

RECOMMENDATIONS FOR ENSURING EARLY THROMBOLYTIC THERAPY FOR ACUTE MYOCARDIAL INFARCTION

The Heart and Stroke Foundation of Canada, the Canadian Cardiovascular Society
and the Canadian Association of Emergency Physicians, for the Emergency Cardiac Care Coalition

Abstract • Résumé

Objective: To recommend practical steps to ensure early thrombolytic therapy and thereby reduce mortality and morbidity associated with acute myocardial infarction (AMI).

Options: Various factors were considered that influence time to thrombolysis related to patients, independent practitioners and health care systems.

Outcomes: Reduction in morbidity and mortality associated with AMI.

Evidence: Early initiation of thrombolytic therapy reduces morbidity and mortality associated with AMI. The ECC Coalition analysed the factors that might impede early implementation of thrombolytic therapy.

Values: Published data were reviewed, and recommendations were based on consensus opinion of the Emergency Cardiac Care (ECC) Coalition. The ECC Coalition comprises 20 professional, nongovernment and government organizations and has a mandate to improve emergency cardiac care services through collaboration.

Benefits, harms and costs: Early thrombolytic therapy reduces morbidity and mortality associated with AMI. Implementation of the recommendations will result in reduced time to thrombolytic therapy, streamlining of current practices and enhanced cooperation among health care professionals to expedite care. Depending on existing practices, implementation may require protocol development, and public and professional education. Although costs are associated with educating the public and health care professionals, they are outweighed by the financial and social benefits of reduced morbidity and mortality.

Recommendations: Early recognition of AMI symptoms by the public and health care professionals, early access to the emergency medical services system and early action by emergency care providers in administering thrombolytic therapy (within 30 minutes after the patient's arrival at the emergency department).

Validation: No similar consensus statements or practice guidelines for thrombolytic therapy in Canada are available for comparison.

Sponsors: The development of these recommendations was funded by the Heart and Stroke Foundation of Canada. The recommendations are endorsed by the Heart and Stroke Foundation of Canada, the Canadian Cardiovascular Society, the Canadian Association of Emergency Physicians and the representatives of the member organizations of the ECC Coalition.

Objectif : Recommander des étapes pratiques à suivre pour assurer une thérapie thrombolytique rapide et réduire ainsi la mortalité et la morbidité liées à l'infarctus aigu du myocarde (IAM).

Options : On a considéré divers facteurs qui agissent sur le temps d'administration de la thrombolyse en fonction des patients, des praticiens indépendants et des systèmes de soins de santé.

The Emergency Cardiac Care (ECC) Coalition comprises the Canadian Association of Critical Care Nurses, the Canadian Association of Emergency Physicians, the Canadian Association of Fire Chiefs, the Canadian Cardiovascular Society, the Canadian Council of Cardiovascular Nurses, the Canadian Medical Association, the Canadian Nurses Association, the Canadian Red Cross Society, the Canadian Ski Patrol System, the Canadian Society of Ambulance Personnel, the Canadian Society of Respiratory Therapists, the College of Family Physicians of Canada, Health Canada, the Heart and Stroke Foundation of Canada, the Régie régionale de la Santé et Services sociaux de l'Estrie, the Ottawa-Carleton Public Health Unit, the Royal Canadian Mounted Police Training and Development Branch, St. John Ambulance, the ACT Foundation of Canada and Urgences Santé.

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Résultats : Réduction de la morbidité et de la mortalité liées à l'IAM.

Preuves : La mise en oeuvre rapide de la thérapie thrombolytique réduit la morbidité et la mortalité associées à l'IAM. La Coalition des soins cardiaques d'urgence a analysé les facteurs qui pourraient nuire à la mise en oeuvre rapide d'une thérapie thrombolytique.

Valeurs : Les données publiées ont été examinées et les recommandations ont été fondées sur l'avis consensuel de la Coalition des soins cardiaques d'urgence. La Coalition, qui regroupe 20 organisations professionnelles, non gouvernementales et gouvernementales, a le mandat d'améliorer les services de soins cardiaques d'urgence par la collaboration.

Avantages, préjudices et coûts : Une thérapie thrombolytique rapide réduit la morbidité et la mortalité liées à l'IAM. La mise en oeuvre des recommandations entraînera une réduction du délai de mise en oeuvre de la thérapie thrombolytique, la rationalisation des pratiques actuelles et une amélioration de la collaboration entre les professionnels de la santé pour accélérer les soins. Selon les pratiques existantes, la mise en oeuvre peut obliger à mettre au point des protocoles et à organiser des activités d'éducation de la population et des professionnels. Même si l'éducation de la population et des professionnels de la santé entraîne des coûts, ceux-ci sont compensés par les avantages financiers et sociaux d'une réduction de la morbidité et de la mortalité.

Recommandations : Reconnaissance rapide des symptômes d'IAM par la population et les professionnels de la santé, accès rapide au système des services médicaux d'urgence et intervention rapide des fournisseurs de soins d'urgence pour administrer la thérapie thrombolytique (dans les 30 minutes après l'arrivée du patient au service d'urgence).

Validation : Il n'existe pas d'énoncé consensuel ou de guide de pratique semblables sur la thérapie thrombolytique au Canada qui pourraient servir à des fins de comparaison.

Commanditaires : L'élaboration de ces recommandations a été financée par la Fondation des maladies du coeur du Canada. Les recommandations ont été appuyées par la Fondation des maladies du coeur du Canada, la Société canadienne de cardiologie, l'Association canadienne des médecins d'urgence et les représentants des organisations membres de la Coalition des soins cardiaques d'urgence.

Large randomized controlled trials have clearly shown that morbidity and mortality associated with acute myocardial infarction (AMI) can be reduced by the early initiation of thrombolytic therapy.¹⁻⁴ In one study the rate of death 21 days after AMI was reduced by 47% when thrombolytic therapy was started within 1 hour after the onset of pain.⁵ In another trial the infarct size was reduced by more than 50% when thrombolytic therapy was begun within 70 minutes after the onset of pain.⁶ Other studies have also shown that the sooner the treatment is initiated, the greater the benefit.⁷⁻⁹

The Emergency Cardiac Care Coalition (ECC Coalition), comprising representatives from 20 professional, nongovernment and government organizations, believes that thrombolytic therapy can, and should, be administered to a patient with AMI within 30 minutes of arrival at hospital.¹ In 1993 the ECC Coalition recognized that, in Canada, thrombolytic therapy was not reliably provided at the earliest possible moment. In the face of increasing evidence that earlier treatment improves the outcome of patients with AMI, the ECC Coalition met to identify steps to eliminate or minimize delay at every stage between the onset of symptoms and treatment. The recommendations in this statement reflect the shared professional opinion of all of the ECC Coalition member groups.

RECOMMENDATIONS

The ECC Coalition strongly supports coordinated ef-

forts to minimize the time to thrombolytic therapy for AMI by eliminating unnecessary delays. All hospitals and communities should critically examine their current programs and practices in light of the following recommendations.

AWARENESS: EARLY ACCESS TO MEDICAL CARE

It is vital that anyone who experiences symptoms of AMI or cardiac arrest be assisted as quickly as possible. For this to occur, a cardiac emergency must be recognized and the emergency medical services (EMS) system activated. Delay may involve lack of recognition of the symptoms by the affected person or a bystander.^{10,11} Further delay may be encountered if a universal access number (911) or a tiered response by the EMS system is not available in the area.^{12,13}

Therefore, the ECC Coalition recommends the following:

- Programs should be instituted in every community to educate the public on the symptoms of AMI and the actions to take in the event of AMI.^{9-11,14} One such program is the Heart and Stroke Foundation of Ontario's Heart Steps (Appendix 1).
- Professional organizations should take an active role in ensuring that their members are aware of the importance of reducing the time to thrombolytic therapy by eliminating unnecessary delays.
- Family physicians and other health care providers should play a key role in educating their patients

on the symptoms of AMI and the actions to take.¹³

- Family physicians and other health care providers should ensure that the families of patients at high risk for AMI know the symptoms of AMI and the actions to take.

EMERGENCY MEDICAL SERVICES AND PREHOSPITAL CARE

EMS systems play a key role in prehospital care and the transportation of AMI patients. Rapid administration of state-of-the-art treatment by EMS personnel is essential for improving chances of survival.¹

The ECC Coalition recommends the following:

- Ambulance personnel, first responders, and nurses or rural physicians who arrange transport for patients should alert the receiving hospital of any patient who may be suffering AMI.^{1,9}
- EMS personnel should establish a protocol for identifying people who may be experiencing AMI,^{1,15} determining the suitability for thrombolytic therapy⁶ (Appendices 2 and 3) and communicating this information to the receiving facility.
- Ambulance services should consider the use of field electrocardiograms to help identify people who may be suffering AMI.^{1,12,15-18}
- EMS systems with advanced life support capability should monitor closely the developing body of evidence on prehospital thrombolytic therapy. EMS systems in communities where transportation time may be prolonged should assess their need and ability to provide prehospital thrombolytic therapy in light of the current evidence^{8,16,18} and the overall provision of care.

HOSPITAL CARE

A goal of emergency departments should be to administer thrombolytic therapy to all eligible patients within 30 minutes after their arrival at the emergency department.¹ Identification of the causes of delays in assessment and treatment in the emergency department and implementation of steps to minimize those delays will improve patient outcome.

The ECC Coalition recommends the following:

- All emergency departments should be ready and able to provide thrombolytic therapy.^{9,16,19}
- Thrombolytic drugs should be readily available on a 24-hour basis.
- The hospital should work with local EMS services to identify AMI patients before they arrive at the emergency department.¹
- The emergency department should develop a plan

to minimize the delay in delivering thrombolytic therapy.^{9,20}

- The nurse(s) and physician(s) and other members of the health care team who provide care in the coronary/critical care unit or the emergency department should cooperate to develop a plan for the diagnosis, treatment and delivery of care to patients with suspected AMI (Appendix 3).^{1,9,19} The plan should (a) be appropriate to the hospital and take into account all of the hospital's resources, (b) be specific and delineate the responsibilities of team members during the first hours of care, (c) specify the equipment and supplies needed and their location, the tests required and other details relevant to the provision of care, and (d) ensure that thrombolytic therapy is initiated within 30 minutes after the patient's arrival at the emergency department.¹³
- An ongoing evaluation and audit protocol should be implemented and reviewed regularly to ensure that objectives are met.¹⁶

CONCLUSION

There is substantial evidence that early initiation of thrombolytic therapy can greatly reduce morbidity and mortality associated with AMI.^{1-9,19} By addressing every area in which delays may occur, the ECC Coalition recommends ways in which early initiation of thrombolytic therapy can be achieved.

Implementation of these recommendations will require change of practices, development of EMS and hospital protocols, and education of health care professionals and the public for the early recognition of AMI symptoms, early access to the EMS system and early action by emergency care providers. The costs of implementing these recommendations depend on existing practices and protocols and the level of public awareness in the community.

VALIDATION

These recommendations have been endorsed by all of the member groups of the ECC Coalition. It is the coalition's belief that no other set of comprehensive recommendations on early thrombolytic therapy has been developed for use in Canada. For this reason an exacting comparative analysis against similar guidelines was not undertaken.

The development of the statement was funded by the Heart and Stroke Foundation of Canada. These recommendations are endorsed by the Heart and Stroke Foundation of Canada, the Canadian Cardiovascular Society, the Canadian Association of Emergency Physicians and the representatives of the member organizations of the Emergency Cardiac Care Coalition.

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Appendix 1: Description of Heart Steps

What is it?

Heart Steps is a community-based education program of the Heart and Stroke Foundation of Ontario. The goal of Heart Steps is to eliminate or minimize delays in accessing proven therapies of early advanced care in order to reduce morbidity and mortality associated with acute myocardial infarction (AMI). The Heart Steps' three key communications messages are:

- **Act immediately:** Learn the symptoms of a heart attack and the appropriate actions to take.
- **Join the rescuers:** Heart-attack victims tend to deny symptoms, so take charge!
- **Tell someone:** If you are experiencing chest discomfort, tell someone or call for help!

Where is it delivered?

In communities of all sizes and locations across Canada.

When is it delivered?

It is up to each community to decide. Some have promoted Heart Steps in November, January and February, tying it into CPR and Heart month. Each community must decide what will work for them and what resources are available. The Heart Steps program lasts about 8 weeks and can be modified to fit a community's needs.

Who is involved?

Being a community-based program, Heart Steps requires collaboration between existing organizations and people in the community who have a common interest in emergency cardiac care. These include emergency medical services, CPR training organizations, medical and paramedical professionals, allied health professionals (i.e., pharmacists, dentists) and heart-attack survivors.

Appendix 2: Sample of the Prehospital Thrombolytic Checklist to be used by ambulance attendants during transportation of a person suffering AMI to hospital

Patient history	Response	
Surgery within 4 weeks	Yes	No
Stroke or transient ischemic attack within 6 months	Yes	No
Major trauma within 4 weeks	Yes	No
Bleeding ulcer or gastrointestinal bleed	Yes	No
Intracranial tumour, bleed, arteriovenous malformation or aneurysm	Yes	No
Bleeding disorder	Yes	No
Liver disease	Yes	No
Kidney disease	Yes	No
Diabetes-related eye disease	Yes	No
Surgery involving central nervous system within 6 months	Yes	No
Childbirth within 6 weeks	Yes	No
Streptokinase therapy within 6 months	Yes	No
Alert the receiving hospital that the patient is "checklist negative" or advise the hospital if there are any positive answers.		

Appendix 3: Sample of the thrombolysis protocol development template to be used by hospital services (usually emergency) in developing a thrombolytic therapy protocol for AMI patients on arrival at hospital

Who will determine whether the patient is experiencing myocardial ischemia?

What will the criteria be for determining whether the patient is experiencing myocardial ischemia?

How will the patient be transported to a stretcher?

Which stretcher or emergency-department area will the patient be transported to?

What basic assessment or intervention will be provided within the first 10 minutes after the patient's arrival in the emergency department? (e.g., Heart monitor, recording of vital signs, oxygen therapy, insertion of intravenous line, blood tests, electrocardiography, administration of nitroglycerine, notification of emergency physician on duty or physician on-call for emergencies)

What basic intervention or assessment will be provided within the second 10 minutes after the patient's arrival? (e.g., Assessment by emergency physician on duty or physician on-call for emergencies, determination of indications or contraindications for thrombolytic therapy, further treatment of chest pain)

What further intervention or assessment will be provided within the third 10 minutes? (e.g., Infusion of thrombolytic agent if indicated, arrangement of transfer of patient to coronary care unit or other appropriate facility)

Which basic blood tests will be needed and should blood samples be sent for testing before the physician has completed an assessment?

What will the hospital or regional criteria be for indications and contraindications for thrombolytic therapy?

Which thrombolytic agents will be available?

If more than one thrombolytic agent will be available, what will the criteria be for deciding which agent to use?

Where will the thrombolytic agents be stored?

How will the thrombolytic agents be mixed?

How will the thrombolytic agents be administered?

What will the standard adjuvant therapy be (acetylsalicylic acid, heparin, β -blocker, nitroglycerine)?

Where will the thrombolytic therapy be administered? (e.g., In the emergency department before transfer of the patient; in the emergency department, with transfer of the patient after the infusion has been started; or after transfer of the patient [only if transfer can be performed and thrombolytic infusion started within 5 minutes after transfer])

What will be the minimum nursing staff requirements be for appropriate observation of the patient during administration of thrombolytic therapy?

What will the procedure be for obtaining cardiology consultation (if required)?