

ERGONOMIC REDESIGN

Quality improvement for pre-hospital care of acute myocardial infarction

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Background

We developed clinical actions (indicators) for acute myocardial infarction (AMI) that should be delivered to every patient with that condition.¹ A care bundle refers to collective delivery of these actions.

The pre-hospital care bundle for patients with AMI² comprises administration of aspirin, glyceryl trinitrate (GTN), pain assessment (two pain scores) and analgesia (morphine and/or Entonox^{®3}).

There were consistent shortfalls in pain assessment and administration of analgesia for AMI which has negative physiological and psychological effects that are detrimental to patient outcomes.

Our aim

Our aim was to increase the delivery of the AMI care bundle over two years, from 43% to at least 70% by April 2012.

Method

As part of a national Quality Improvement Collaborative project, the Ambulance Service Cardiovascular Quality Initiative (ASCQI), frontline clinicians in East Midlands Ambulance Service were invited to improve pre-hospital care for patients with AMI between April 2010 and March 2012.

We convened workshops to explore barriers to effective pain management using quality improvement (QI) methods including process maps, cause-and-effect diagrams and interviews of staff. We undertook thematic analysis of audio recordings from QI workshops and semi-structured interviews.

Results

Suboptimal pain management in AMI was due to 'poorness of fit' between human, task and system factors. This led to accidental slips, lapses and mistakes, as well as routine (purposeful) and exceptional (unavoidable) violations. For example, pain assessment methods and tools did not work adequately; poor access to analgesia meant pain relief, if given, was often delayed; and gaps in critical-to-quality processes were not being measured nor feedback provided to staff.

Closing the Gap

Interventions to 'close the gap' included:

- Education and training in care processes
- Aide memoires and checklists to prompt care bundle delivery
- Modified pain assessment tools
- Analgesic equipment review
- Review of clinical records
- Timely audit and feedback (positive and negative) by clinical leaders

Interventions were piloted using plan-do-study-act (PDSA) cycles. Annotated Statistical Process Control (SPC) charts were used to evaluate the effects of changes made. Successful interventions were spread across the Trust when significant and stable improvements were realised. There was a significant improvement in delivery of the AMI care bundle from 43% to 70% within 18 months.

Strengths and limitations

Adopting a collaborative approach and using QI methods enabled us to gain a deep understanding of how the system of care could be ergonomically improved. These methods are now being applied to improve care for other clinical conditions such as asthma.

More time to nurture a culture for improvement and to foster ownership and support from senior/executive management teams would have been beneficial.

Conclusion

By adopting a collaborative approach and using QI methods, systems of pre-hospital care can be ergonomically redesigned to improve outcomes and reduce accidental, routine and exceptional violations.

Slips, lapses and mistakes

Intervention: education and training

We used to have protocols and everyone knew what they had to follow. Now you've got these big grey areas to work within.

Intervention: patient report form and improved mechanism of audit and feedback by clinical leaders

I think it's being delivered but it's not being documented.

Intervention: aide memoires and checklists to prompt care bundle delivery

You might ask once and then think actually no they need treatment. Then they've gone on to something else, they've forgotten about the pain score.

Routine violations

Intervention: education and training

There's an element of laziness, also there's an element if I don't give it (morphine) I can't get into trouble for it.

Intervention: improved mechanism of audit and feedback by clinical leaders

I avoided doing a pain score on him because I would have felt if he'd said 10/10 on paper I would have had to give him morphine.

Intervention: aide memoires and checklists to prompt care bundle delivery

If you say to them 'Why didn't you consider Entonox^{®?}', they say 'JRCALC guidelines doesn't say I have to'. Not a great defence but it is a defence.

Exceptional violations

Intervention: analgesic equipment review

Predominantly they don't always have the information that would lead them to take the correct equipment to scene.

Intervention: improved mechanism of audit and feedback by clinical leaders

The Patient report form audit as it is I don't think is fit for purpose.

Intervention: modified pain assessment tools

The fact that the JRCALC guidelines refers to 'moderate to severe', but we have historically used 0-10, so where do you put moderate from 0-10, where do you put severe on 0-10?