Delirium

Derived from Latin ‘off the track’

Dr Shane Roche

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Definition

Diagnostic and statistical manual of mental disorders (DSM IV)

“Delirium is characterised by a disturbance of consciousness and a change in cognition that develop over a short period of time. The disorder has a tendency to fluctuate during the course of the day, and there is evidence from the history, examination or investigations that the delirium is a direct consequence of a general medical condition, drug withdrawal or intoxication.”
Prevalence

• 26 - 40% of older people attending A&E have cognitive impairment
• 10 - 31% of older patients on admission have delirium
• Community prevalence uncertain
• 17 - 33% patients with delirium or cognitive impairment identified in A&E

Incidence

• Incidence in hospital 15 -33%
• 50% post op ,80% in ICU
Delirium

- Elderly population
- 40% our inpatients over 65 yrs
- Dementia common in the elderly
- Age and dementia RF for Delirium

Cost for the NHS: LOS

- \( \uparrow \) mortality (2x) & morbidity, HAI Placements
- In 30% symptoms persist, worse prognosis
- Distressing for patients, families, staff

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Clinical assessment method

- Acute onset and fluctuating course – hours to days with lucid periods.
- Inattention – patient is easily distracted, attention wanders.
- Disordered thinking.
- Altered level of consciousness – Drowsy or overactive.
Case 1

- 84 yr old man with “acute confusion”
- History from wife and GP: 2 /52 behavioural change
- Wife frightened, he was hitting her, shouting , talking to the wall, not eating

Background of 1 year of mild cognitive impairment , COPD

- Medication
  Inhalers
- Mobility: good, no falls
- Function
  Independent with PADL’s
  Severe visual impairment
  Continent
  No carers
Examination and Investigations

- Weight 48kg, Afebrile
- HR 98 bpm, BP 122/56 mmHg
- RR: 26, SaO2 89% RA, wheeze
- Bladder not palpable, PR (NAD)
- **CNS:**
  - able to count fingers
  - no focal neurology
  - visual hallucinations
  - AMTS 3/10
- CRP 56
- PO2 8 on air
- WCC 13.3, Hb 12.0
- CXR hyper inflated lung
- ECG - SR
- Urine and blood culture no growth
- CT head: CVD
## Progress

### Diagnosis
- Delirium (hyperactive) using CAM
- Acute exacerbation of COPD
- Underlying dementia
- Visual impairment

### Management
- Tx for COPD
- Delirium: 1 to 1 nursing
- New POC
- LOS 10 days
- MMSE 20/30 (Memory clinic)
Case 2

- 94yr male

- Found by neighbour outside his house, shouting, not making sense

- Collateral Hx from daughter: his is acute, no recent fall or illness

- IPADL, lives alone, no history of cognitive impairment

- CVA 14yrs ago, minimal residual deficit

- HTN, ex smoker, prev high ETOH

- Med: Felodipine, Aspirin
Examination + Investigations

- Febrile, AMT 2/10
- Confused, agitated
- CVS, Resp, Abdo exam: NAD
- CNS difficult to assess
- Treated for UTI
  (urine culture positive, E coli)
- Constipation
- CT: Old CVA, CVD
- ECG: SR
- CXR: NAD
- Bloods: High CRP(120), WCC (16) and urea(10)
- Bloods improved with antibiotics and fluids within 3 days
Progress

- Patient remained confused
- Hyperactive delirium on CAM
- MMSE 12/30
- Help of 1 for all ADL, mobile with assistance of 1

- Rehab for 6 weeks
- Total LOS 9 weeks
- Home with POC

1) E.Coli UTI
2) New diagnosis of dementia
3) Delirium
### Risk factors for developing delirium

- Age, male sex
- Poor cognitive status
- Poor functional status
- Drugs
  - Post Operative
  - Fractured Femur
- Sensory impairment
- Severity of illness
- ICU admission
- Genetic: APO e4 allele 3x more likely to develop delirium.
Prevalence of Ageing health issues amongst acutely ill elderly patients aged over 70 years screened on 2 MFE wards

<table>
<thead>
<tr>
<th>%</th>
<th>Age 70-79</th>
<th>Age 80+</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 or more medications</td>
<td>78</td>
<td>70</td>
<td>74</td>
</tr>
<tr>
<td>Difficulty walking</td>
<td>50</td>
<td>59</td>
<td>54</td>
</tr>
<tr>
<td>Falls</td>
<td>26</td>
<td>50</td>
<td>39</td>
</tr>
<tr>
<td>Difficulty with PADL*</td>
<td>30</td>
<td>32</td>
<td>31</td>
</tr>
<tr>
<td>Cognitive problems</td>
<td>20</td>
<td>35</td>
<td>28</td>
</tr>
<tr>
<td>Incontinence</td>
<td>25</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Sensory disability</td>
<td>16</td>
<td>30</td>
<td>24</td>
</tr>
<tr>
<td>Mental health issues</td>
<td>13</td>
<td>17</td>
<td>15</td>
</tr>
<tr>
<td>Tissue viability risk</td>
<td>7</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>
Interrelationship between vulnerability and Insult

- **High level of vulnerability**
  - **Low-level insult**
    - ⇒ Moderate to high risk of developing delirium
  - **High-level insult**
    - ⇒ Very high risk of developing delirium

- **Low level of vulnerability**
  - **Low-level insult**
    - ⇒ Low risk of developing delirium
  - **High-level insult**
    - ⇒ Moderate to high risk of developing delirium
## Aetiology

### Table 2. Causes of delirium in 171 patients\(^a\)

<table>
<thead>
<tr>
<th>Cause</th>
<th>No. of cases</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infection</td>
<td>73</td>
<td>34</td>
</tr>
<tr>
<td>Chest</td>
<td>40</td>
<td>-</td>
</tr>
<tr>
<td>Urinary</td>
<td>25</td>
<td>-</td>
</tr>
<tr>
<td>Other</td>
<td>8</td>
<td>-</td>
</tr>
<tr>
<td>Stroke</td>
<td>24</td>
<td>11</td>
</tr>
<tr>
<td>Drugs(^b)</td>
<td>24</td>
<td>11</td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>Fractures</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Hip</td>
<td>7</td>
<td>-</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Carcinoma</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Fluid and electrolyte imbalance</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>Heart failure</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Diabetes (hypo- or hyperglycaemia)</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Peripheral vascular disease/gangrene</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Alcohol withdrawal</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Gastrointestinal bleed</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Respiratory failure</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Pulmonary embolus</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Anaemia</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Perforation of duodenal ulcer</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Subdural haematoma</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Brain tumour</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>217</strong></td>
<td>-</td>
</tr>
</tbody>
</table>

\(^a\)42 patients (25%) had two or more equally contributory causes.

\(^b\)Analgesics, hypnotics, sedatives and anti-cholinergic drugs.
Drug causes of Delirium
Severe risk

– Benzodiazepines.
– Opioid analgesics
– Anti Parkinsonian agents
– Tricyclic antidepressants
– Lithium
– Steroids
Why do patients develop delirium?
Pathophysiology

Two stress response systems thought to be involved

1- Inflammation and sickness behavior response
2- Activity of the limbic-hypothalamic-pituitary-adrenal axis

Proposed etiological factors: (a) Direct brain insults and (b) aberrant stress responses

Direct brain insults: sepsis, infection, drugs, vascular
Aberrant stress responses: neurotransmitter depletion, Ach, dopamine increase, cytokines affecting BBB

Ageing and CNS diseases alter magnitude or duration of stress and sickness behavior responses

(Unraveling the path physiology of delirium: a focus on the role of aberrant stress responses. Maclullich AM et al)
Evidence

Haloperidol dopamine antagonist $\uparrow$ ACh release

Rivastigmine used for behaviour symptoms in dementia

Haloperidol is used to treat delusions and hallucinations and dementia

Some evidence for Noradrenalin and serotonin pathways involvement
Clinical features of delirium

- Acute onset
- Fluctuating course
- Inattention
- Disorganised thinking
- Altered level of consciousness
- Cognitive deficits
- Perceptual disturbances
- Psychomotor disturbances
- Altered sleep-wake cycle
- Emotional disturbances
I went to the doctor with fluid on the knee and he said "You're not aiming straight"
<table>
<thead>
<tr>
<th></th>
<th>Hypoactive type (25%)</th>
<th>Hyperactive type (25%)</th>
<th>Mixed type (50%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level of alertness</strong></td>
<td>Drowsy, lethargic,</td>
<td>Vigilant, hyper</td>
<td>Alternates</td>
</tr>
<tr>
<td></td>
<td>stays in bed</td>
<td>alert, hallucinate</td>
<td>between hypo/hy</td>
</tr>
<tr>
<td></td>
<td>Refuses therapy</td>
<td></td>
<td>p/hyper alert</td>
</tr>
<tr>
<td><strong>Ability to follow commands</strong></td>
<td>Able to follow</td>
<td>May be combative</td>
<td>Alternates</td>
</tr>
<tr>
<td></td>
<td>simple commands</td>
<td>pulls on tubes</td>
<td>between hypo/hy</td>
</tr>
<tr>
<td></td>
<td>Passively</td>
<td>Wants to climb out of</td>
<td>p/hyper alert</td>
</tr>
<tr>
<td></td>
<td>cooperative with</td>
<td>bed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>requests</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Likely complications</strong></td>
<td>Pressure sores</td>
<td>Falls</td>
<td>Pressure sores</td>
</tr>
<tr>
<td></td>
<td>Malnutrition</td>
<td>Malnutrition</td>
<td>Malnutrition</td>
</tr>
<tr>
<td></td>
<td>Loss of function</td>
<td>Over sedation</td>
<td>Loss of function</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Falls</td>
</tr>
</tbody>
</table>
Diagnosis

Practitioner awareness

- History

Acute onset / fluctuating course

Any acute illness

Collateral history important

Medications

Tools

- Confusion Assessment Method (CAM)
- Screening (for nurses)
- Delirium Observation Screening Scale (DOSS)
- EEG
- Biomarkers
- Computerised neuropsychological tests
CONFUSION ASSESSMENT METHOD (CAM) SHORTENED VERSION WORKSHEET

EVALUATOR: _______________________________  DATE: _______________________________

I. ACUTE ONSET AND FLUCTUATING COURSE
   a) Is there evidence of an acute change in mental status from the patient’s baseline?
      NO ________  YES ________
   b) Did the (abnormal) behavior fluctuate during the day, that is tend to come and go or increase and decrease in severity?
      NO ________  YES ________

II. INATTENTION
   Did the patient have difficulty focusing attention, for example, being easily distractible or having difficulty keeping track of what was being said?
      NO ________  YES ________

III. DISORGANIZED THINKING
   Was the patient’s thinking disorganized or incoherent, such as rambling or irrelevant conversation, unclear or illogical flow of ideas, or unpredictable switching from subject to subject?
      NO ________  YES ________

IV. ALTERED LEVEL OF CONSCIOUSNESS
   Overall, how would you rate the patient’s level of consciousness?
      -- Alert (normal)
         -- Vigilant (hyperalert)
         -- Lethargic (drowsy, easily aroused)
         -- Stupor (difficult to arouse)
         -- Coma (unarousable)
   Do any checks appear in this box?
      NO ________  YES ________

If all items in Box 1 are checked and at least one item in Box 2 is checked a diagnosis of delirium is suggested.
<table>
<thead>
<tr>
<th>OBSERVATION</th>
<th>Day shift</th>
<th>Evening shift</th>
<th>Night shift</th>
<th>TOTAL SCORE TODAY (0 - 39)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>never</td>
<td>sometimes</td>
<td>always</td>
<td>never</td>
</tr>
<tr>
<td>1</td>
<td>Dozes off during conversation or activities</td>
<td>0</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Is easily distracted by stimuli from the environment</td>
<td>0</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Maintains attention to conversation or action</td>
<td>1</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Does not finish question or answer</td>
<td>0</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Gives answers that do not fit the question</td>
<td>0</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>Reacts slowly to instructions</td>
<td>0</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>Thinks they are somewhere else</td>
<td>0</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>Knows which part of the day it is</td>
<td>1</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>Remembers recent events</td>
<td>1</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>Is picking, disorderly, restless</td>
<td>0</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>11</td>
<td>Pulls IV tubing, feeding tubes, catheters etc.</td>
<td>0</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>12</td>
<td>Is easily or suddenly emotional</td>
<td>0</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>13</td>
<td>Sees/hears things which are not there</td>
<td>0</td>
<td>1</td>
<td>-</td>
</tr>
</tbody>
</table>

**TOTAL SCORE PER SHIFT (0 - 13)**

**DOS SCALE FINAL SCORE = TOTAL SCORE TODAY / 3**

<table>
<thead>
<tr>
<th>DOS SCALE Final Score</th>
<th>&lt; 3</th>
<th>Not delirious</th>
<th>≥ 3</th>
<th>Probably delirious</th>
</tr>
</thead>
</table>

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Diagnosis

• Serum anticholinergic activity (SAA) is a suggested biomarker for anticholinergic burden and delirium risk, but the association with cerebral cholinergic function remains unclear
  (Thomas C as et al. BMC Neurosci. 2008 Sep 15;9:86)

• CT / MRI limited value in diagnosis
  (Soiza RL et al Neuroimaging studies of delirium: a systematic review)

• Quantitative activated spectral EEG : 4 studies
  Abnormal pattern in delirium, useful in hypoactive delirium or in patients with dementia
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Management of delirium

• Diagnosis
• Prevention

Multidisciplinary

Aims
Manage symptoms
Prevent complications
Education/training

Environment
quiet room
Reorientation TPP
Reduce ward moves

Nursing + therapy
1:1 nursing,
promote sleep and activity
Nutrition and hydration,
prevent pressure sores

Doctor
exclude acute illness
Sedation, Poly pharmacy
Pain
capacity
Can we predict?

Validated prediction model for in hospitalised elderly patients based on 4 risk factors at admission (Inouye et al)

1) Severe illness
2) Visual impairment
3) Cognitive impairment
4) High Ur/Creat ratio

Model revealed
83% incidence of delirium in the pts with 3 or 4 risk factors vs. 9% in pts with no risk factors
Prevention

• Limited evidence

• Pharmacological:
  1 trial with haloperidol in surgical patients, reduced duration of delirium and LOS

• Non pharmacological:
  1) CEA by geriatrician
     Cochrane: 6 RCT trials looking at prevention of delirium in surgical setting
     N = 833 patients
     Proactive CEA
     Incidence reduced by 50%, NNT 5.6 patients to prevent 1 delirium
Prevention

2) Environment:

Repeated orientation, promoting sleep, early mobilization, adequate hydration and minimising noise / stimuli shown to reduce incidence in high risk patients (Grade c)

3) Protocols:

Use of acute confusion/ delirium protocols have reduced incidence of falls by 25%, polypharmacy identified in 50% (Wisconsin, USA)
Prognosis

• 29% recover completely

• 32% persistent symptoms at discharge and 1 year

• 2 fold increased mortality at 1 year

• Incident but not prevalent delirium is predictor of LOS

• Duration and severity has an impact on LOS, complications and prognosis

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Identify all older patients (over 65 years) with cognitive impairment using the AMT or MMSE on admission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 2</td>
<td>Consider delirium in all patients with cognitive impairment and at high risk (severe illness, dementia, fracture neck of femur, visual and hearing impairment). Use the CAM screening instrument</td>
</tr>
<tr>
<td>Step 3</td>
<td>Identify the cause of delirium if present from the history – obtained from relatives/carers – examination and investigations. Treat underlying cause or causes – commonly drugs or drug withdrawal, infection, electrolyte disturbance, dehydration or constipation</td>
</tr>
</tbody>
</table>
| Step 4 | In patients with delirium and patients at high risk of delirium:  
**Do:**  
- provide environmental and personal orientation  
- ensure continuity of care  
- encourage mobility  
- reduce medication but ensure adequate analgesia  
- ensure hearing aids and spectacles are available and in good working order  
- avoid constipation  
- maintain a good sleep pattern  
- maintain good fluid intake  
- involve relatives and carers (carers leaflet)  
- avoid complications (immobility, malnutrition, pressure sores, over-sedation, falls, incontinence)  
- liaise with old age psychiatry service  
**Do not:**  
- catheterise  
- use restraint  
- sedate routinely  
- argue with the patient |
| Step 5 | If sedation has to be used, use one drug only starting at the lowest possible dose (haloperidol 0.5 mg currently recommended) and increasing in increments if necessary after an interval of two hours |
| Step 6 | Ensure a safe discharge and consider follow-up with old age psychiatry team.  
Provide family/carer education and support |

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Service Implications

• Screen on admission
• Identify high risk patients
• Identify incident delirium and treat early + Prevent complications
• Education + Training
  • Practice Development Nurse (like CCF, resp, diabetic)
• Hospital protocol
  • Systems reviewed regularly, Audit
• Research: Use of dementia drugs in delirium (Trial)
My wife said "Watcha doin' today?"
I said "Nothing"
She said, "You did that yesterday"
I said "I wasn't finished."

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Summary

• Importance of diagnosis

• Delirium

• RCP Guidelines

• Service development