Outline

- Approach
- Definitions
- Cases
I WATCH DEATH

- Infectious
- Withdrawal
- Acute Metabolic
- Trauma
- CBS
- Hypoxia/hypercarbia
- Deficiencies
- Environmental/Endocrine
- Acute Vascular
- Toxins/Drugs
- Heavy Metal
Infectious

- Sepsis, IE, encephalitis, meningitis, central nervous system abcess
Withdrawal

- Alcohol, benzos, barbiturates,
Acute Metabolic

- Hypo/hyperglycemia
- hypo/hypernatremia
- hypercalcemia
- hypomagnesemia
- acidosis
- renal failure
- hepatic failure
Trauma

Head trauma
CNS Disease

- SAH, EPH, SDH,
- tumor,
- post-ictal,
- vasculitis
Hypoxia/Hypercarbia

- Various hemoglobinopathies as well
  - E.g. carboxyhemoglobin
Deficiencies

♀ B12, thiamine
Environmental/Endocrine

- Hypo/hyperthermia
- hyperthyroid
- hypocortisolemia
Acute Vascular

- Hypertensive emergency
- Sagittal vein thrombosis
- SAH
Toxins/Drugs

- Street drugs
- EtOH, MeOH
- CO, industrial poisons (CN)
- Medications
  - esp psychiatric
Heavy Metal
Definitions

- **Organic brain syndrome** = delirium = acute confusional state = metabolic encephalopathy = reversible cerebral dysfunction
- Reduced ability to focus, maintain or shift attention
- Cognitive dysfunction -- memory, language orientation -- not due to pre-existing dementia
- Develops over hours to days and tends to fluctuate throughout day
Making the Diagnosis

● Confusional Assessment Method (CAM)
  ▶ acute onset and fluctuating course
  ▶ inattention
  ▶ disorganised thinking
  ▶ altered LOC
    ◆ need to have first 2 and 1 of last 2
    ◆ sens 90% and spec 95% (?Gold standard)
Generalised alteration in cerebral metabolic activity

cerebral cortex and subcortical structures affected

causes changes in alertness, arousal, attention and ability to process information

Ach transmission implicated

elderly more susceptible

medication MC cause (upto 40%) Rosen 2002.
Case 1

- 36 yo woman with a history of anxiety attacks
  - c/o difficulty breathing and chest pain. Can’t catch her breath.
  - Sudden onset approx 45 minutes ago while on the phone with her boyfriend who she is having relationship problems with.
  - Said she almost fainted, then called 911.
Case 1

- PMH:
  - post-partum 3 weeks uncomplicated vaginal delivery of FT male
  - anxiety without agoraphobia
  - depression
  - previous suicide attempts
  - under the care of a psychiatrist
Case 1

O/E

110, 25, 90% on RA 110/80, 37.9, c/s 4.2.
- pale, moderate respiratory distress, anxious.
- Won’t answer questions; thinks its 1999.
- maybe JVP up
- resp exam normal
- CVS exam tachycardic, no murmurs, no edema or signs of increased right heart pressure. Peripheral pulses present
- remainder of exam WNL
Case 1

What’s your top 3?
- I WATCH DEATH

Investigations?

Nurse wants her out of the monitored area and into a psych room

CXR normal
ECG sinus tach
7.47/90/30/20/-4(nrb)
CBC normal
Lytes normal, no gap
d-dimer >1.00
TnT 0.04
??
Case 1 -- PE
Case 2

82 yo woman sent from Crossbow
- has become drowsy but also intermittently belligerent to staff and family over last 2 days
- nausea and vomiting
- refusing to eat
- usually she is up and around by herself but recently has not been.
- Incontinent of urine
Case 2

No current complaints except that you let her go back to work

O/E

70, 100/60, 96% r/a, 18, 38.2, c/s 6.0.

- alert, disoriented to year and place
- thin and pale, in NAD
- no meningismus/lymphadenopathy, JVP 3 cm ASA
- Resp/CVS normal
- Abd -- generalised tenderness lower quadrants
- GU -- ?suprapubic tenderness. No CVA.
- Ext -- no rashes
Case 2

**Differential?**
- I WATCH DEATH

**Investigations?**
- WBC 3.1 all neuts
- Hb/PLT normal
- Lytes normal, AG 14
- Cr 100 BUN 6.0
- U/A +nitrites/leuks/blood/ketones
Case 2 -- Urosepsis
Case 3

33 yo woman brought in by husband

c/o incoordination and severe restlessness in her legs over last few days.

Husband states she has recently become confused and today asked him how many years they’d been married.
Case 3

Ã— PMH: hypertension, bipolar.

Ã— Meds: lithium, prozac, clomipramine (recently started by psychiatrist)

Ã— O/E

- 110, 130/90, 25, 99% r/a, 39.2.
- Diaphoretic, in NAD, restless
- pupils 6mm, reactive, no meningismus
- resp/cvs/abd normal
- fine tremor
- increased tone symmetrically
- ?hyperreflexic
Case 3

Investigations

- cbc, lytes, AG, cr, lfts, d-dimer, tnt all normal
- tox screen neg
- ecg normal
- cxr normal

Top 3

- serotonin syndrome
- NMS
- sympathomimetic
- anticholinergic
Case 3 -- Serotonin Syndrome

- **Cognitive-behavioural**
  - confusion, disorientation, agitation, restlessness
- **Autonomic dysfunction**
  - hyperthermia, diaphoresis, tachycardia
- **Neuromuscular symptoms**
  - myoclonus, hyperreflexia, rigidity

- **ABCs**
- **aggressive cooling**
  - BDZ for neuromuscular symptoms (titrate to effect)
  - consider serotonin receptor antagonists
    - cyproheptadine
Syndromes with altered mentation and hypertonia

EMR March 1999

- Serotonin syndrome
- Malignant hyperthermia
- Neuroleptic malignant syndrome
- Thyrotoxicosis
- Heatstroke
- CNS hemorrhage
- Tetanus
Case 5

- 23 yo girl brought by EMS from drop-in
  - she’s yelling and is uncooperative
  - EMS say they think she may be diabetic

- VS 130, 100/60, 30, 97% r/a, 36.5
  - c/s 23.4
- Top 3?
Case 5

- ABG 6.9/130/26/10/-12
- CBC normal
- Lytes 140/5.3/95/10  AG 35 Cr 110 Bun 9
- u/a ketones

Diagnosis?
- DKA
45 yo male brought in by partner for acute change in mentation

- Partner states patient has HIV/AIDS and over last 12 hours has become drowsy, disoriented and is ‘unlike himself’.
- PMH: recent admission for PCP, last serology and titres unknown.
- Meds: 3TC, AZT, nelfinavir
- c/o headache
Case 6

o/e

- 96,110/80,20,90% r/a, 38.0, c/s 6.8
- GCS 13 (E3,V4,M6) disoriented to place and year
- dry and cachectic
- ?meningismus ?fundoscopy, no lymphadenopathy
- no focal neurologic signs
- resp/cvs/abd wnl
- no rashes
Consent for LP in delirium

Case 6

Anything else?

Top 3

Investigations
- CT
- LP
- CBC

antibiotics? SOC?

Steroids? When?

Meningitis
- HIV/AIDS
  - bacterial (strep or neisseria)
  - toxoplasmosis
  - cryptococcus
  - CMV
  - HSV
  - lymphoma
Case 7

50 yo male brought from cells for uncontrollable behavior. Maybe a seizure.

- known alcoholic
- picked-up yesterday night (approx 18hrs ago) on an outstanding charge. Last EtOH unknown.
- PMH -- unknown
- Med -- unknown
- Allergies -- unknown
Case 7

o/e

- 130, 160/90, 30, SaO2?, T 39.5, c/s 2.1
- restless and very agitated, sweating.
- Pupils 5mm, reactive
- Visual hallucinations
- Coarse tremor
- Urinary incontinence
Case 7

Top 3?
- EtOH withdrawal
- Meningitis
- Sympathomimetic OD

Investigations
- CT head normal
- LP normal
- CBC, lytes, AG, Cr, BUN, LFTs, INR normal
- Tox screen neg.

What is this?

Alcohol Withdrawal Syndromes
- Minor
  - 6-36hrs
  - Mild autonomic dysfunction, nausea, anorexia, coarse tremor, tachycardia, hypertension, hyperreflexia, and anxiety

- Major
  - 24hrs to 5d
  - Above plus hypertonia, hyperthermia, hallucinations

- Delirium tremens
  - ...
Delirium Tremens

- Medical emergency
- Extreme end of withdrawal spectrum
- Gross tremor, profound confusion, fever, incontinence, frightening visual hallucinations, and mydriasis
- Only 5% of patients hospitalized for alcohol withdrawal develop delirium tremens
- Untreated -- mortality 10%
Case 8

27 yo male

- picked-up by CPS for yelling and shouting at people at LRT station
- many previous visits for psychotic symptoms
- unsure about compliance with meds
- he states that he’ll talk to you if you can establish your level of clearance
Case 8

o/e

- 90, 120/80, 20, 99% r/a, 37.1, c/s 6.8
- dishevelled, oriented, distracted, irritable
- flat affect, disorganized thought
- admits to auditory hallucinations
- speech is clear
- physical exam in psych room
  - are you going to do one?
Case 8

P/E

- poor hygiene and dentition
- rest wnl

Any investigations?

Korn et al Journal of Emergency Medicine 2000 18(2)173-

- retrospective review
- in pts with prior psych history and who present with an isolated psych complaint
- with normal vitals and normal exam
- 'little benefit from lab tests or imaging.
## Psychiatric vs Functional

### EMR SEPT 2002

<table>
<thead>
<tr>
<th>PSYCHIATRIC</th>
<th>ORGANIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>age 13-40 yrs</td>
<td>&lt;12 &gt;40</td>
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<tr>
<td>gradual [weeks-months] onset</td>
<td>acute onset</td>
</tr>
<tr>
<td>scattered thoughts</td>
<td>fluctuating symptoms</td>
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<tr>
<td>auditory hallucinations</td>
<td>disorientation</td>
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<tr>
<td>awake and alert</td>
<td>visual hallucinations</td>
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<tr>
<td>flat affect</td>
<td>emotionally labile</td>
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<tr>
<td></td>
<td>abnormal vitals</td>
</tr>
</tbody>
</table>
Case 4

16 yo male you intubated on his birthday for a GCS of 5 following a night of celebration.
- His friends who dropped him off denied use of drugs or toxic alcohols
- State he’s an otherwise healthy guy on the hockey team
- 30 minutes after the tube...
Case 4

- **40.3, 130, 160/80**
- respirator alarming d/t high insp pressures
- masseter muscle spasm and generalised hypertonia symmetric throughout

- **Malignant Hyperthermia**
  - d/s precipitating agent
  - dantrolene boluses of 2mg/kg to max 10mg/kg over 24hrs
  - cooling measures prn
  - supportive measures
Case 9

25 yo male with diarrhea x3/52 brought in by sister for acute onset confusion

- multiple ?bloody episodes/day, none formed
- mild abdominal pain and emesis as well
- no recent travel, well water, uncooked meat

PMH: Crohn’s for 3yrs; 2 exacerbations requiring hospitalisation. Not taking steroids
Case 9

- **o/e** 100, 110/70, 16, 99% r/a, T 36.5, c/s 3.9.

  - c/o intermittent blurred vision, no H/A

  - He was oriented to person only and was able to follow one-step commands.

  - Marked confusion and agitation. Recent memory was impaired, but long-term memory was intact.

  - Abdominal examination unremarkable. The patient complained of double vision on lateral gaze, and there was limitation of lateral eye movements bilaterally. Motor power was normal, and deep tendon reflexes were diminished in the legs. There was mild dysmetria on finger-to-nose testing and marked heel-to-shin ataxia. Gait was wide-based.

- ???
Case 9

★ Top 4?

★ Investigations?

★ Empiric treatment?

★ Wernicke’s Encephalopathy

- Ophthalmoplegia, ataxia and confusion
  - Ophthalmoplegia usually bilateral horizontal nystagmus or bilat CN VI palsy
- Due to thiamine deficiency
- Pathology confined to mammillary bodies, cerebellum and hypothalamus
Wernicke’s Encephalopathy

- **Acute Treatment**
  - iv thiamine
  - opthalmoplegia usually resolves within 30mins
  - ataxia and confusion slower to resolve
Case 10

39 yo woman, previously healthy.

- brought in by husband for 3-4 days of intermittent disorientation and yellow eyes.
- Can’t remember what she was doing or where she was this am
- not complaining of new pains but says has felt warm over last 3-4 days.
- PMH/Meds/Allergies: none stated
Case 10

**O/E**

- 90, 20, 120/80, 96% R/A, 39.0, c/s 4.2.
- Pale mucous membranes
- Scleral icterus
- Resp/CVS/GI exam normal
- Alert and oriented to year and month, thinks she is in McDonalds
Case 10

- Hb 80, Plts 80, smear pending
- bili 40
- LFTs normal
- Cr 120 (? prev)
Thrombotic Thrombocytopenic Purpura

- Pentad of altered mentation, thrombocytopenia, hemolytic anemia, ARF, proteinuria and fever
- Assoc with toxigenic bacteria, post-partum state, BMT, auto-immune diseases, certain medications (quinine, plavix)
- Physical exam usu. normal (rarely petichial rash)
Case 11

 dez 73 yo woman brought in by EMS
 son called her as per usual at 12pm and she said she wasn’t feeling well
 asked where her husband was
 he called EMS

 PMH: HT, T2DM, OA
 Meds: norvasc, metformin, glucosamine
Case 11

O/E

- 50, 100/60, 90% 5L, 18, 36.5, c/s 5.0
- Unable to co-operate with exam
- Confused, diaphoretic, restless
- Bibasilar crackes
- CVS exam ?S4 no signs inc Rt heart pressures, no murmurs.
- Radial pulses equal bilaterally
- Abd exam normal
Case 11

- CXR redistribution, mediastinum normal
- blood work normal
- u/a normal
- d-dimer, TnT pending

Anything else you want doctor?
Case 11
Silent AMI

- Atypical presentations of AMI more common in elderly
Case 12

- 87 yo woman sent from nursing home by GP.
  - noted today to be more disoriented, irritable and refusing to eat or drink.
  - No volunteered complaints
- PMH; Alzheimer’s, glaucoma, restless legs, bipolar disease.
- Meds: list pending
Case 12

**o/e**

- 80, 120/80, 16, 97% on 2l NP, 37.2, c/s 5.1
- very confused, agitated.
- in NAD
- JVP not visible
- no meningismus or lymphadenopathy
- resp/cvs exam wnl
- abd distended, soft, very uncomfortable with percussion/light palpation throughout.
Apraxia -- failure to carry out motor activities
agnosia -- failure to recognise objects

غرد

What's going on?

Top 3

Investigations

Dementia -- Diagnostic Criteria

Memory impairment

- inability to learn new information or recall recently learned information
- usually long term memory intact

Cognitive disturbances

- aphasia
- apraxia
- agnosia
- disturbance in executive functioning
Delirium on Dementia

Precipitating events

- CVA, cerebral hemorrhage
- Pain
- Ischemic gut, AMI, AAA
- Dehydration
- Infection
  - GU
  - Pulmonary