ambulance service, for example attending road traffic incidents and providing major incident support; trained lay people through First Responder schemes (trained by the ambulance service), paramedics and specialist hospital staff coming out to patients.



Defibrillation

To achieve the NSF standard that defibrillation takes place within 8 minutes, lay people have been trained and deployed to defibrillate people. One study showed that where lay people defibrillated 3-5 minutes after collapse 22.7% patients were discharged alive from hospital. This project was located where AMIs took place most frequently including, airports, train stations and other busy public places¹¹. In rural areas busy public spaces are rare, so such schemes may be more difficult to set up. An alternative is for First Responders who live in rural areas, to be trained appropriately and then called out when a 999 call is made. Living locally, they are often able to reach the patient before the ambulance arrives, and can carry out basic emergency care including defibrillation. In one area research shows that First Responders have attended over 620 people since April 2004, and average arrival time has been 6 minutes¹². GPs are also able to carry out defibrillation in rural areas, and they are likely to have experience in advanced life support. However, little research has been carried out to evaluate their role, and as already shown many often arrive without a defibrillator^{7,8}.

Thrombolysis

Thrombolysis needs to be undertaken within one hour of symptom onset for optimum recovery³. In rural areas the ideal situation is for thrombolysis to be carried out prior to hospital admission and it has been shown that 'pre-hospital' thrombolysis in rural areas has a potential to save lives¹³. In Scotland the median time saved has been 130 minutes, resulting in a halving of mortality at one year¹³. However, this relies on accurate diagnosis of AMI. One study showed GPs who independently gave thrombolysis misdiagnosed at a rate of 22%¹³. In order to obtain more accurate diagnoses paramedics have used electro-cardiograms and linked with cardiologists at the main hospital^{14,5}. This has involved the use of rigorous protocols, checklists and telemedicine and although this may create a delay in treatment, accuracy of diagnosis has improved¹⁴. An ideal scenario is a 'dual response' where paramedics and GPs work together with patients who have an AMI. This has resulted in more GPs willing to give thrombolytic treatment, improved diagnosis and this 'team response' has helped with practical difficulties when patients need various interventions¹⁴.

Critical care

When critical care is required because of serious illness or injury in remote rural locations this can be very challenging. Paramedics can be trained to give advanced airway management, invasive procedures and critical care intervention, however such specialist skills, rarely used, can create problems. In certain areas of Scotland therefore, attempts are made to bring the specialists to the patient^{15,16}. This service helps to bring integrated care to remote areas¹⁶. When road travel times are in excess of one hour then air transport is used¹⁵. Evaluation is scanty but all patients undergoing such care were stabilised and a high proportion survived^{15,16}.



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