Vital Signs Monitoring

Practical Skills Teaching

Year 2 Medical Students
MB BCh

2013 - 2014
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Introduction to workshop

Welcome!

Thank you for agreeing to participate in Year 2 Practical Skills Teaching.

The workshop outcomes for the students are to learn the skills required to undertake basic ward observations of the adult patient. We also hope to use the opportunity to ask the students to develop their communication skills. These observations will be carried out frequently and is therefore essential that the patient understands why it is necessary.

At the end of the workshop we will be asking you to complete evaluation forms. Please give as much information as you can, as we will use this data to develop the workshop for 2014/15.

Just as a reminder, more information about this skill is found at the Clinical Skills Resource site for tutors. The link to the module is:

http://medic.cardiff.ac.uk/clinicalskills/

Please find the Vital Signs Monitoring module within the list of on-line tutorials.

We are aiming for the students to be:

Accurate          Efficient          Compassionate

Thank you again for your participation.

The Clinical Skills Team
Overall Session Aim

To facilitate understanding of vital signs monitoring

Intended Learning Outcomes

By the end of this workshop the student should be able to:

✔ Define the reasons why the monitoring of vital signs is essential.

✔ Describe how basic monitoring forms the basis for a track-and-trigger system for identifying acute illness.

✔ Demonstrate, to a level expected of the student’s stage of training, competence in the procedural steps required to perform basic monitoring of vital signs, and accurately record them using an observation chart such as NEWS in a simulated or clinical setting.

✔ Appreciate the need for acting on the recommendations of a NEWS chart when a patient observation score falls into a category that requires intervention.

✔ Display the ability to use the handover tool SBAR.

✔ Display a professional manner and good communication skills towards the patient (actor or student colleague) if present, and throughout the skills simulation session.

✔ Evaluate own learning and recognise how improvements can be made.
Workshop Structure – Guidance for Tutors

Please Note: Students arrive 15 minutes prior to taught session for registration and housekeeping

<table>
<thead>
<tr>
<th>Taught Session Time: 40 minutes</th>
<th>Session Progression</th>
<th>Additional Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vital Signs Monitoring</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 minutes</td>
<td><strong>Introduction</strong></td>
<td>Questions and Answers detailed in Appendix A</td>
</tr>
<tr>
<td></td>
<td>Question and Answer Session</td>
<td></td>
</tr>
<tr>
<td>8 minutes</td>
<td><strong>Demonstration</strong></td>
<td>Pulse Oximeter</td>
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<tr>
<td></td>
<td>Full demonstration of vital signs monitoring by Tutor</td>
<td>GreenLight</td>
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<td></td>
<td></td>
<td>Stethoscope</td>
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<td></td>
<td></td>
<td>NEWS charts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Thermometer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BP Monitor - Digital</td>
</tr>
<tr>
<td>2 minutes</td>
<td><strong>Questions and Answers</strong></td>
<td></td>
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<tr>
<td></td>
<td>Students given the opportunity to ask any questions that</td>
<td></td>
</tr>
<tr>
<td></td>
<td>may have arisen during demonstration</td>
<td></td>
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<tr>
<td>20 minutes</td>
<td><strong>Practice</strong></td>
<td>Pulse Oximeter</td>
</tr>
<tr>
<td></td>
<td>Students work in pairs and practice performing basic</td>
<td>GreenLight</td>
</tr>
<tr>
<td></td>
<td>monitoring of vital signs and recording on NEWS charts</td>
<td>Stethoscope</td>
</tr>
<tr>
<td></td>
<td>Tutor to support and lend guidance where necessary</td>
<td>NEWS charts</td>
</tr>
<tr>
<td></td>
<td>Tutors to encourage patient / student communication –</td>
<td>Thermometer</td>
</tr>
<tr>
<td></td>
<td>Student pair can act out student-patient relationship</td>
<td>BP Monitor - Digital</td>
</tr>
<tr>
<td>2 minutes</td>
<td><strong>Discussion and Final Question and Answer</strong></td>
<td></td>
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<tr>
<td></td>
<td>Recapitulate on the session and address any questions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>that have arisen</td>
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</tbody>
</table>
Introduction:

Ward patients are routinely monitored by measurement and recording of basic physical signs. Although these are not necessarily used to diagnose the problem, they are extremely valuable as early indicators of deterioration in health. The scores derived from these measurements are used to provide a trigger for more urgent investigation or management. The most commonly recorded signs are: Blood pressure, heart rate, respiratory rate, temperature and conscious level. Blood Haemoglobin oxygen saturation is often added to these basic measurements.

When scores are recorded for each (according to the amount of deviation from normal values), they form the basis for track and trigger system such as the Early Warning Score (EWS), the National Early Warning Score (NEWS) and Modified Early Warning Score (MEWS). They are designed to draw attention to patients at risk of deterioration.

Blood Pressure

Blood pressure may be measured directly (by introducing a needle or catheter into the lumen of the artery) or indirectly, by occluding the vessels in a limb by means of a tourniquet technique. The indirect method is less accurate, but less invasive and quicker.

The manual indirect method involves listening over vessels distal to an occluding cuff. When the pressure in the cuff is reduced, characteristic sounds are heard (Korotkov sounds) as first the arterial blood supply, then venous blood supply returns to the limb.

NB: The width of the cuff should be approximately the circumference of the arm. A cuff that is too small will over-read a blood pressure, and too large a cuff will under-read.

Heart Rate

Heart rate is measured by palpating a peripheral artery and timing the number of beats per second with a watch with a second hand. Strictly speaking, this is actually pulse rate, and may be lower than the heart rate measured by listening to the chest. In the vast majority of patients the two measurements are the same.

It may also be measured by a pulse oximeter or an ECG monitor.

Heart rate is raised in a large number of conditions such as shock, pyrexia, pain, anaemia. It is regarded as a more sensitive sign of shock than blood pressure.
**Respiratory Rate**

Respiratory rate is one of the best early indicators of physiological deterioration. It may be increased by shock, pain, pyrexia and any problem that increased the work of breathing.

A sudden reduction may be a late sign of physiological decompensation.

Respiratory rate is measured by observing the patient and timing the respirations with a watch over a period of say 30 seconds.

Respiratory rate monitors are available, but tend to detect chest movement, which may or may not correlate with respiratory rate.

**Temperature**

Temperature is routinely measured by infra red probes that are inserted into the external auditory meatus for a few seconds. This gives a reasonable estimate of core body temperature. If the ear is blocked (for instance by wax) the reading may not be accurate.

In certain situations it may be useful to measure skin temperature with a thermistor probe. The difference between the core and peripheral temperature may then be used as an indicator of a change in arterial blood supply, shock etc.

Temperature is raised in systemic infection, haematoma and a large number of other pathologies. A low temperature (hypothermia) is also an important clinical sign, and when very low may need to be actively treated.

**Consciousness Level**

- **A** Alert
- **V** Verbal
- **P** Pain
- **U** Unresponsive
Haemoglobin Oxygen Saturation

Haemoglobin oxygen saturation of the blood is most easily measured by a pulse oximeter. Although this gives a good estimate of arterial oxygen saturation, arterial blood gases are still needed, particularly for estimation of carbon dioxide partial pressures and hydrogen ion concentration.

National Early Warning Score

NEWS is based on a simple scoring system in which a score is allocated to six physiological measurements already taken in hospitals – respiratory rate, oxygen saturations, temperature, systolic blood pressure, pulse rate and level of consciousness. The more the measurements vary from what would have been expected (either higher or lower), the higher the score. The six scores are then aggregated to produce an overall score which, if high, will alert the nursing or medical team of the need to escalate the care of the patient.

NEWS also has detailed recommendations on the actions for each score. For example, a medium score should prompt an urgent review by a clinically skilled person with competencies in the assessment of acute illness – usually a ward-based doctor or acute team nurse, who should consider if a critical care outreach team is needed.

Assessment:

For the purposes of this workshop, students will be assessed on a formative basis. This will take place in two parts:

1. A quiz at the start of the session based on prior self-directed learning (Answers detailed in Appendix A).

2. The practical component is assessed through observation and feedback on the student performance with the aim of encouraging further practice and improvement. Throughout the session it is proposed that frequent questions should be posed to the students, encouraging each student as the session progresses. A formative assessment sheet is provided, on which the tutor has to indicate that the student has participated in the practical component. There is room for ‘comments’ regarding student performance if required.
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.</strong> What six basic physical signs are monitored on a ward?</td>
<td>1. Blood Pressure</td>
</tr>
<tr>
<td></td>
<td>2. Heart Rate</td>
</tr>
<tr>
<td></td>
<td>3. Respiratory Rate</td>
</tr>
<tr>
<td></td>
<td>4. Temperature</td>
</tr>
<tr>
<td></td>
<td>5. Conscious Level</td>
</tr>
<tr>
<td></td>
<td>6. Haemoglobin Oxygen Saturation</td>
</tr>
<tr>
<td><strong>2.</strong> What does NEWS stand for?</td>
<td><strong>N.</strong> National</td>
</tr>
<tr>
<td></td>
<td><strong>E.</strong> Early</td>
</tr>
<tr>
<td></td>
<td><strong>W.</strong> Warning</td>
</tr>
<tr>
<td></td>
<td><strong>S.</strong> Score</td>
</tr>
<tr>
<td><strong>3.</strong> What does AVPU Stand for?</td>
<td><strong>A.</strong> Alert</td>
</tr>
<tr>
<td></td>
<td><strong>V.</strong> Verbal</td>
</tr>
<tr>
<td></td>
<td><strong>P.</strong> Pain</td>
</tr>
<tr>
<td></td>
<td><strong>U.</strong> Unresponsive</td>
</tr>
<tr>
<td><strong>4.</strong> What type of system is NEWS?</td>
<td>Track and Trigger System</td>
</tr>
<tr>
<td><strong>5.</strong> If a blood pressure cuff is too large will the blood pressure be under-read or over-read?</td>
<td>Under-read</td>
</tr>
<tr>
<td><strong>6.</strong> If a blood pressure cuff is too small will the blood pressure be under-read or over-read?</td>
<td>Over-read</td>
</tr>
<tr>
<td><strong>7.</strong> Over which artery should the stethoscope be placed when measuring the blood pressure?</td>
<td>Brachial Artery</td>
</tr>
<tr>
<td><strong>8.</strong> What piece of equipment is used to measure the Haemoglobin Oxygen Saturation?</td>
<td>Pulse Oximeter</td>
</tr>
<tr>
<td><strong>9.</strong> What is the name of the sounds associated with blood pressure?</td>
<td>Korotkov Sounds</td>
</tr>
<tr>
<td><strong>10.</strong> What is AVPU used to measure?</td>
<td>Level of consciousness</td>
</tr>
</tbody>
</table>
Appendix B – Procedure Checklist

Blood Pressure:

☐ The necessity for all procedures should be explained to the patient and verbal consent obtained
☐ Ensure that the patient is lying or sitting. Also ensure that the sphygmomanometer is positioned at heart level, with the palm of the hand facing upwards.
☐ Use appropriate cuff size. Measure arm circumference if in doubt
☐ Apply the cuff of the sphygmomanometer snugly around the arm, 2.5cm above the antecubital fossa, with the cuff level with the patient’s heart.
☐ Inflate cuff until radial pulse can no longer be felt, providing an estimated systolic blood pressure.
☐ Deflate the cuff slowly.
☐ Record the systolic and diastolic pressures and compare the present reading with the previous readings.
☐ Completely remove the cuff from the arm

Heart Rate:

☐ Measure heart rate by timing the pulse at the wrist with a watch

Respiratory Rate:

☐ Measure respiratory rate by timing chest movements with a watch

Temperature:

☐ Cover the temperature probe with a transparent cap
☐ Measure temperature by pressing the appropriate button and record displayed temperature.
☐ Discard transparent cap
Consciousness Level:

- Measure conscious level with AVPU scale
- Record reading on chart

Haemoglobin Oxygen Saturation:

- Measure oxygen saturation with a pulse oximeter
- Record reading on chart

National Early Warning Score (NEWS):

- Add scores together to calculate NEWS
- Take appropriate action
Appendix C - Useful resources:


Blood Pressure:  
[http://www.cetl.org.uk/learning/bpm/player.html](http://www.cetl.org.uk/learning/bpm/player.html)

Korokhoff Sounds:  
[http://www.cetl.org.uk/learning/BP_Korotkoff_sounds/player.html](http://www.cetl.org.uk/learning/BP_Korotkoff_sounds/player.html)

Royal College of Physicians July 2012. *National Early Warning Score (NEWS). Standardising the assessment of acute-illness severity in the NHS*  