Welcome to the 1st Society for Acute Medicine Webinar

Wednesday 20 May 2020

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<th>Timing BST</th>
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<td>Early Learning from COVID-19 &amp; Acute Kidney Injury</td>
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<td><strong>Break</strong></td>
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<td>Oral Abstract Presentations</td>
<td>&quot;It's Only Three Hours a Week&quot; - Providing Structure to Undergraduate Teaching on AMU</td>
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<td>3 x Oral Presentations @ 10 mins each:</td>
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<td>Proteus Mirabilis – A Rare Cause of Infective Endocarditis</td>
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<td>Angus De Wilton, UCLH</td>
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<td>Using Trends in Electronic Recordings of Vital Signs to Identify Patients Stable for Transfer from Acute Hospitals</td>
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<td>Chris Subbe, BCU HB &amp; Bangor University</td>
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<tr>
<td>Summary &amp; Close</td>
<td>Dr Sue Crossland</td>
<td>2055-2100</td>
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Presentation 1
Darren Green

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Early Learning from COVID-19 & Acute Kidney Injury

Presented by:
Darren Green, Salford Royal NHS Foundation Trust
Overview

• Epidemiology of COVID-19 AKI specifically in AMU patients
• Pathophysiology of AKI in COVID-19
• Assessment and management
• Further reading
Epidemiology – how common is AKI on AMU?
What is the impact of AKI?
Location of onset of AKI

% of total AKI

- AMU
- CRITICAL CARE UNIT
- ED
- IP WARD

% mortality in AKI patients

- AMU
- CRITICAL CARE UNIT
- ED
- IP WARD

- non-COVID
- COVID
Prescribed medication and AKI

![Graph showing the effect of prescribed medication on AKI in COVID and non-COVID patients.](image)
Pathophysiology of AKI in COVID-19

- Iatrogenic background therapies
- Iatrogenic “run them dry”
- Iatrogenic other necessary therapies
- Disease severity hypoxia, hypotension
- Secondary complications Sepsis, DKA
- Co-morbid factors CKD, heart failure, DM, other vascular
- Vascular endothelial damage Present on post-mortem
- Microthromobosis Cause of lung injury
- Viral glomerular damage Some evidence available
Assessment – basic principles

• Context, pre-test probability
• Association versus causation
• Evidence versus conjecture
• Moving goalposts
• New territory versus established practice
<table>
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<tr>
<th>Assessment</th>
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<tr>
<td><strong>AKI present</strong></td>
<td>assess for congestion, heart failure</td>
</tr>
<tr>
<td><strong>Clinical dehydration</strong></td>
<td>thirst, dry membranes, dark urine</td>
</tr>
<tr>
<td><strong>Acute AKI risk factors</strong></td>
<td>persistent fever</td>
</tr>
<tr>
<td></td>
<td>reduced oral intake (e.g. overnight)</td>
</tr>
<tr>
<td></td>
<td>hypotension (are drugs implicated)</td>
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<tr>
<td></td>
<td>oliguric</td>
</tr>
<tr>
<td></td>
<td>urinary sediment</td>
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<tr>
<td></td>
<td>rhabdomyolysis</td>
</tr>
<tr>
<td></td>
<td>thrombosis</td>
</tr>
<tr>
<td></td>
<td>hypoxia</td>
</tr>
<tr>
<td></td>
<td>NIV</td>
</tr>
<tr>
<td><strong>Co-morbid risk</strong></td>
<td>CKD, hypertension, CAD, age....</td>
</tr>
<tr>
<td></td>
<td>Drugs</td>
</tr>
</tbody>
</table>
Investigations

Renal order set
   CK
   Cystatin C
   urine dip
   thrombosis screen
   urea : creat
   tests for differential diagnoses

Daily renal chemistry on AMU

USS
   AKI 3, total anuria, no response to treatment
   Consider necessity in the context of outbreak
Giving intravenous fluids

• Controlled fluid resuscitation generally advised
• Always monitor I-O (if lower risk, 4 hourly & no catheter)
• Increased frequency of review and interval prescribing

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<th>Cl</th>
<th>k</th>
<th>Bic</th>
<th>Ca</th>
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<tbody>
<tr>
<td>Plasma*</td>
<td>135</td>
<td>105</td>
<td>4.5</td>
<td>24</td>
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<tr>
<td>0.9% Saline</td>
<td>154</td>
<td>154</td>
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<tr>
<td>Hartmann's</td>
<td>131</td>
<td>111</td>
<td>5</td>
<td>29</td>
<td>2</td>
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</table>

*example values
Other meds – risks versus benefits

• Antibiotics
• Gentamycin
• Opiates
• RAAS blockade
• NSAIDs
• Diuretics
• Metformin
• SGLT2i
• Digoxin
• CT IV contrast
• LMWH
Other meds – risks versus benefits

- Antibiotics: dose reductions for Tazocin, vancomycin, teicoplanin
- Gentamycin: seek alternatives
- Opiates: early dose reduction
- RAAS blockade: continue in heart failure unless AKI, hyperk, low BP
- NSAIDs: continue if clear benefit
- Diuretics: stop if dry or at risk
- Metformin: probably safer than we think
- SGLT2i: stop
- Digoxin: reduce maintenance dose, give usual loading dose
- CT IV contrast: risk versus benefit, no evidence to support pre-emptive RRT
- LMWH: local policy
Other meds – risks versus benefits

- Antibiotics: dose reductions for Tazocin, vancomycin, teicoplanin
- **Gentamycin**: seek alternatives
- Opiates: early dose reduction
- RAAS blockade: continue in heart failure unless AKI, hyperk, low BP
- NSAIDs: continue if clear benefit
- Diuretics: stop if dry or at risk
- Metformin: probably safer than we think
- **SGLT2i**: stop
- Digoxin: reduce maintenance dose, give usual loading dose
- CT IV contrast: risk versus benefit, no evidence to support pre-emptive RRT
- LMWH: local policy
Further reading

COVID-19 links

- NHSE AKI in COVID clinical guide
- NICE COVID AKI rapid guideline
- Renal Ass position on ACEi
- Narrative review
- NHSE RRT in COVID guide
- ICNARC COVID ICU outcomes
- COVID renal histology
- COVID AKI epidemiology

Other documents

- NICE IV fluid flowsheet
- NICE composition of crystalloids
- Think Kidneys AKI drugs guide
- BHS RA guidance HF & CKD meds
- IMV assd AKI systematic review
- CIN guidance
- Metformin and lactic acidosis
Acute Medical Workforce Wellbeing - Caring for Our Doctors Caring for Our Patients

Presented by:
Eoin Dore
Sandwell and West Birmingham Hospitals NHS Trust
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@DoreEoin

Co- authored by:
M Anwar, A Holden, S Clare (Consultant Lead),
Acute Medical Workforce Wellbeing - Caring for Our Doctors Caring for Our Patients

- Introduction
- Method
- Results
- Discussion of this project
- Further work
Introduction

• Why
• How
• What
Method

• Culture change
• Facility change
• Education
• MDT Approach

• Surveyed
  • **Survey 1:** Immediately post use of pod
  • **Survey 2:** At the start and the end of the project
Results

Survey 1:
• 30 users surveyed immediately post.
• 85% of users felt more energised.
• 83% reported feeling more alert.
• 90% would recommend to a colleague.
• Feedback from:
  • ‘Feel calmer like I’m able to process thoughts better’
  • ‘Whilst I had my time in the pod, I felt relaxed and ready to do my job all over again.’
  • ‘Marvellous installation.’

Survey 2:
• 40 users at 3 months.
• 3 month survey: Increase in people taking breaks, increase in energy levels during shift and a decrease in post night shift fatigue.
Discussion

• Sleep pods in **high acuity** and **high turnover** areas such as AMU’s are **key for morale**, rest and team working.

• **Breaks are vital** for concentration and sound decision making.

• Sensory deprivation reported to be useful post cardiac arrest.

• We highly recommend this installation for all AMU’s.

• A facility improvement needs to be part of a **wider wellbeing strategy**.
References

3. ‘Napping during night shift’ Fallis WM et al Critical Care Nurse; 31: e1-e11 2011)
Weighing information in diagnostic reasoning.
Where do we stand?

Presented by:
Mohsin Zaman,
Consultant in Critical Care & Acute Medicine, Northampton General Hospital
Mohsin.zaman@ngh.nhs.uk

Co-authored by:
Ali Ismail
THE Context

- 10-15% of the medical diagnosis is inaccurate.
- 50% or doctors report worrying about making the wrong diagnosis.
- Wrong medical diagnosis is the most common source of medical errors.

- We note that doctors address their anxiety of missing a diagnosis by relying more on investigations. Which can possibly lead to harm to the patients, undue anxiety and increase the healthcare costs of the system.

- Given all these facts we endeavoured to see if we can devise a method to judge how doctors weigh the information gathered during a typical clinical encounter.
We asked those present to give a % probability of the diagnosis of Acute Coronary syndrome when each bit of information was given

• 55 year old male presented to ED with chest pain

- Smoker
- Diabetic
- Hypertension
- Pain Radiating to Left Arm – from ED notes
- ECG – no ischemic changes
- Peripheral Vascular Disease
- Trop +ve
- You get a call back saying mixed samples- this patients Trop is -ve
- Now you start taking the history
- Pain Radiating to Both arms
- He also feels SOB
- He is sweaty and clammy
The results from 108 participants
The Clinical Approach to chest pain

- ACS
- Aortic Dissection (31%)
- Stable Angina
- Aortic Stenosis (1%)
- Pulmonary Hypertension
- Pneumothorax
- PE (2%)
- Pericarditis (4%)
- Pneumonia / Pleuritis (2%)
- Herpes Zoster (1%)

Other GI conditions:
- Esophageal Reflux / Spasm
- Peptic Ulcer Disease
- Gallbladder disease
- Other GI conditions (42%)

Other Musculoskeletal disorders:
- Cervical Disk Disease
- Arthritis of shoulder or spine
- Costo-chondritis
- Anxiety State

- 42%
- 28%
Risk factors

Decreasing Probability

-45%  -30%  -15%  15%  30%  45%

10

Increasing Probability

0.1  0.2  0.5  1  2  5  10

-30%

-45%

3.1 Abnormal stress test

2.7 Peripheral artery disease

CABG 0.97

Diabetes – 1.4
Previous MI – 1.6
CVA – 1.4
Male – 1.3
HTN – 1.2
Obesity – 1
Family hx of CAD – 1
Smoking – 1.1

CAD – known
Feedback and discussion with participants

• A discussion with the doctors post education revealed the following points

◆ the physicians frequently overestimated the importance of traditionally taught risk factors
◆ They were focused on looking for patterns
◆ They assumed that investigations were a lot more accurate
◆ They were not trained in the use (consideration) of pre and post test probability of a diagnosis at the bedside
◆ 95% in the feedback thought that the session would change their clinical approach
Discussion

• The current methods of training has limited focus on diagnostic error.

• The training does not impress the need of understanding evidence base in coming to a diagnosis.

• A teaching program focused on common presenting complaints and the diagnostic approach for these might serve in reducing clinical risk and investigations instigated in acute care.
Presentation 4
Ben Chadwick

www.acutemedicine.org.uk
The New Acute Medicine Curriculum

Presented by:
Ben Chadwick, AIM SAC Chair, Consultant in Acute Medicine
Why a new curriculum?

General Medical Council

JRCPTB
Joint Royal Colleges of Physicians Training Board

SAM
The Society for Acute Medicine
What did we want to keep?

• Broad base of training
• Specialist skill
• Links with Intensive Care
What did we want to improve?

• Take the chance to further differentiate us from General Internal Medicine
• Focus on the areas where we do have specialist skills and knowledge
• A chance to integrate Point of Care Ultrasound (POCUS) into the core curriculum
• Protected time for specialist skill and POCUS – moving towards a 4:1 model of training
Competencies in Practice (CiPs)
Acute Internal Medicine CiPs

<table>
<thead>
<tr>
<th>Specialty CiPs</th>
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<tbody>
<tr>
<td>1. Managing Acute Medicine services</td>
</tr>
<tr>
<td>2. Delivering alternative patient pathways including medical same day emergency care</td>
</tr>
<tr>
<td>3. Prioritising and selecting patients appropriately according to the severity of their illness, including making decisions about appropriate escalation of care</td>
</tr>
<tr>
<td>4. Integrate with other specialist services including Intensive Care, Cardiology, Respiratory and Geriatric medicine</td>
</tr>
<tr>
<td>5. Managing the interface with community services including complex discharge planning at the front door</td>
</tr>
<tr>
<td>6. Developing a sub-specialty skill within the domains of clinical, academic, research or practical skills</td>
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</tbody>
</table>
How have we gone about it?

- Discussed at the Specialist Advisory Committee
  - TPD representation
  - Trainee representation
  - Lay people
- Small working group to write the document
- Sent out for comment
- Has been through the Curriculum Oversight Group
- Submission to the Curriculum Assessment Group in October
Point of Care Ultrasound training

- Ideal timing to think about including this for all trainees
- Feasibility has been a key concern
  - Can we deliver consistently across the 4 nations
- Focused Acute Medicine Ultrasound (FAMUS) used as a template for this
Specialist skill

- Has to meet with GMC and HEE requirements
- More complex now that the rules around funding have changed
- Latest draft is an attempt to somewhat standardise the requirements
- What should we call it??
What next?

• Final version of the curriculum will be shared widely for comment prior to going to CAG later this year
• If passes this stage will need to move to working on implementation
• Ensuring that we can deliver POCUS training
• Ensuring that we can deliver 4:1 training
Questions?
Presentation 5
Michael Duffy

www.acutemedicine.org.uk
“It’s only three hours a week”

Providing structure to undergraduate teaching on AMU

Presented by:
Michael Duffy, Bristol Royal Infirmary
michaelduffy2@nhs.net

Authored by
Michael Duffy
INTRODUCTION

Background

The Royal College of Physicians provides guidance for teaching on an Acute Medical Unit as part of the “Acute Care Toolkit” - recommending work-based learning complemented by classroom sessions (SAM, 2012).

The Toolkit’s focus is on promoting postgraduate education, with specific reference to consultant skills and roles.

The guidance is less applicable to undergraduate education; with an unfamiliar environment rendering learning opportunities less accessible, and requiring closer supervision by AMU staff - often at the expense of their clinical duties.

Aim

To improve the undergraduate experience on an Acute Medical Unit, and promote structured self-directed learning, by introducing two junior-led group sessions during their 5 day placement.
Third year medical students who had completed their five days of AMU placement were asked to complete an anonymous three-part survey. The survey consisted of 15 questions, obtaining quantitative data using Likert scales and qualitative by providing space for free text. Questions were partially modelled on the Manchester Clinical Placement Index (Dornan et al, 2012).

Pre-intervention areas of concern included the extent to which learning was self-directed, and the absence of organised teaching.

<table>
<thead>
<tr>
<th>Before the Placement...</th>
<th>learnt a lot from joining the ward round</th>
</tr>
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<tbody>
<tr>
<td>I was given adequate information about the ward's schedule/team</td>
<td>felt I could ask questions on the ward round</td>
</tr>
<tr>
<td>I had general knowledge of acute medicine</td>
<td>felt there was sufficient bedside teaching and small group discussion</td>
</tr>
<tr>
<td>I knew what I wanted to achieve during my time on AMU</td>
<td>learnt a lot from bedside teaching/small group discussion</td>
</tr>
<tr>
<td>I knew what I was expected to learn during my time on AMU</td>
<td></td>
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<tr>
<td>After the Placement...</td>
<td></td>
</tr>
<tr>
<td>During the Placement...</td>
<td>left feeling more interested in acute medicine</td>
</tr>
<tr>
<td>I was introduced to the acute medical team adequately</td>
<td>felt my educational needs were met on AMU</td>
</tr>
<tr>
<td>I knew whom to approach if my teaching needs were not being met</td>
<td>would recommend this placement as useful</td>
</tr>
<tr>
<td>I was able to join the AMU/post take ward rounds</td>
<td>The curriculum provides time to cover the basics of A.M.</td>
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Two 90 minute clinician-led sessions were then performed during each five day placement. They were structured to allow each student time to present a patient, discuss management as a group, and explore a topic related to acute medicine (Figure 2).

From October 2019, this continued over a four month period. After their placements, the students were anonymously surveyed - and the results used for comparison.

<table>
<thead>
<tr>
<th>Figure 2 - AMU Group session</th>
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<td><strong>4</strong></td>
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<td><strong>5</strong></td>
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<td><strong>6</strong></td>
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29 third year medical students completed the questionnaire: 12 pre- and 17 post-intervention:

- Positive learning experience from ward round participation increased from 41.6% to 70.6%.
- Positive learning experience from small group and bedside teaching increased from 58.3% to 100%.
- When asked if students had a member of staff to approach if their teaching needs were not being met, originally 25% answered positively, improving to 70.6%.
- Improvement was clear across all of the questionnaire’s indicators of satisfaction.

### RESULTS

<table>
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<tr>
<th>Summary</th>
<th>1. Positive responses</th>
<th>2. Positive responses</th>
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<tbody>
<tr>
<td>Adequate information given</td>
<td>16.7%</td>
<td>73.4%</td>
</tr>
<tr>
<td>General knowledge</td>
<td>16.7%</td>
<td>93.3%</td>
</tr>
<tr>
<td>Achievement goals</td>
<td>0%</td>
<td>53.3%</td>
</tr>
<tr>
<td>Expected to learn</td>
<td>0%</td>
<td>40%</td>
</tr>
<tr>
<td>Introduced adequately</td>
<td>16.7%</td>
<td>61%</td>
</tr>
<tr>
<td>Educational lead</td>
<td>16.7%</td>
<td>66.6%</td>
</tr>
<tr>
<td>Joining ward rounds</td>
<td>66.7%</td>
<td>93.4%</td>
</tr>
<tr>
<td>Learning from ward rounds</td>
<td>50%</td>
<td>66.7%</td>
</tr>
<tr>
<td>Participate in ward rounds</td>
<td>16.7%</td>
<td>53.4%</td>
</tr>
<tr>
<td>Enough CBD/bedside teaching</td>
<td>16.7%</td>
<td>100%</td>
</tr>
<tr>
<td>CBD/bedside teaching useful</td>
<td>50%</td>
<td>100%</td>
</tr>
<tr>
<td>Interest in A.M</td>
<td>66.7%</td>
<td>100%</td>
</tr>
<tr>
<td>Needs met</td>
<td>33.3%</td>
<td>100%</td>
</tr>
<tr>
<td>Placement useful</td>
<td>33.3%</td>
<td>93.3%</td>
</tr>
<tr>
<td>Enough time</td>
<td>50%</td>
<td>40%</td>
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DISCUSSION

Limitations:

- The evaluation served as an index of satisfaction, a test of feasibility and of acceptability. However by adapting the MCPI’s items its validity as a measure of teaching effectiveness was diluted. (*Is the teaching of good quality?*)

- The extent to which self-directed learning increased was not measured; two cases per student as a minimum is all that can be inferred (*Did the intervention promote self-directed learning?*)

Learning point:

- The focus of any further evaluation of this new teaching should include quantitative measures of the sources of learning - e.g. student reporting. This may prevent undue influence from other sources of learning (although student comments typically cited the teaching sessions as their main source)
CONCLUSION

- On-ward teaching should continue to be the foundation of AMU education.

- However - the two structured 90 minute sessions had an immediate, demonstrably positive impact on undergraduate satisfaction.

- This extends beyond the sessions themselves - they allow a port-of-call when needs throughout a five day placement are not being met.

- They serve as an excellent first step towards opening up learning opportunities in what can be a busy and inaccessible environment for medical students

- They are implementable in most acute medical environments; requiring a doctor, a unit filled with patients, a quiet space and three hours a week
Presentation 7
Chris Subbe

www.acutemedicine.org.uk
Using Trends in Electronic Recordings of Vital Signs to Identify Patients Stable for Transfer from Acute Hospitals

- From saving lives to changing systems -

Chris Subbe
Pen-Y-Gwryd Hotel, Snowdonia
Validation of a modified Early Warning Score in medical admissions

C.P. SUBBE, M. KRUGER, P. RUTHERFORD and L. GEMMEL

From the Departments of Medicine, and Critical Care, Wrexham Maelor Hospital, and Department of Nephrology, University of Wales College of Medicine, Wrexham, UK

Received 17 May 2001 and in revised form 9 July 2001

Table 1 Modified Early Warning Score

<table>
<thead>
<tr>
<th></th>
<th>3</th>
<th>2</th>
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<th>2</th>
<th>3</th>
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<tbody>
<tr>
<td>Systolic Blood pressure (mmHg)</td>
<td>&lt;70</td>
<td>71–80</td>
<td>81–100</td>
<td>101–199</td>
<td>≥200</td>
<td></td>
<td></td>
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<tr>
<td>Heart rate (bpm)</td>
<td>&lt;40</td>
<td>41–50</td>
<td>51–100</td>
<td>101–110</td>
<td>111–129</td>
<td>≥</td>
<td></td>
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<tr>
<td>Respiratory rate (bpm)</td>
<td>&lt;9</td>
<td>9–14</td>
<td>15–20</td>
<td>21–29</td>
<td>≥</td>
<td></td>
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</tr>
<tr>
<td>Temperature (°C)</td>
<td>&lt;35</td>
<td>35–38.4</td>
<td>Alert</td>
<td>Reacting to Voice</td>
<td>Reacting to Pain</td>
<td>Ur</td>
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<tr>
<td>AVPU score</td>
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Effect of an automated notification system for deteriorating ward patients on clinical outcomes

Christian P. Subbe¹, Bernd Duller² and Rinaldo Bellomo³

Abstract

Background: Delayed response to clinical deterioration of ward patients is common.

Methods: We performed a prospective before-and-after study in all patients admitted to two clinical ward areas in a district general hospital in the UK. We examined the effect on clinical outcomes of deploying an electronic automated advisory vital signs monitoring and notification system, which relayed abnormal vital signs to a rapid response team (RRT).

Results: We studied 2139 patients before (control) and 2263 after the intervention. During the intervention the number of RRT notifications increased from 405 to 524 (p = 0.001) with more notifications triggering fluid therapy, bronchodilators and antibiotics. Moreover, despite an increase in the number of patients with “do not attempt resuscitation” orders (from 99 to 135; p = 0.047), mortality decreased from 173 to 147 (p = 0.042) patients and cardiac arrests decreased from 14 to 2 events (p = 0.002). Finally, the severity of illness in patients admitted to the ICU was reduced (mean Acute Physiology and Chronic Health Evaluation II score: 26 (SD 9) vs. 18 (SD 8)), as was their mortality (from 45% to 24%; p = 0.04).

Conclusions: Deployment of an electronic automated advisory vital signs monitoring and notification system to signal clinical deterioration in ward patients was associated with significant improvements in key patient-centered clinical outcomes.

Trial registration: ClinicalTrials.gov, NCT01692847. Registered on 21 September 2012.
Electronic monitoring
MEWS: Warning
Text in this section is configurable to your hospital policy. The following is an example:
INFORM NURSE IN CHARGE
PERFORM OBSERVATIONS 1 HOURLY
<table>
<thead>
<tr>
<th>Location</th>
<th>Previous MEWS</th>
<th>Time Since Last MEWS</th>
<th>Prol</th>
<th>HR/Pis</th>
<th>SpO2</th>
<th>BP</th>
<th>RR</th>
<th>Temp</th>
<th>AVPU</th>
<th>O2Dist</th>
<th>Notification</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>4</td>
<td>1h 23min</td>
<td>NEWS</td>
<td>68</td>
<td>100</td>
<td>152/64 (85)</td>
<td>*36</td>
<td>35.9</td>
<td>*Alert</td>
<td>*NotDelivered</td>
<td>MEWS: Observe 4</td>
</tr>
<tr>
<td>33</td>
<td>5</td>
<td>2h 55min</td>
<td>CREWS</td>
<td>98</td>
<td>93</td>
<td>127/101 (108)</td>
<td>*24</td>
<td>36.9</td>
<td>*Alert</td>
<td>*Delivered</td>
<td>MEWS: Observe 5</td>
</tr>
<tr>
<td>44</td>
<td>3</td>
<td>4h 47min</td>
<td>PAL</td>
<td>98</td>
<td>95</td>
<td>125/70 (81)</td>
<td>*21</td>
<td>36.8</td>
<td>*Alert</td>
<td>*NotDelivered</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>4</td>
<td>2min</td>
<td>NEWS</td>
<td>73</td>
<td>96</td>
<td>113/52 (53)</td>
<td>20</td>
<td>36.2</td>
<td>*Alert</td>
<td>*NotDelivered</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>3</td>
<td>2h 11min</td>
<td>NEWS</td>
<td>91</td>
<td>92</td>
<td>148/93 (108)</td>
<td>*23</td>
<td>36.1</td>
<td>*Alert</td>
<td>*Delivered</td>
<td>MEWS: Change from Observe 3 to Warning 7</td>
</tr>
<tr>
<td>33</td>
<td>1</td>
<td>2h 11min</td>
<td>NEWS</td>
<td>79</td>
<td>92</td>
<td>105/93 (68)</td>
<td>*19</td>
<td>36.3</td>
<td>*Alert</td>
<td>*NotDelivered</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>5</td>
<td>1h 55min</td>
<td>NEWS</td>
<td>100</td>
<td>98</td>
<td>142/51 (87)</td>
<td>*21</td>
<td>36.4</td>
<td>*Alert</td>
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<tr>
<td>35</td>
<td>3</td>
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<td></td>
<td></td>
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<td>20</td>
<td>36.3</td>
<td>*Alert</td>
<td>*NotDelivered</td>
<td></td>
</tr>
</tbody>
</table>

* MEWS: Observe
* MEWS: Warning
* MEWS: Alert
* MEWS: Not Delivered
* MEWS: Delivered
Summary

**General Ward**
- 20% Mortality
- 34% Severe Adverse Events
- 86% Cardiac Arrest

**ICU**
- 19% ICU Admission
- 26 vs 18 APACHE II
- 66% ICU Mortality (actual)

N=2139 Patients Pre-Phase and 2263 in Intervention Phase (two year total)
1) mean APACHE II score went down from 26 (before) to 18 (after) = predicted mortality: 45% before vs. 24% after
2) actual mortality went down from 42% (before) to 14% (after)

Patient deteriorates and is transferred
Protocol

• 1485 + 791 patients for analysis

• Stability definitions:
  • NEWS 3 or less for 48 hours
  • PSI stable
  • No NEWS of 6 or more

• Classification and Regression Trees Analysis (CART)

• Random Forrest Analysis
Positive Predictive Value
Machine Learning vs NEWS
Outcome

• Saving in beds days based on
  • Ability to transfer to another location
  • Availability of 48 hours of monitoring

• Next steps
  • Clinical simulation
  • Application to pre-hospital data
twitter: @csubbe
Thank you! Join us again…

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Time – all BST</th>
</tr>
</thead>
<tbody>
<tr>
<td>27 May 2020</td>
<td>Update on Ongoing Trials in COVID-19 in Acute Medicine</td>
<td>1900-2100hrs</td>
</tr>
<tr>
<td>3 June 2020</td>
<td>Insights from ISARIC and ICNAR</td>
<td>1900-2100hrs</td>
</tr>
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<td>10 June 2020</td>
<td>ACP Acute Medical Curriculum &amp; COVID-19 in Acute Medicine: Clinical Update</td>
<td>1900-2100hrs</td>
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<td>17 June 2020</td>
<td>COVID-19 in Acute Medicine: Implications for Acute Oncology</td>
<td>1900-2100hrs</td>
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</tbody>
</table>

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