

Association between outcome and modified early warning scores: relationship with age and medical discipline

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EDITOR:

Patients developing critical illness often show abnormalities in routinely measured physiological variables for many hours prior to a cardiac arrest, or referral to critical care. The early identification of these abnormalities should give an opportunity to intervene to influence patients' outcomes and this process forms the basis for early warning scoring systems [1]. In 2002, we introduced a modified early warning system (MEWS) into our 900-bedded University Teaching Hospital. We set a trigger score of 3 as that which required a medical review; we did not provide an early warning team [2] or outreach service. We asked the nursing staff to audit the system by logging a trigger score of 3 or more into the patients' electronic patient record (Sunrise Clinical Manager 3.03(2002); iSoft, Manchester, UK). Funding was given to provide one Charge Nurse to train staff between May 2003 and April 2004. We reviewed the outcome of patients who had trigger scores entered into the iSoft system between January 2002 and September 2005. The aim of our study was to explore whether increasing age, trigger score and presence of the patient on a medical or a surgical ward are useful in predicting the survival of the patient.

Data were extracted for all patients with a logged MEWS score of 3 or more from the iSoft patient record and exported into SPSS (SPSS for Windows 13.4 SPSS Corporation, Chicago, USA). Some patients appeared in the database on more than one occasion, due to different inpatient episodes. For the survival analysis, only the first reported early warning score for each patient was used. The total number of recorded scores per patient was also noted.

Survival or time of death for the first 90 days following the initial trigger score was then established. We then identified the ward where the patient had been when the first MEWS score was recorded and categorized the ward as medical or surgical. The age of the patient was also noted and subsequently categorized as 57 yr and under, 58–72 yr or over 73 yr to produce 3 equally sized groups for the purpose of the Kaplan–Meier curves

only. Kaplan–Meier survival curves for the different age groups, initial MEWS scores and presence of the patient on a medical or surgical ward were then constructed.

The three factors: MEWS score, age (as a continuous variable) and presence on a medical or surgical ward, and their interactions, were then simultaneously entered into a Cox regression model to look at the relationship between these factors and survival at 90 days. None of the interaction terms appeared significant and so these were removed from the model. Plots were then produced to check the proportional hazards assumption necessary for Cox regression, and no problems were identified. Finally, we categorized the MEWS scores by the month that they were recorded to see if the total number of scores recorded per month had decreased since the funding for nurse training had been withdrawn.

A total of 2596 patients were identified who had MEWS scores logged, their mean \pm SD age was 62 ± 18 yr (range 16–99), 49% were male and 51% were female. Of them, 1137 patients were nursed on surgical wards and 1459 nursed on medical wards; 644 (25%) of the patients died within 90 days of their first recorded MEWS score of 3 or more. For patients with a trigger score greater than 3, age was associated with an increase in the risk of death of 4% for each additional year of life (95% CI 3–5%). Being on a medical ward rather than a surgical ward is associated with an increase in risk of death of 81% (95% CI 53–114%). The risk of death also increased with increasing MEWS score, a score of 4 is associated with a 23% increase (95% CI 1–50%) in risk of death compared to a score of 3, and a score of over 6 being associated with a 183% increase in risk of death (95% CI 105–290%) compared to a score of 3. The number of MEWS scores recorded by month showed a decrease from 270 per month in May 2004 to 95 per month in December 2005 after the withdrawal of funded training for nursing staff from April 2004.

The patients with MEWS scores of 3 or more described in this observational study represent a convenience sample of patients where the nurses logged the trigger score in the electronic patient record. The decrease in scores recorded in the months following removal of educational funding clearly demonstrate that the patients with logged MEWS scores only represent a sample of the total

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patient population during the study period. The relationship between increasing MEWS score and mortality is, however, very clear and is consistent with our early observations [3] and with studies that have shown a relationship with MEWS scores and outcome where the scores have been noted by an outreach team who have been asked to review the patient by the ward staff [4,5]. Our present study has also shown that for patients with MEWS scores of 3 or more, increasing age and presence on a medical ward are independently associated with an increased risk of death. This should allow the production of better predictive models based on MEWS score, age and underlying diagnosis. We are unsure why presence on the medical ward rather than on the surgical ward is associated with a greater chance of death. A possible explanation is that many medical patients have disease processes that are less reversible than many diseases managed on surgical wards.

The reduction in MEWS scores recorded in our study after the removal of educational funding has not meant that the system is no longer used. Not logging a score makes no difference to the calculation of the score or obtaining a medical review. The reduction in scores does, however, suggest that the system is not 'robust', as recommended by NCEPOD [1], without continued investment in training. This training is important to ensure accurate collection and calculation of MEWS scores and to ensure an appropriate medical review.

In summary, we have demonstrated a strong relationship between increasing MEWS score and outcome. Our results also suggest continued investment in training is required to maintain robust early warning or track and trigger systems.

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Bradycardia–asystole during neck dissection

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During radical neck dissection, bradycardia and asystole are life-threatening signs of an exaggerated carotid sinus reflex (CSR) that may occasionally be observed in certain patients. This may be seen before, during or after head and neck surgery.

A 40-yr-old (smoker for 20 yr) male presented with difficulty in swallowing for 4 months and neck swelling for 1 month. Indirect laryngoscopy revealed a growth involving the right aryepiglottic

fold, extending to the epiglottis and pyriform sinus. A single hard immobile lymph node of 3 cm was found in the jugulodigastric triangle. A clinical diagnosis of carcinoma of the hypopharynx was made. A biopsy was performed under local anaesthesia, and histopathology confirmed the growth to be a squamous cell carcinoma. He received external radiation to the head and neck (60 Gy in 30 fractions over a period of 6 weeks). Direct laryngoscopy at the end of the treatment showed regression of the primary. He was then scheduled to undergo neck dissection for the residual nodal disease. Preoperative anaesthetic evaluation was unremarkable and no airway problems were anticipated.

In the operating room, monitoring was instituted and anaesthesia induced. After tracheal intubation

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