Time to intervene? Lessons from the NCEPOD cardiopulmonary resuscitation report 2012

Despite medical knowledge of poor outcomes from cardiopulmonary resuscitation, public perceptions and expectations are often skewed by what is depicted in the media. In-hospital cardiac arrest carries a poor prognosis with less than 20% of patients surviving to discharge from hospital (Roberts et al, 2000). This disparity between the public's perception of good outcomes and the harsh reality of poor prognosis often makes the 'do not attempt cardiopulmonary resuscitation' a difficult discussion between patients, their families and the health-care professionals caring for the patient.

A balance lies between the wishes of the patient to explore all possible treatments that potentially extend life, and treatments that may prolong patient suffering and be ultimately futile. A responsibility lies with clinicians to assess and plan ahead in scenarios where a patient may deteriorate to the point of requiring higher levels of treatment in a high dependency or intensive care unit. A judgement must then be made, ideally after exploring the patient's and relatives' own wishes, on whether this would be appropriate. In cases where high dependency or intensive care unit type care is inappropriate then a 'ceiling of treatment' should be set, including the documentation of resuscitation status. These decisions then need to be effectively communicated to the patient, relatives and medical team to prevent misconceptions, inappropriate cardiopulmonary resuscitation attempts and unnecessary escalations in treatment.

This year, the National Confidential Enquiry into Patient Outcomes and Death (NCEPOD) produced a report looking at various factors surrounding, leading up to, and in the management of in-hospital cardiac arrests (Findlay et al, 2012). The findings of this report have important and wide-ranging implications for all clinicians. This article summarizes the key findings of the report and how they will impact on hospital clinical practice, in particular junior doctors.

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National Confidential Enquiry into Patient Outcomes and Death: Time to Intervene?

National Confidential Enquiry into Patient Outcomes and Death reports, such as those focused upon acute kidney injury and deaths in acute hospitals, are independently commissioned reports produced by an expert panel to investigate particular areas of hospital care with the aim of improving clinical practice. A study was conducted of all patients over the age of 16 years who underwent cardiopulmonary resuscitation for an in-hospital cardiac arrest, over a 2-week period in November 2010, in all NHS and independent hospitals. The aim of this was to identify remedial factors in clinical care and before cardiac arrest as well as assessing the outcome and the quality of care before and after a cardiopulmonary resuscitation attempt.

The required clinical information was collated both prospectively and retrospectively and obtained by a number of means including resuscitation forms, clinical questionnaires and patient case notes. Organizational questionnaires were also used to collect data on available facilities and resources in the event of a cardiac arrest. Important patient exclusions were cardiac arrests that occurred in the intensive care unit as these tend to be managed within the unit without the resuscitation team and any patient that had an out of hospital cardiac arrest before admission.

To outline the key findings of 'Time to Intervene' this article is separated into the components of patient care from the period before cardiac arrest to post-resuscitation care. These components include the initial clinical assessment on admission to hospital, subsequent clinical assessments before cardiac arrest, determining resuscitation status, attempted cardiopulmonary resuscitation and clinical outcomes post-cardiopulmonary resuscitation. In addition it describes the patient population undergoing in-hospital cardiac arrests.

Before cardiac arrest

Initial clinical assessment: too slow, wrong person

Clinical information was available for 585 patients who had in-hospital cardiac arrests. One of the aims of this National Confidential Enquiry into Patient Outcomes and Death report was to identify remedial factors before cardiac arrest, particularly in the 48 hours before the event. These remedial factors are elements in the patient clinical care pathway that if altered may have had a positive impact on patient outcome.

In this area, initial assessment and recognition of a sick patient is key to determining patient outcome. In clinical practice this responsibility often lies with the most junior members of the medical team. The report identified that two thirds of all initial assessments were made by 'basic grade' doctors and that deficiencies in clinical assessment, either in the history taken and/or physical examination, were found in approximately half (48%). The resulting delay in delivering definitive treatment can ultimately affect patient outcome, which may contribute to the subsequent cardiac arrest. Inadequacies in the initial assessment also lead to a lack of awareness by all members of the medical team of unwell patients who would otherwise warrant early review and subsequent escalation to higher levels of care if required.

Consultant reviews of all new patients admitted to hospital may have an important role in the supervision of junior doctors, especially as National Confidential Enquiry into Patient Outcomes and Death data identified that 13% of patients had their diagnosis changed after consultant review. However, in 48% of cases, time to

first consultant review was more than 12 hours. This falls outside recommendations made by a recent Royal College of Physicians report that advocated an initial consultant assessment of all new patients within 12 hours of admission, in addition to a twice-daily review of medical inpatients on acute medical units (Lambourne et al, 2012).

Clinical assessment: 'signs not recognized'

The use of 'track and trigger' monitoring systems is now commonplace in the majority of hospitals but to be effective, they need to be linked to an appropriate response to an unwell patient, thus promoting early escalation of assessment and management. Other considerations include the appropriateness of the clinical area for managing the patient and whether the supervising clinical team has the necessary skills and experience.

Use of these systems was recommended in a previous National Confidential Enquiry into Patient Outcomes and Death (2005) report to ensure timely intervention by the medical emergency team for acutely unwell patients. More recently a Royal College of Physicians working group report introduced a national early warning system to standardize patient monitoring systems (Royal College of Physicians, 2012). Key to these systems are patient observations which are indicative of physiological instability. Notably, when assessors reviewed cardiac arrests in patients who had been in hospital for >24 hours, over 50% of patients had one or more indices of physiological instability lasting greater than 12 hours, resulting in a clinical assessment.

The issue arises that although clinical reviews do happen as a result of patient physiological instability, there is an apparent lack of escalation to more senior input with an increasing number of clinical reviews not correlating with an increase in frequency of reviews by a more senior clinician. When analysing these data further, National Confidential Enquiry into Patient Outcomes and Death advisors were of the opinion that in only approximately two thirds of cases were the warning signs recognized and less than 50% of the time were these acted on appropriately.

Potentially, input from a more senior clinician at an earlier stage may prevent a patient from clinically deteriorating to the point of cardiac arrest. According to National Confidential Enquiry into Patient Outcomes and Death advisors 38% of cardiac arrests were avoidable. These data suggest that despite widespread use of track and trigger systems to monitor patients who are clinically deteriorating there is an apparent lack of junior doctors calling for senior help as part of an effort to escalate management.

Resuscitation – cardiopulmonary resuscitation status and post cardiac arrest outcomes

Despite best efforts, patients can deteriorate to the point of requiring organ support and higher levels of care such as high dependency or intensive care. Provision of this is not appropriate for all patients and decisions on this are in part based on the patient's functional status and physiological reserve capacity before admission to hospital. This has to be taken in context with the patient's comorbidities and prognosis which impacts on the likelihood of recovery to be discharged from hospital and returning to a level of functionality similar to the pre-hospital status. The patient's own expressed wish for higher levels of care is another determining factor.

Should a patient deteriorate to the point of cardiac arrest, with these factors in mind, cardiopulmonary resuscitation may be considered futile and even if successful may only add to patient suffering with very little gain in prolonging quality of life. Additionally, patients who have successful cardiopulmonary resuscitation almost inevitably require admission to the high dependency or intensive care unit which in itself may not be in the patient's best interests and does not guarantee survival.

The Resuscitation Council (UK) (2010) recommends that patients should have a do not attempt cardiopulmonary resuscitation status if they do not wish cardiopulmonary resuscitation or if cardiopulmonary resuscitation would be a futile intervention that would not prolong life and may lead to unacceptable patient suffering. Ideally this should be discussed at the initial assessment, provided the clinician in question feels capable, or at the time of first consultant review.

The report reveals that only 10% of patients had a recorded resuscitation status at their initial assessment and cardiopulmonary resuscitation status had not been considered by a consultant in 87% of cases. Only 22% of patients had a documented cardiopulmonary resuscitation status at the time of cardiac arrest. The National Confidential Enquiry into Patient Outcomes and Death assessor's own opinion was that 85% of patients should have had a do not attempt cardiopulmonary resuscitation status; however, 89% (174/196) of these patients did not have a do not attempt cardiopulmonary resuscitation order and went on to have cardiopulmonary resuscitation inappropriately. The majority of these patients were elderly patients over the age of 75 years with multiple comorbidities and decreased functional capabilities, for who cardiopulmonary resuscitation was considered futile.

The poor prognosis for patients undergoing cardiopulmonary resuscitation for in-hospital cardiac arrests is further underlined by the outcomes. The majority of patients (85%) in the report had asystole or pulseless electrical activity arrests as their first recorded rhythm which is associated with higher mortality compared to ventricular tachycardia and fibrillation arrests (Roberts et al, 2000). Looking at all in-hospital cardiac arrests, 34% survived initial resuscitation but only 15% survived to discharge from hospital.

Of those patients that were discharged, two thirds were discharged to their home and the remainder to an institute or further care. Overall, 1 in 10 patients who have in-hospital cardiac arrests survive to be discharged to their home, the majority of these had ventricular tachycardia or ventricular fibrillation arrests which usually arise as a result of cardiac causes and carry a better survival prognosis, as oppose to asystole and pulseless electrical activity which usually originate from non-cardiac causes. This illustrates that although there is a reasonable initial survival from in-hospital cardiac arrests, many will eventually die in hospital or will be left with significant physical or cognitive deficits requiring significant care needs.

Discussion

Time to Intervene? has revealed that the documentation of cardiopulmonary resuscitation status is poor which is ultimately leading to a large number of inappropriate

cardiopulmonary resuscitation attempts in patients who have in-hospital cardiac arrests. Cardiopulmonary resuscitation status should ideally be determined at a patient's initial assessment on admission to hospital. However, time pressures are often cited as the main reason for this not being done through the course of the patient's inpatient admission.

Conclusions

Junior doctors, who see the majority of new admissions, should be aware of issues regarding assessment of cardiopulmonary resuscitation status and decisions on cardiopulmonary resuscitation status should be completed at the time of first consultant review, which should occur within 12 hours of admission. Junior doctors also have the responsibility of reviewing the majority of patients who demonstrate signs of physiological instability. In such circumstances, a low threshold must be adopted to ensure review by the nurse in charge, the hospital outreach team and a more senior clinician – especially in the face of continuing physiological instability. Additionally, more work is required to support junior doctors learning and understanding how to recognize and manage the acutely unwell patient. The presence of 24-hour intensive care unit outreach teams may significantly enhance patient care as well as providing support, teaching and training for ward staff.

Where appropriate some assessment of cardiopulmonary resuscitation status and ceiling of care should also be made in consultation with senior colleagues. Clear documentation of cardiopulmonary resuscitation status on standardized forms, communication of do not attempt cardiopulmonary resuscitation status to other medical team members and setting of ceilings of treatment may prevent unnecessary cardiopulmonary resuscitation attempts and admissions to high dependency or intensive care unit care, which may cause continuing patient suffering and may ultimately be futile. Although junior doctors are not expected to make decisions on resuscitation status, knowledge is required of the issues and ethics regarding the subject which is necessary for higher specialist training. **BJHM**

Conflict of interest: none.

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LEARNING POINTS

- In-hospital cardiac arrests carry a poor prognosis – 1 in 10 patients will survive to be discharged home.
- Approximately 40% of cardiac arrests are potentially avoidable. Preventing cardiac arrest is dependent on prompt recognition of markers of physiological instability and acting on these appropriately.
- A low threshold for seeking review by a senior clinician must be adopted by junior doctors in the face of continuing physiological instability as well as ensuring higher degrees of monitoring in the appropriate clinical area by the appropriately trained staff.
- Cardiopulmonary resuscitation status should be determined and documented on standardized forms at initial assessment before admission to hospital or at least at the time of first consultant review.
- Where appropriate, do not attempt cardiopulmonary resuscitation orders should be used to prevent unnecessary cardiopulmonary resuscitation attempts which may prolong patient suffering and may ultimately be futile.