Back to the bedside? Making clinical decisions in patients with a prolonged disorder of consciousness.

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- Court of Protection, Court 33, case of **N**
  - 54 yr old, MS 25 yrs, unconscious 5+ years
  - Previously not wanted to live if disabled
  - 1.5 yrs of resistance to Best Interests meeting
- Court case raised two questions:
  - Does diagnosis (of VS) apply in MS?
  - If so, was she in Vegetative State or not
    - Hinged on relevance of visual tracking

Some witnesses absent; ***no decision***

Content

- History/legal
  - why it matters
- Determining consciousness
  - Clinical
  - Signs & Tests
- Categorisation
- Best Interests

Messages

- No separate state of being unaware
  - just one end of a continuum
  - always a level of uncertainty
    - state and prognosis
- Stop determining if in VS or not
  - Revoke legal 'Practice Direction'
    - Court involvement has many disadvantages
    - Use Best Interests process from outset
  - Measure awareness with CRS-R/WHIM
- Need expert clinical service to manage

Cause of disordered consciousness

- Original working group (1994) agreed
  - Acute brain damage
    - Hypoxia, trauma, vascular, infective etc
  - Degenerative/metabolic (adult, children)
    - Alzheimers, Huntington's, Adrenoleukdystrophy
  - Developmental
    - Hydrocephalus, microcephalus etc

Bland 1993

- Decided that:
  - feeding and hydration were treatment
  - he was and **would always be** unaware
  - he had **no** interest in decision about treatment
  - treatment was futile (he gained no benefit)
  - therefore could withdraw treatment
- **Not** a Best Interests decision
  - (although Best Interests are often mentioned)

Decisions, if lacks capacity

- Mental Capacity Act (MCA) 2005
- **Best Interests** – what the person would (have) wanted or decided
  - **Not** same as prolonging life
  - Reflects person's attitudes & beliefs
    - from statements **and** behaviours
- Process set out in MCA
  - Relatives: inform on attitudes/beliefs
  - Decision maker (healthcare): makes decision

The problem - 1

- The Court of Protection's Practice Direction 9E [2015] contains the advice originally given in 1993:
  - "*decisions about the proposed withholding or withdrawal of artificial nutrition and hydration from a person in a permanent vegetative state or a minimally conscious state*" should be brought to the Court

The problem - 2

- Legal position has generalised:
  - at any time; well before **permanent**
  - To any treatment; not simply stopping hydration/feeding
- Consequences are:
  - this stops or delays decisions, so that
    - families and others are distressed/stressed
    - Best Interests are not considered for any treatment

Problems - causation

- These problems arise because:
  - Clinicians, managers, and lawyers all lack experience, knowledge and skills
  - Everyone is risk-adverse
  - Many people cannot/will not consider anything less than doing ‘everything possible’, for ever

Problems – legal consequence

- Since Bland the legal focus has been on
  - Is patient in the vegetative state, or not?
    - **not** on the person's Best Interests
- The evidence is all concerned with assessment of awareness/consciousness
  - Clinical staff also focus on this and ignore
    - causation, and whether it can be improved
    - other aspects of management
    - the patient's best interests in any decision

Brain-stem death

- Observed that if no brain-stem function, always died in short-time despite ventilation
- Devised clinical tests of brain-stem function
  - if absent, person declared legally dead
  - tests did **not** test whether person was dead
    - tested integrity or otherwise of brain-stem function
- Court **not** involved

Consciousness

- Neurophysiological substrate not known
  - Probably a 'whole system, network' property
- Therefore
  - need to determine consciousness clinically
  - cannot test for integrity of identified specific brain structures supporting consciousness

Consciousness – simple guide!

- Two aspects
  - **experiential** – what it feels like to be cold, angry, hungry, in pain
    - *"what is it like to be a bat"* (Thomas Nagel, 1974)
  - **cognitive** – awareness of self and environment
- No single 'test'.
  - *"we can only infer the presence or absence of conscious experience in another person"*

Consciousness & responsiveness

- Comatose patients are responsive
  - basis of Glasgow Coma Scale
  - may respond to pain, noise, light etc
- Unconscious people may move
  - blink, posturing, spontaneous movement
- In prolonged unconsciousness, sleep-wake cycle returns, usually within 4 weeks
  - open eyes, eyes move etc

Patients who are unaware may

- Localise stimuli (noise, touch, light)
  - *"However, patients in a vegetative state often have inconsistent primitive auditory or visual orienting reflexes, characterized by a turning of the head and eyes towards peripheral sounds or movements. "*
- Show spontaneous movements
- Grunt, cough, vocalise, swallow
- Show reflex and automatic behaviours
  - E.g. alert or startle to sudden stimulus

Awareness – clinical assessment

- Observe a patient's behaviour (spontaneous and stimulated).
- Ask the question, *"To what extent does the observed behaviour require (a) extracting some specific meaning from a stimulus* ***and/or*** *(b) formulating and acting towards some specific abstract goal?"*
  - Look for evidence of **discrimination** between or recognising **significance** of stimuli

Variation in consciousness

- Level of consciousness varies
  - normal variation over-time:
    - sleep-wake; drowsiness; day-dreaming; hyper-alert; alcohol etc
  - varies in people with brain dysfunction
    - coma levels (GCS 3-8); MCS, VS, etc

Assessing presence of awareness

- Methods used
  - Single physiological signs
    - visual pursuit (tracking)/fixation
    - visual threat
  - Technologically-based physiological tests
    - fMRI, EEG
  - Formal multi-item clinical batteries
    - Coma Recovery Scale – Revised
    - SMART, WHIM and others

Problem with tests/signs

- No agreed validation criterion
  - Only one available is clinical judgement
    - human assessment taking all observations into account
    - The pattern & consistency of observations
- Any *test* has false positive and false negative rate
  - inevitable consequence of being a surrogate marker

Visual Pursuit - 1

- Evidence review said that some patients in vegetative state *"have some degree of briefly sustained visual pursuit or tracking"*
  - therefore cannot indicate consciousness

Medical aspects of the persistent vegetative state (1).
The Multi-Society Task Force on PVS.
N Engl J Med 1994;330:1499–508.

Visual pursuit - 2

- 10 patients in stable VS
  - 5/10 patients had visual fixation

Bruno MA et al. Visual fixation in the vegetative state: an observational case series PET study. BMC Neurol 2010;10:35.

- 14 patients in VS, 16 patients in MCS
  - Visual pursuit in:
    - 5/14 VS patients (36%)
    - 12/16 MCS patients (75%)

Riganello F et al. Visual pursuit response in the severe disorder of consciousness: modulation by the central autonomic system and a predictive model. BMC Neurol 2013;13:164.

Visual pursuit - 3

- 9 patients in VS, 13 patients in MCS
  - 3 (33%) of VS patients showed pursuit
  - 5/13 (38%)MCS patients did **not** show pursuit

Candelieri A et al. Visual pursuit: within-day variability in the severe disorder of consciousness. J Neurotrauma 2011;28:2013–17.

- 9 patients in VS, 9 patients in MCS
  - Time on-target of moving stimulus
    - VS: 2.4% to 9.9% time on-target
    - MCS: 7.6% to 93.3% time on target

Trojano L et al. Quantitative assessment of visual behavior in disorders of consciousness. J Neurol 2012;259:1888–95.

Visual pursuit

- A prognostic factor (*several studies*)
  - Presence increases probability that consciousness will return
- Becomes more apparent and more accurate as consciousness returns
- Not itself indicative of consciousness

fMRI

- Model = changes in local blood flow is associated with specific cerebral tasks
- 23 patients VS, 31 patients MCS
  - 4/23 VS positive, only 1/31 MCS positive
    - 2/4 VS were in early phase (2 & 6 mths after TBI)
- Strong arguments against published

Monti MM et al. Wilful modulation of brain activity in disorders of consciousness. N Engl J Med 2010;362:579–89.

Nachev P, Hacker PMS. Covert cognition in the persistent vegetative state. Prog Neurobiol 2010;91:68–76.

EEG

- Model = changes in EEG associated with specific cerebral tasks
- 16 patients in VS
  - 3 showed positive EEG changes (statistically)
    - one of three in early phase (3 months post-TBI)
- Significance & interpretation debated

Cruse D et al. Bedside detection of awareness in the vegetative state: a cohort study. Lancet 2011;378:2088–94.

Mashour GA, Avidan MS. Capturing covert consciousness. Lancet 2013;381: 271–2.

SMART

- Originally a treatment planning tool
- Original study on 60 people, not validated
- Methodological problems
  - Why are 5 consecutive observations ‘significant’ but 5 non-consecutive observations not?
  - How does one account for chance?

WHIM

- 63 items, naturalistic observation
- Poor item description
  - *Vocalises to express mood or needs*
  - *Frowns, grimaces etc to show dislike*
- Recently tested against clinical diagnosis
  - Item order changed
- Most patients were in early, recovery phase

Proposed reordering of WHIM items.

Description	New Order	VS n=336	MCS- n=309	MCS+ n=483	Compatibility
Eyes open briefly	1	92%	94%	99%	VS
Eyes open for extended Period	2	85%	88%	97%	VS
Eyes open/move - do not focus on object/ person	3	78%	88%	94%	VS
Mechanical vocalisation (with yawn, sigh etc)	4	24%	36%	36%	VS
Grinding of teeth/clamping down of teeth	5	21%	18%	16%	VS
Looks at person briefly	6	14%	65%	94%	VS
Attention held momentarily by dominant stimulus	7	12%	67%	94%	VS
Frowns, grimaces to show dislike (eg during handling)	8	11%	20%	31%	VS
Makes eye contact (briefly)	9	5%	35%	76%	VS
Volitional vocalisation to express feelings / discomfort	10	1%	18%	28%	VS
Marked Arousal/agitation - prior urination/defaecation	11	1%	1%	2%	VS
Looks at person giving attention	12	1%	36%	74%	VS
Looks at person who is talking to them (at least 3 secs)	13	1%	32%	71%	VS
Maintains eye contact for 5 seconds or more	14	3%	28%	59%	VS
Crying	15	1%	3%	6%	VS
Smiles for any reason	16	0%	0%	21%	VS
Eyes follow person moving in line of vision	17	1%	38%	73%	MCS-minus
Turns head/eyes to look when someone is talking	18	1%	25%	66%	MCS-minus
Watches person moving in line of vision	19	0%	27%	63%	MCS-minus
Tracks for 3-5 seconds	20	1%	24%	59%	MCS-minus
Performs physical movement on verbal request	21	2%	20%	55%	MCS-minus
Looks at object when requested	22	0%	15%	42%	MCS-minus
Tracks a source of sound	23	1%	9%	44%	MCS-minus
Seeks eye contact	24	0%	6%	37%	MCS-minus
Imitates gestures (blink x2, thumb up etc)	25	0%	10%	22%	MCS-minus
Shows selective response to preferred people	26	0%	4%	11%	MCS-minus
Looks at and apparently explores pictures eg TV, magazine	27	0%	1%	27%	MCS-minus
Switches gaze spontaneously from one person to another	28	0%	1%	22%	MCS-minus
Choose an object when requested	29	0%	2%	15%	MCS-plus
Looks for object that has been shown and then removed	30	0%	0%	16%	MCS-plus
Vocalises to express mood or needs	31	0%	0%	16%	MCS-plus
Can attend to task - concentration is vulnerable	32	0%	0%	14%	MCS-plus
Speaks (vocalises) in whispered tones	33	0%	0%	12%	MCS-plus
Monosyllabic or single words in response to questions	34	0%	0%	12%	MCS-plus
Silent mouthing	35	0%	1%	11%	MCS-plus
Is able to ignore distraction	36	0%	1%	7%	MCS-plus
Indicates understanding by a headshake, nod, gesture etc	37	0%	0%	7%	MCS-plus
Laughs (sounds to express amusement)	38	0%	0%	6%	MCS-plus
Momentarily distracted by ext. stimuli, can return to task	39	0%	0%	6%	MCS-plus
Expletive utterance	40	0%	0%	3%	MCS-plus
Brief phrases	41	0%	0%	3%	MCS-plus
Can say what part of day it is	42	0%	0%	2%	MCS-plus
1 or 2 orientation items correct	43	0%	0%	2%	MCS-plus
Points with Eyes	44	0%	0%	1%	MCS-plus
Uses one or two gestures	45	0%	0%	1%	MCS-plus
Names or indicates left and right on self	46	0%	0%	2%	MCS-plus
Knows the name of one member of staff	47	0%	0%	2%	MCS-plus
Monosyllabic or single words to express mood or need	48	0%	0%	1%	MCS-plus
Uses writing, typing or other communication aid	49	0%	0%	1%	MCS-plus
Speech is established – but content indicative of problems	50	0%	0%	1%	MCS-plus
Speech is fluent but rambling	51	0%	0%	0%	MCS-plus
Can find a specific playing card from selection of four	52	0%	0%	0%	MCS-plus
Conventional speech – but with few words	53	0%	0%	0%	MCS-plus
Recognises coins	54	0%	0%	0%	Emerged
Initiates conversation	55	0%	0%	0%	MCS-plus
Vocalises to attract attention	56	0%	0%	0%	MCS-plus
Knows the price of 3 common objects	57	0%	0%	0%	MCS-plus
Uses writing, typing or other communication aid fluently	58	0%	0%	0%	Emerged
3-5 orientation items correct	59	0%	0%	0%	Emerged
Remembers something from the day before	60	0%	0%	0%	Emerged
Remembers something from earlier in the day	61	0%	0%	0%	Emerged
Out of Post Traumatic Amnaesia	62	0%	0%	0%	Emerged

Lynne Turner-Stokes et al. BMJ Open 2015;5:e006051

BMJ Open

Coma Recovery Scale - Revised

- The best, but:
  - has false positives and false negatives
- 103 patients, clinical consensus diagnosis
  - 44 clinically VS; CRS-R rated 18 as MCS
  - *Authors did not report converse (MCS -> VS)*

Schnakers C et al. Diagnostic accuracy of the vegetative and minimally conscious state: clinical consensus versus standardized neurobehavioral assessment. BMC Neurol 2009;9:35.

Disordered consciousness varies

- Hour to hour and day to day
  - best in the morning
- Occasional more extreme
  - Talking (Aylesbury Duck)
- Late 'recovery'
  - most reports not true
  - but ?6 of 50 did?

Estraneo A et al. Late recovery after traumatic, anoxic, or hemorrhagic long-lasting vegetative state. Neurology 2010;75:239–45.

Separation of VS/MCS

- Systematic review concluded:
  - *"Overall, there was no combination of variables that allowed reliably discriminating between VS and MCS. This pattern of results casts doubt on the empirical validity of the distinction between VS and MCS."*

Liberati G, Hünefeldt T, Olivetti Belardinelli M. Questioning the dichotomy between vegetative state and minimally conscious state: a review of the statistical evidence. Front Hum Neurosci 2014;8:865.

Categorisation

- Distinction of VS from MCS
  - *"Dr Wade, is true to say that, if the vegetative state were an exclusive club, it would have become increasingly difficult to join over the last twenty years?"* (Mr Justice Hayden, 2015)

Categorisation

- Is there a categorically different state, VS?
- Or are people along a continuum?

- If there is a categorical difference:
  - how does one explain seamless change (during recovery)?
  - what signs identify it?

Why is categorisation needed?

- Legally at present in UK when withdrawal of hydration is being considered:
  - **If** patient is in **Permanent Vegetative** State
    - patient has **no** interest in treatment
    - therefore can withdraw hydration
  - **But** if patient is **minimally** aware or above
    - Patient **does** have an interest
    - therefore needs a **Best Interests** decision about continuing hydration

Awareness – a multi-faceted state?

- Likely that awareness has components
  - wakefulness and attention
  - emotional awareness
  - internal states (hunger etc)
  - somatic awareness
  - awareness of time
  - self awareness (situation)
- Likely that recovery of components is piecemeal and variable

Categorisation of state possible?

- People in PDOC are on a continuum
  - no consciousness – reduced quality and/or quantity – 'normal', with reduced cognition
- No firm distinction VS/MCS/severe loss
  - slow increase in level of responsiveness
    - probably variable order of recovery of components
    - Probably slow increase in 'active' components
  - fluctuation in awareness state

Prognosis - legal view

- *"It is sufficient to say that it arises from the destruction, through prolonged deprivation of oxygen, of the cerebral cortex, which has* ***resolved into a watery mass****."*
- *"There are techniques available which make it possible to ascertain the state of the cerebral cortex, and in Anthony Bland's case these indicate that, as mentioned above, it has* ***degenerated into a mass of watery fluid.****"*

Categorisation of prognosis?

- Prognosis also uncertain
  - becomes more certain over time
  - never reaches 100%

Conclusions - 1

- All patients (in PDOC) show responses, and spontaneous movements.
- Consciousness in a patient
  - Varies in quality (what is seen) and quantity (how often, how long) over time
  - Is always somewhere along a continuum
  - Is not securely categorised as VS or MCS

Conclusions - 2

- Prognosis
  - Changes as time passes:
  - For acute injuries:
    - Range of probable outcomes narrows over 6-12 months, exponentially
    - But recovery of some consciousness **may, rarely** occur after 'permanence'
  - For degenerative conditions the same applies, in reverse

Conclusions - 3

- The legal question (VS or MCS?) is not answerable with 100% certainty:
  - level of consciousness, **or**
  - possibility of (brief) return of consciousness
- Therefore the legal system should **either**:
  - Only consider Best Interests, **or**
  - Return majority of decisions to clinical team

WHY?

Current 'system' dysfunctional

- Patient's perspective
  - All attention is on very active treatment until able to go to Court (often legally advised)
    - No Best Interests meeting about any decision
    - Often subject to apparently, arguably 'inhuman and degrading treatment'
  - Lack of interested experts
    - Failure to manage well (e.g. posture)
    - Failure to diagnose properly (e.g. sedation by unneccessary drugs)

Current 'system' dysfunctional

- Relative's perspective
  - No Best Interests process
    - Failure to ask about patient's wishes, views
    - Failure to respect patient's wishes, views
  - Inadequate &/or incorrect information
    - Clinically - no involvement of expert service
    - Legally – about process etc
    - Prognostically - no involvement of expert service
  - Not engaged in process, not respected

Current 'system' dysfunctional

- Public perspective:
  - Delays and costs associated with process
    - Treatment: whether or not to withdraw
    - Care/rehabilitation: who funds, where etc
    - Avoidable complications
  - Cost of care
    - Ongoing cost = £100,000 pa
- **Also see**: *JJ Fins. Rights come to mind. Cambridge University Press 2015*

Treatment & epidemiology

- Craniectomy in severe TBI with raised ICP
  - Vegetative state up from 1.7% to 6.2% (3.6x)

- Unknown, but estimate:
  - 6000 in PVS from acute damage (600/pa)
    - Cost = £600,000,000 per annum care cost (NHS)
  - 12,000 in PVS from degenerative disorders
  - 36,000 in MCS (any cause)
    - Cost = £3.0 billion / year

Future - 1

- Need a full public debate about ethical and legal aspects of resource use
  - Managing 1 person in VS for 10 years 'costs'
    - Five avoidable deaths in other people, **or**
    - 100 people cannot have a hip replacement, **or** …
- Need debate about the decision-making process
  - Role of legal system

Future - 2

- Active use of Best Interests from outset
  - For all significant decisions, including starting gastrostomy use
- Remove all requirement to use legal process
  - Return to position for all other healthcare decisions
    - For any exceptional or disputed circumstance
- Stop categorising state and prognosis

Future - 3

- Move to default of
  - Stopping active intervention when:
    - Awareness is low level and/or short duration, **and**
    - Prognosis for acceptable (to patient) recovery is less than 5% probable (best estimate)
- Not to be a rule; exceptions allowed e.g.
  - Known strong belief in not allowing withdrawal

Future - 4

- Requires:
  - Ready access to expert service within 4 weeks
    - Earlier would be better
  - Continued involvement of expert service while still has a disordered level of consciousness or is severely disabled
  - Training of all acute surgical/medical services in need to use Mental Capacity Act at all times for everyone with loss of consciousness

Wednesday, November 4th 2015

- Official solicitor withdrew opposition
  - Strongly influenced by family evidence
    - Patient would not have wanted to continue
- Judge decided
  - Could not overlook National Guideline
    - Therefore decided she was aware
    - Therefore decided had to decide on Best Interests
  - Considered all evidence
    - Agreed continued hydration was not in her Best Interests

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