Collaborative Heart Attack Management Program (CHAMP): an introduction of prehospital thrombolytics for STEMI management in British Columbia

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Aim

Implement a prehospital thrombolysis (PHT) program to improve first medical contact (FMC) to needle time in ST elevation myocardial infarction (STEMI) patients presenting to our hospital. Our goal is to meet a FMC to needle time of <30 minutes in 80% of our trial patients.

Background

STEMI

Outcomes are directly related to total ischemic time with the greatest benefit when treatment occurs within 2 hours of symptom onset.

Revascularization Strategy

Primary percutaneous coronary intervention (PPCI) is the preferred strategy if transport time to a PCI capable centre is less than 60 minutes.

This is unattainable in Kamloops, B.C.

Figure 1: The red circles in the map approximate a 60-minute driving time from each of the 5 PCI Centers in B.C. Kamloops is shown for reference. Vancouver includes Vancouver General Hospital, St. Paul's Hospital and Royal Columbian Hospital

Prehospital Thrombolysis

- Delivered in the field by advanced care paramedics (ACPs) with Cardiology support.
- PHT with early angiography has equivalent outcomes to PPCI.
- Treatment within 2 hours results in smaller infarct size and reduced morbidity and mortality
- Success is related to reduced ischemic times

Design

This project is a collaboration between BC Emergency Health Services (BCEHS) and Royal Inland Hospital (RIH) Cardiologists. A comprehensive protocol and curriculum have been developed and administered to ACPs who will be involved in providing STEMI care. ACPs will identify eligible patients in the field and transmit the electrocardiogram (ECG) to the on-call Cardiologist. The case, including a detailed history, physical exam, and indications and contraindications for thrombolysis will be reviewed with the Cardiologist.

This is a proof of concept pilot trial which will prospectively enroll a total of 10 patients in the intervention (PHT) arm. The comparison arms consists of 20 STEMI patients who were treated with in-hospital thrombolytics (IHT) between December of 2017 to October of 2018. Our primary outcomes include FMC to needle time and symptom onset to needle time.

Preliminary Outcomes

Table 1. Baseline characteristics of patients receiving IHT versus CHAMP patients receiving PHT.

Premorbid data	In-hospital thrombolysis (baseline n=20)	Prehospital thrombolysis (n=5)
Average age	70.4	70.8
Sex (male)	17 (85%)	4 (80%)
Diabetes Mellitus	7 (35%)	1 (20%)
Hypertension	8 (40%)	3 (60%)
Dyslipidemia	5 (25%)	3 (60%)
Chronic Kidney Disease	3 (15%)	1 (20%)
Smoker (current or past)	16 (80%)	3 (60%)
Previous MI	3 (15%)	2 (40%)
Previous stent	1 (5%)	2 (40%)
Previous CABG	1 (5%)	1 (20%)

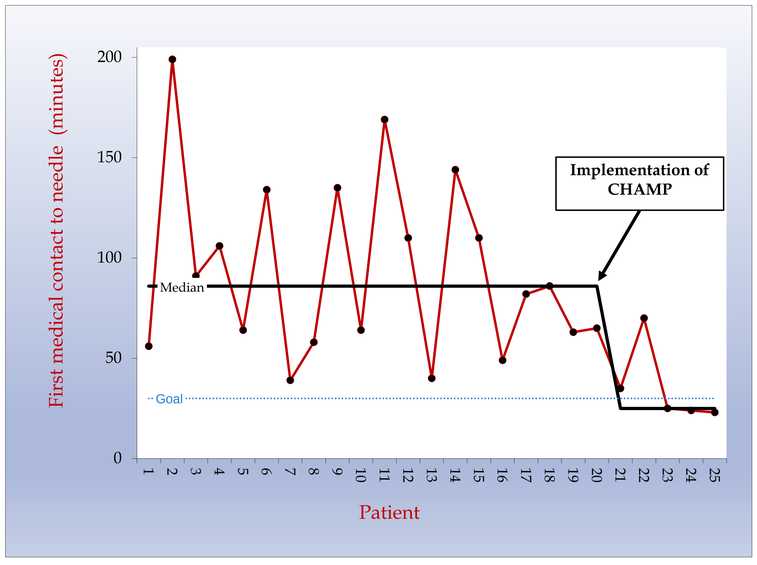

Figure 2: Run chart comparing FMC to needle time in baseline patients with in-hospital thrombolysis (patients 1-20) and trial patients with prehospital thrombolysis (patients 21-24).

Overall 57.8 min reduction in FMC to needle time
PHT 35.4 (23-70) min vs. IHT 93.2 (39-199) min
Overall 62.9 min reduction in symptom onset to treatment time
PHT 94.6 (35-146) min vs. IHT 177.5 (53-783) min

60% of our trial patients met target treatment time of <30 minutes (3/5)

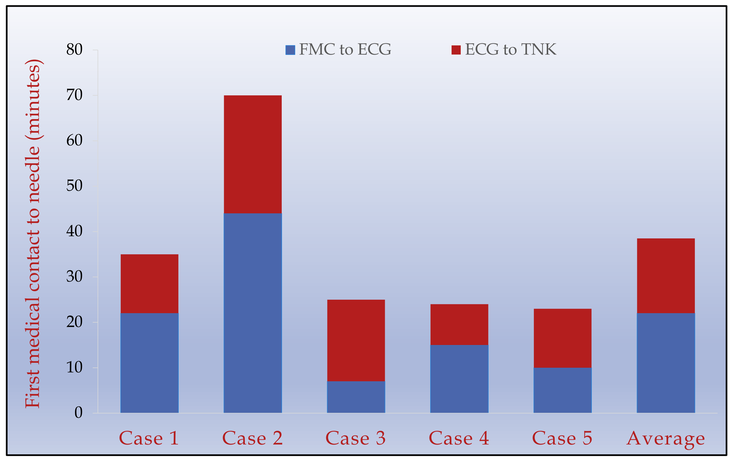

Figure 3: Breakdown of time spent between FMC to ECG (black), ECG to TNK (red) and FMC to TNK (total bar) for each case of prehospital thrombolysis.

Lessons Learned

Communication

- Implemented a protocol for cases where paramedics are out of range.
- Streamlined the process to contact the on-call cardiologist.

Preventing Errors:

- Provided practice kits
- Trained ACPs on administration of STEMI medications
- Created a checklist-based protocol
- Color coded medication labels
- Created sealed tamper proof kits

Resource Optimization:

- Dispatch to prioritize ACPs to STEMI calls

"I don't think I would have made it without this treatment."

Future Directions

Expansion into other non-PCI capable centers in BC

ENGAGE a local physician lead who provides on-site Cardiology support and can assist with BCEHS education
CREATE a comprehensive protocol for STEMI recognition and management by ACPs in the field
EDUCATE local paramedics and emergency personnel involved in STEMI care, providing ongoing support and continuing education
INVOLVE physician providers of STEMI care (Cardiologists, Internists, Emergency Physicians), BCEHS crew members, pharmacists, and allied health care workers in developing regionalized STEMI networks of care

Sustainability

Intermittent updates on project progress have been provided to the senior executive team (SET). The final data from this project will be presented to SET from interior health (IH) and BCEHS. A Memorandum of Understanding for the ongoing safe use of STEMI medications is being created between BCEHS and IH Pharmacy. We have engaged the community through the patient voices network (PVN). This project has also been presented as a priority QI initiative at the IH Cardiovascular leaders meeting.

"I owe it to the program as to why I'm [doing] so good."

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