An Introduction to Clinical Decision Making

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Chair, Scottish Clinical Decision Making Special Interest Group
Clinical Skills Managed Educational Network and Scottish Clinical Skills Network
Overview

• Intro to clinical decision making (CDM)
• The five second rule: a case based CDM challenge
• How do we think and make decisions?
• What affects our CDM?
• How can we improve CDM and enhance patient safety?
• Next?
CDM and non-technical skills

- Team working
- Decision making
- Situation awareness
- Task management
- Diagnosis
- Prognosis
CDM exercise 1

• Think about your choice of speciality, profession, job

• What influenced you in that decision making?
Look at the next slide and ask yourself:

• “Which beach would I rather be on?”
A or B?
CDM in the acutely ill

• 21 year old with known asthma
• In respiratory ward
• Phone call
• Decisions
• Recognition
The five second rule
CDM in the acutely ill

- In the ward
- Assessment and management
- Looks….
- Obs….
- Actions

**System 1 thinking: (intuitive)**

- Cognitive style: Heuristic
- Cognitive awareness: Low
- Cost: Low
- Automaticity: High
- Rate: Fast
- Reliability: Low
- Errors: Usually
- Effort: Low
- Predictive power: Low
- Emotional component: High
- Scientific rigour: Low
Importance of CDM in managing sick patients

- Patients still die from ‘simple’ things either missed, delayed or done sub-optimally
- Decisions including diagnosis
- Approx 80% of clinical time spent in the cognitive domain
THE FOUR KEY DOMAINS OF EMERGENCY CARE

1. Acute assessment + stabilisation with immediate investigations and support. Targeted secondary exam

2. Monitors: reassess Surface Invasive Real time or Delayed Illness severity

3. CDM Team work Task Mx Situation Awareness Critical Thinking

4. Differential diagnosis/definitive diagnosis Immediate, medium term and long term treatment
1. Advanced First Aid

ASSESSMENT
- Hello, how are you?
- Response
- Airway: patent?
- Breathing

ACTION
- Look: obstruction
- Listen: ? noise
- Clear or secure: head tilt/chin lift or jaw thrust? Airway: oral or nasal?
- High conc^n oxygen: mask type? Flow?
1. Advanced First Aid

ASSESSMENT

• Sounds ?
• Common 3 are ?
• Causes are ?

ACTION

• Clear and keep open
• Get help 2222?
• Advanced airway management required?
• Tracheal tube? Size? Cut to what length? Are drugs needed for anaesthesia and intubation? If yes, which?
1. Advanced First Aid

ASSESSMENT

Sounds
• Nil: complete obstruction or not breathing
• Snoring/gurgling: reduced GCS, foreign material
• Stridor: anaphylaxis, burns/thermal; tumour; abscess/infection

For each ask ‘what is the diagnosis?’

ACTION

• Clear and keep open
• Get help 2222
• Positioning
• Advanced airway management required
1. Advanced First Aid plus 2.

**OBSERVE**
- Rate
- Volume
- Symmetry
- Character
- Work of breathing
- Compromise

**Ix & MONITOR**
- CXR, PEFR, ABGs
- Repeat observations
- Pulse oximetry

**TREAT**
- Oxygen
- Nebulisers
1. Advanced First Aid

**ASSESS**
- Pulse: *which pulse?*
- Skin: cap refill time, temperature
- BP: *where? Which method?*

**PHYSIOLOGY**
- MAP = CO x SVR
- CO = HR x SV
- Low BP = decompensation
1. Advanced First Aid

**iv access**

- **Site**
- **Size**
- **Blood sampling**

**iv access**

- **Upper limb**
- **Femoral**
- **High flow: short and thick**
- **Fluids**
- **Drugs**
Wide bore peripheral cannulae
1. Advanced First Aid

- Disability ?
- Conscious level, focal neurology
- DEFG
- Difficult bit
IMMEDIATE INVESTIGATIONS

- Arterial blood gases: $O_2$, $CO_2$, acid-base
- Potassium
- Glucose can all be done on a blood gas sample
- Haemoglobin
- 12 lead ECG
- CXR
- Targeted investigations

- What should we do having analysed this information?
1. Advanced First Aid

- Evidence
- Environment: context
- Targeted secondary Examination
- Explanation
- Everything else…
Advanced First Aid = Phase 1: abcde

- abcde, treating as you go
- Repeated assessment and continuous monitoring: patient better or worse?
- **Do we need enhanced abcde?**
- Targeted secondary examination
<table>
<thead>
<tr>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute assessment + stabilisation &amp; immediate investigations and support.</td>
<td>Monitors: reassess Surface Invasive Real time or Delayed Illness severity</td>
<td>CDM Team work Task Mx Situation Awareness Critical Thinking</td>
<td>Differential diagnosis/ definitive diagnosis Immediate, medium term and long term treatment</td>
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</tbody>
</table>

THE FOUR KEY DOMAINS OF EMERGENCY CARE
Illness Severity Assessment

- Speed of action needed
- Level & type of expertise: resuscitation; diagnostic; therapeutic
- Where should the patient be? Nursing intensity, monitoring, medical input?
- Definitive treatment: speed?
SEVERITY SCORING 1: CLINICAL

ABNORMAL PHYSIOLOGY
- Airway compromised
- Resp rate
- Pulse rate
- SBP
- GCS

OBSERVATIONS
- Bad
- <10 or >30
- <45 or >120
- <100 (110) or >200
- Fall of 2 points, <15
## SEVERITY SCORING 2: INVESTIGATIONS

<table>
<thead>
<tr>
<th>ABNORMAL INVESTIGATIONS</th>
<th>RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypoxaemia</td>
<td>&lt;3 or &gt;6 (ECG)</td>
</tr>
<tr>
<td>Hypercarbia</td>
<td>&lt;3 or &gt;20</td>
</tr>
<tr>
<td>Potassium</td>
<td>&gt;50 or &lt;30</td>
</tr>
<tr>
<td>Glucose</td>
<td>&lt; -5 or &gt; +10</td>
</tr>
<tr>
<td>H⁺</td>
<td>Diagnosis ?</td>
</tr>
<tr>
<td>Base excess</td>
<td></td>
</tr>
<tr>
<td>Lactate</td>
<td></td>
</tr>
</tbody>
</table>
Relationship between base excess and mortality in ICU

Base Excess and Mortality  Red = Dead  Green = survivor

ICM 2001;27:74-83
SEVERITY SCORING 3: organ failures

- Clinical: cardiovascular (shock)
- CNS reduced conscious level
- Urea and creatinine: renal
- ABGs: respiratory (oxygenation+/or CO₂ clearance)
- Clotting: coagulation
- WBC: bone marrow
- Gut/liver: glucose; lactate; clinical
## 4. Differential Diagnosis, ultimate diagnosis and definitive treatment

<table>
<thead>
<tr>
<th>Left Column</th>
<th>Right Column</th>
</tr>
</thead>
<tbody>
<tr>
<td>Get more history</td>
<td>GP, family, SAS</td>
</tr>
<tr>
<td>Trachea</td>
<td>Deviation</td>
</tr>
<tr>
<td>Chest</td>
<td>Lateralising signs, wheeze, crackles</td>
</tr>
<tr>
<td>JVP and heart</td>
<td>HS III or IV, murmurs</td>
</tr>
<tr>
<td>Abdomen</td>
<td>Swelling, pulsation</td>
</tr>
<tr>
<td>Skin, CNS</td>
<td>Rashes, neck stiffness, lateralising signs</td>
</tr>
</tbody>
</table>
ASSESSMENT

• A clinical
  +
• B investigations
  +
• C organ failures
  +
• D diagnosis
Decision making

- Diagnosis (and treatment)
- Is the diagnosis correct (complete) ?
- Prognosis
- Admit ?
- Discharge ?
- Stop ?
- Distributed
Diagnostic Error

- Ranked 2nd cause of adverse events (Harvard study, 1991)
- Diagnostic failure highest in EM, GP, Gen Med
- Passing on to specialists in wards, ICU
- 2/3 of claims against UK GPs are for diagnostic failure
<table>
<thead>
<tr>
<th>Type 2 thinking (analytical)</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive style</td>
<td>Systematic</td>
</tr>
<tr>
<td>Cognitive awareness</td>
<td>High</td>
</tr>
<tr>
<td>Cost</td>
<td>High</td>
</tr>
<tr>
<td>Automaticity</td>
<td>Low</td>
</tr>
<tr>
<td>Rate</td>
<td>Low</td>
</tr>
<tr>
<td>Reliability</td>
<td>High</td>
</tr>
<tr>
<td>Errors</td>
<td>Few</td>
</tr>
<tr>
<td>Effort</td>
<td>High</td>
</tr>
<tr>
<td>Predictive power</td>
<td>High</td>
</tr>
<tr>
<td>Emotional component</td>
<td>Low</td>
</tr>
<tr>
<td>Scientific rigour</td>
<td>High</td>
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</tbody>
</table>

- History: full
- Examination: complete
- Investigations
- Differential Dx
- Treatment
- Refine diagnosis
Categorising Clinical Decision Making

- Cognitive theory: traditional
- Technical
- Professional
- Distributed
Traditional cognitive taxonomy
or
“how you think it”

- Problem solving
- Pattern recognition
- Decision analysis theory
- Hypothetico-deductive reasoning
CDM: a universal model of diagnostic reasoning

**Intuitive**
- Experiential-inductive
- Bounded rationality
- Heuristic
- Pattern recognition
- Hard wired response
- Thin slicing
- Unconscious thinking theory

**Analytical**
- Hypothetico-deductive
- Unbounded rationality
- Normative reasoning
- Robust CDM
- Acquired, critical, logical thought
- Multiple branching/arborisation
- Deliberate, purposeful thinking
What affects clinical decision making?

- Knowledge and skills
- Behaviours: attitude (multiple selves), emotions (affect: self, family, patients, relatives, colleagues), values.
What affects clinical decision making?

<table>
<thead>
<tr>
<th>Factors</th>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Context</td>
<td>Physical factors</td>
</tr>
<tr>
<td>Values</td>
<td>Stress and Fatigue</td>
</tr>
<tr>
<td>Affect</td>
<td>Ergonomics</td>
</tr>
<tr>
<td>Knowledge</td>
<td>Experience</td>
</tr>
<tr>
<td>Critical thinking</td>
<td>What we hear</td>
</tr>
<tr>
<td>Interruptions</td>
<td>What we think</td>
</tr>
<tr>
<td>Clinical reasoning</td>
<td>Cognitive biases</td>
</tr>
<tr>
<td>Words</td>
<td>Heuristics</td>
</tr>
<tr>
<td>Non-technical Skills</td>
<td>Epiphanies</td>
</tr>
<tr>
<td></td>
<td>Geography</td>
</tr>
</tbody>
</table>
# 30 Cognitive Errors after Croskerry

<table>
<thead>
<tr>
<th>Aggregate bias</th>
<th>Gender bias</th>
<th>Psych-Out Errors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchoring</td>
<td>Hindsight bias</td>
<td>Representativeness</td>
</tr>
<tr>
<td>Ascertainment bias</td>
<td>Multip.Alternatives</td>
<td>Search satisficing</td>
</tr>
<tr>
<td><strong>Availability</strong></td>
<td>Omission bias</td>
<td>Sutton’s Slip</td>
</tr>
<tr>
<td>Base rate neglect</td>
<td>Order effects</td>
<td>Triage-Cueing</td>
</tr>
<tr>
<td>Commission bias</td>
<td>Outcome bias</td>
<td>Unpacking principle</td>
</tr>
<tr>
<td><strong>Confirmation bias</strong></td>
<td>Overconfidence</td>
<td>Vertical line failure</td>
</tr>
<tr>
<td>Diagnostic creep</td>
<td>Playing the odds</td>
<td>Visceral bias</td>
</tr>
<tr>
<td>Attribution error</td>
<td>Posterior prob.</td>
<td><strong>Ying-Yang Out</strong></td>
</tr>
<tr>
<td>Gambler’s Fallacy</td>
<td>Premature closure</td>
<td>Zebra retreat</td>
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*Note: The errors in yellow are particularly noteworthy.*
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   Targetted secondary exam

2. Mons: reassess
   Surface
   Invasive
   Real time or Delayed
   Tissue hypoxia

3. CDM
   Team work
   Task Mx
   Situation Awareness
   Critical Thinking

4. Differential diagnosis/ definitive diagnosis
   Immediate, medium term and long term treatment
Evidence Based Medicine

Clinician factors: judgment, affect, experience

Patient Factors
Solutions

• Training in critical thinking
• Training in major cognitive and affective biases
• Training in logical thought
• Awareness of self and metacognition
• Timely feedback
• Training in cognitive forcing strategies
“It sort of makes you stop and think, doesn’t it.”