The Weekly Probe

21st October 2016 **Volume 13 Issue 34**

Southcare – we have ben advised that Southcare are unable to take any further referrals this weekend.

Suspected MERS cases – after a potential case presented a couple of weeks ago, here is a reminder on the logistics of managing such patients.

MERS Case Definition

Obtain recent travel history from febrile patients

Consider MERS-CoV infection in patients with acute pneumonia/pneumonitis AND a history of travel from the Middle East in the previous 14 days

Consider MERS CoV in patients with pneumonia or pneumonitis with onset within 14 days after:

- Travelling in countries in or near the Middle East; OR

- Close contact (including healthcare) with ill persons from the Middle East or other countries with known MERS CoV outbreaks. This emergency takes into account that an index case of MERS CoV was undiagnosed

Places with Known MERS

- Arabian Peninsula (particularly Saudi Arabia)
- Travelling in countries in or near The Middle East

Update: Hajj Pilgrimage – Saudi Arabia 9- 13 September 2016

- **Australian Hajj pilgrims are likely to be returning in the next few weeks following this**

Patient meets case definition for suspected MERS in triage

- Isolate suspect cases in a single room with negative pressure air-handling (Acute 2B) if possible.
- Use standard and transmission-based precautions (contact and airborne), including the use of a P2 mask, disposable gown, gloves and eye protection when entering a patient care area

EMERGENCY DEPARTMENT PROCESS

Discussion with ON CALL INFECTIOUS DISEASES CONSULTANT (switchboard)
To determine the need for MERS screening and for advice regarding additional appropriate investigations

NOTIFICATION TO THE PUBLIC HEALTH UNIT:
Suspected and confirmed cases are to be notified to the Public Health Unit on 9382 8333 (menu 2) or after hours POWH switchboard on 9382 2222 as a priority by the Infectious Diseases Consultant

AND

NOTIFICATION TO MEDICAL PERSONNEL:
Once a decision has been made to initiate MERS CoV screening, ED & Virology should be immediately notified through POWH switch 9382 2222 24/7.

NOTIFICATION TO EXECUTIVE:
ED In-charge to notify bed manager or AUSNM of suspected case who will notify DUON&M/ of suspected case who will notify, Executive, and Infection Control Department

Test/treating patients:

- Always seek urgent advice from an Infectious disease physician & local laboratory prior to collecting microbiological samples to ensure that appropriate sample collection and to minimise unnecessary staff exposure through multiple collections
- Testing for MERS CoV is available at ICPMR (Westmead) and SEALS (Randwick). Approximate turn around time for results is 8hrs 24/7
- DO NOT use nebulisers or NIV

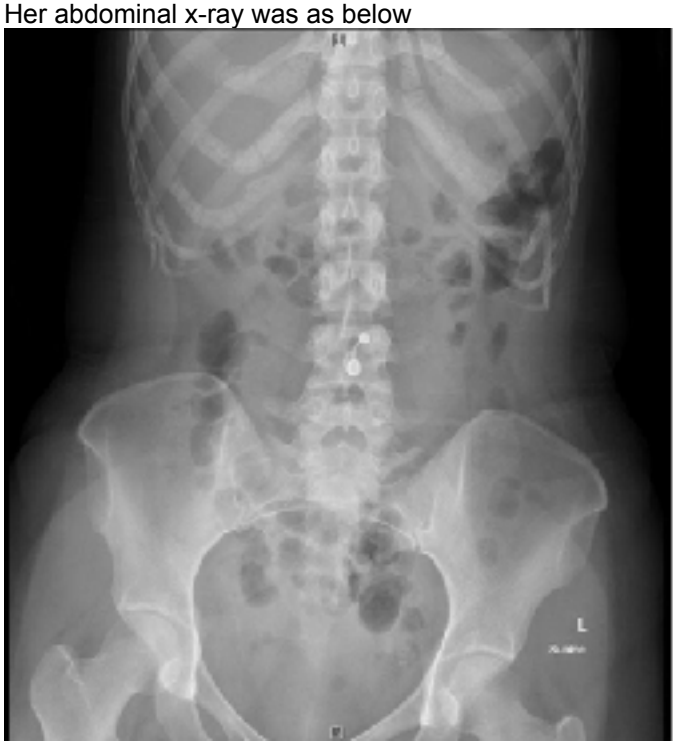
THIS WEEK

Premature Costal Cartilage Calcification

Premature Costal Cartilage Calcification

Thanks to Nitin for the interesting case and review.

A 21 yo female, presented with abdominal pain for 3 days. Workup was essentially non diagnostic and was considered non-specific abdominal pain. She was advised to go back to GP for follow up, medications for constipation and organise outpatient colonoscopy.
Her abdominal x-ray was as below



The x-ray shows premature costal cartilage calcification, premature as it has happened before the age of 30 years.

This is not considered to be a normal variant. As per an Austrian Study, on the retrospective review of 360 abdominal x-rays, they found 19 with PCCC a prevalence of 5.2%. They reviewed these patient’s records and found that most common cause for presentation was abdominal pain of unknown origin despite multiple workups.
However most importantly, these patients had high prevalence of rare metabolic, endocrine and haematological disorders. Important among these are diseases such as porphyria, Addison’s disease, hyperthyroidism and gonadal neoplasms.

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Table 2: Conditions that may lead to premature calcifications of costal cartilages.

Clinical disorder	Presumed pathogenesis
Adolescent hyperthyroidism	Advanced bone maturation by toxic hormone doses
Exposure to corticoids	Complex findings in vitro; extensive research in earlier decades; direct influence on cartilage matrix
Adrenogenital syndrome	Unknown
Knuist syndrome	Autosomal recessive disorder with several anomalies; frequent consanguinity, description, 1971 Mutations in the matrix Gla protein gene (MGP) that acts as a calcification inhibitor (for details see [21])
Porphyria	Unknown
Systemic conditions as chronic renal failure or autoimmune disorders	Unknown

In the ED, we focus on emergencies, but the appreciation of rare presentations is also important. This case highlights the importance of picking up on subtle yet important radiological indicators which point to the need for further investigation under Endocrine and/ or Haematological streams.

Ref- Rhomberg W, Premature Calcifications of Costal Cartilages: A New Perspective, *Radiology Research and Practice* 2014 Volume 2014 (2014), Article ID 523405 http://dx.doi.org/10.1155/2014/523405

DIZZINESS – WHY "WHAT DO YOU MEAN BY "DIZZY"? SHOULD NOT BE THE FIRST QUESTION YOU ASK

Back in early July we discussed nystagmus, vertigo and the assessment of oculomotor disorders especially in the context of posterior circulation strokes.

One "guru" frequently quoted on this topic is David Newman-Toker, an American neurologist who wrote his PhD on dizziness, a very frequently encountered presentation in the ED. In his thesis he looked into why we should not focus on the answer to the above question. I must admit that this is the first question I had been asking of patients and JMOs, so it's bit of a "wake up call".

Dizziness is a complex neurological symptom that reflects a change in the normal balance perception and spatial orientation.

Why do we get dizzy? The vestibular system functions (with other sensory and motor systems) to:

- Prevent falls during locomotion
- Stabilise vision when the head is in motion
- Adjust autonomic tone esp BP to postural and gravitational changes

To achieve these functions there is a complex integration of vestibular and all sensory inputs. In consequence, dizziness results when there is a mismatch or insufficiency of these sensory inputs. This mismatch can be as a result of focal and generalised neurological issues in addition to systemic factors.

Pitfalls of Dizziness

a. Symptoms factors
    a. High symptom prevalence coupled with benign nature of the underlying cause in most patients.
    b. Breadth and complexity of the differential diagnosis / aetiology- one study of 106 dizzy patients had 46 likely diagnoses.
    c. Lack of information about the prevalence of various uncommon causes in frontline health care settings
        i. few studies on the frequency of significant pathology in the undifferentiated dizzy patient
        ii. most studies on dizziness are disease based research in which the information is inverted to help inform diagnostic reasoning "if these are the characteristics of the disease, then when I see these characteristics, they will be indicators of the disease"

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1. eg most studies on head impulse test have been done on outpatients / dizziness clinics where there is a preponderance of chronic peripheral vestibular disorders. Subsequently some authors have suggested that an abnormal head impulse test *alone* is an indicator of peripheral Dx- yet ~ 50% of patients with a central cause have an abN result while nearly 20% of patients with a peripheral cause will have a normal result

d. Inability of patients to clearly describe their dizziness symptoms- see below in more depth
    i. Older patients report 2 or more dizziness categories more than ½ the time.
    ii. There is no consensus amongst clinicians on the exact definition of these dizzy entities (? Does it include those with any sense of spinning or motion)
e. High rate of misconception among providers about bedside assessment- he feels that with the absence of lateralising symptoms, posterior circulation events are often not consider as a potential Dx in the dizzy patient
f. Under appreciated subtleties of clinical history and exam techniques
    i. He feels many are not able to correctly use and interpret the HINTs test or look for subtle neuro signs
g. Lack of sensitivity and specificity of commonly used lab and imaging tests
    i. CT sensitivity for brainstem and cerebellar infarcts is < 40% - even MRI with DWI can miss early brainstem strokes

Our current approach
Traditionally we have divided dizziness into 4 types based on texts written in the 70s

1) vertigo (illusion of spinning or motion)
2) Dysequilibrium (loss of balance or equilibrium when walking)
3) Presyncope (feeling of impending faint)
4) Other ill defined dizzy sensations

This categorisation is the first misstep he feels we make as this then sets the whole cognitive process off in the wrong direction and certain diagnoses are not being considered.

Dizziness type	**Likely Aetiology**
Vertigo	Vestibular
Dysequilibrium	Neurological
Presyncope	Cardiovascular
Non-specific dizziness	Metabolic / psychiatric

He conversely feels that we undervalue other clinical features including timing, triggers and associated symptoms. To test these ideas he undertook a number of studies.

1) He studied 505 ED residents and physicians from the US and found that 64% ranked that "quality" was the most important diagnostic feature (11% timing / 12% triggers / 13% associated symptoms). He found that once this symptom quality was defined, most clinicians agreed that this influenced the decision whether a certain diagnosis was, or was not to be pursued.

2) The second study he performed was on 316 ED patients with dizziness. He allowed them to:

- write down an open ended description of their dizziness
- "pick all that apply" of 6 different dizziness descriptors
- "pick the best" from those 6 descriptors- duration and triggers of symptoms was also asked about.
- For those patients **not** choosing vertigo or spinning as their best choice , they were specifically asked "when you were feeling dizzy did you have any sense of motion or spinning and "when you were feeling dizzy did you have any sense of definite spinning"

The options were checked for *clarity* if > 1 option was selected, *consistency* across the tests and then these were retested to check *reliability*.
(you can this happening on the floor – ask the same question 3 times and you get 4 different answers!)
He found there was :

- A lack of clarity describing dizzy symptoms as patients endorse more than one type of dizziness- 83% selected more than 1 type of dizziness
- Internal inconsistencies with responses- 41% did not select an option previously reported in the open ended format - 76% endorse a category on directed inquiry not mentioned in prior answers
- Unreliable in their responses – 48% had the same description with retests

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- Approximately ¼ - 1/3 of patients who did not select vertigo or spinning on either of their best choices (first or retest) did say yes to the question “when you were feeling dizzy did you have any sense of definite spinning”
- Approximately 60-80% of patients who did not select vertigo or spinning on either of their best choices (first or retest) did say yes to the question “when you were feeling dizzy did you have any sense of motion or spinning”
- Timing and triggers were more reliable and consistent

THP - it is difficult to get a consistent description and many will describe vertiginous symptoms when pushed in this direction

He also points out that the type of dizziness does not appear to be a trustworthy predictor of the underlying cause.
Although the maths doesn’t add up (? Combination of symptoms), the tables below demonstrate that a specific aetiology does not predict a specific symptom quality ie there are no “100%” on either chart.

Etiologic Class	Disease or Syndrome	Vertigo	Presyncope, Lightheaded*	Other Dizziness	Unsteady or Off Balance*
Vestibular	**BPPV** [otolaryngology clinic] (n=28) [28]	89% (vertigo)	11% (non-vertiginous, including postural dizziness & falls)		
	BPPV [Falls & Syncope Unit] (n=31) [29]	90% (vertigo)	10% (non-vertiginous, including postural dizziness & falls)		
	BPPV [neuro-otology clinic] (n=29) [30]	86% (vertigo)	NR	14% (floating sensation)	NR
	Vestibular neuritis (n=41) [31]	81% (vertigo)	NR	19% (illusion & unsteady or "unclear")	
	Unilateral vestibular loss (n=116) [32]	46% (vertigo)	54% (non-vertiginous dizziness)		NR
	Bilateral vestibular loss (n=31) [33]	17% (vertigo)	NR	NR	91% (dysequilibrium)
	Autoimmune inner ear disease (n=25) [34]	20% (vertigo)	20% (lightheadedness)	NR	6% (ataxia)
	Hereditary otovestibular dysfunction (DFNA9 gene) (n=40) [35]	>37%‡ (vertigo)	28% (lightheadedness)	28% (drunken feeling)	>62%‡ (unstable in darkness; tendency fall sideways)
	Labyrinthine fistula (D) (n=25) [36]	40% (vertigo)	44% (lightheadedness)	16% (dizziness)	NR

Etiologic Class	Disease or Syndrome	Vertigo	Presyncope, Lightheaded*	Other Dizziness	Unsteady or Off Balance*
Cardiovascular	**Orthostatic intolerance** (n=90) [83]	≥37%‡ (head movement)	88% (lightheadedness; dimness)		≥37%‡ (impulse of falling)
	Syncope (n=77) [84]	9% (vertigo + spinning)	68% (presyncope/ lightheadedness = impending faint)	4% (other dizziness)	9% (Abnormalities in losing balance)
	Myocardial infarction (D) (n=1,346) [85]	8% (vertigo)	5% (dizziness)	NR	NR
Neurologic	**Migraine** (neurotology dizzy clinic) (n=80) [39]	75% (rotational vertigo)	7% (light-headedness)	18% (to-and-fro sensation)	93% (posture imbalance & unsteadiness)
	Migraine (neurology vestibular clinic) (n=200) [86]	27% (vertigo)	NR	18% (giddy sensations)	
	Cerebellar stroke (D) (n=66) [148]	59% (vertigo)	≥41%‡ (non-vertiginous)		71% (gait instability)
	Basilar occlusion (D) (n=86) [87]	21% (rotational vertigo)	79% (non-vertiginous dizziness)		NR
Psychiatric	**Panic disorder** (n=47) [21]	9% (vertigo = movies, spinning, rocking)	19% (fainting = about to faint or lose consciousness)	72% (giddiness= lightheadedness or 'wooziness')	81% (instability = unsteady or off balance, so that you might fall or veer)
Metabolic	**Hypoglycemia (D)** (n=182) [88]	NR	69% (lightheadedness)	31% (dizziness)	69% (unsteadiness)

Additional comments re CVAs:
- The cerebellum serves man functions that are more distributed and redundant (eg motor learning) so damage to large areas may be associated with only unimpressive clinical findings
- With inferior cerebellar CVA (PICA or AICA) the most common symptoms are vestibular in nature (nausea, vomiting, dizziness, gait unsteadiness) with frequently absent classic Crb signs
- 20% of basilar and 10% of Crb strokes initially manifest only with dizziness or vertigo

What should we do then? In summary he advocates that we should not put so much on the description of the dizziness. Sure, it should be asked about but this should be one part of the history, not the first fork in the road. On pages 171 and 172 (182-3 on the pdf) there are 2 algorithms which we have not included as it’s too busy. However he advocates the steps we should use:

1) Look at vitals- ? abnormal
2) Is there pain ?
3) Is the dizziness situational -? Certain precipitants
4) Are they still dizzy?
5) What was / is the duration?

Table 1. Common causes of dizziness and dangerous mimics, by duration

Duration*	Common, Benign, Causes	Dangerous Mimics
Seconds to Hours (*almost always transient or intermittent*)	• BPPV (*sec*) • orthostatic dizziness (*seconds*) • [illegible] • panic attack (*minutes*) • Meniere syndrome (*minutes*) • [illegible]	• [illegible] • cardiac arrhythmia (*seconds*)[illegible] • [illegible] • [illegible]
Days to Weeks (*NOT almost always persistent or continuous*)	• vestibular neuritis • [illegible] • drug toxicity (e.g., alcohol or anticonvulsants)	• brainstem,[4,6] cerebellar,[7,8] or labyrinthine[9] • bacterial labyrinthitis/acute otitis [illegible] • brainstem encephalitis (e.g., Lyme, herpes) • [illegible]

By combining these historical and examination features (not the dizziness type) he points ourt a number of associations which can be worrying or reassuring.

Table 2. 'Safe-to-Go' steps for bedside evaluation of acutely dizzy patients – History, Review of Systems, Physical Exam

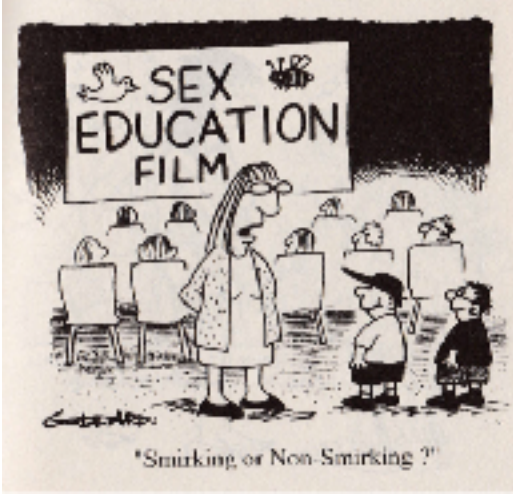
I. HISTORY: Plenty of Protective P's	II. REVIEW OF SYSTEMS: Dearth of Deadly D's[a]	III. PHYSICAL EXAMINATION: Choose either 'WAS DIZZY' or 'STILL DIZZY' Exam
If symptoms are old & recurrent... 1. **PERIODIC & PROLONGED:** recurrent, stereotyped episodes or bouts over a protracted period (longer than ~2-4 years), current episode is typical in all respects	***No** Vascular Brainstem Symptoms...* 1. **Diplopia** (double vision) 2. **Dysarthria** (trouble speaking) 3. **Dysphagia** (trouble swallowing) 4. **Dysphonia** (hoarseness/hiccups) 5. **Dysmetria** (clumsiness) 6. **Dysesthesia** (facial numbness) 7. **Drop Attacks** (sudden falls without loss of consciousness)[b] 8. **Down-is-up Distortions** (room tilts & room inverted illusions)[c]	**'WAS DIZZY':** *If symptoms are intermittent or gone, look for BPPV, orthostasis, or normal neurovestibular exam history* **"P-Power to send Patient Packing"** 1. **Position-Provoked with Positive 'Pike'** (apogeotropic nystagmus on Dix-Hallpike), *or...* 2. **Postural with Predictable Pressure Plunge** (symptomatic orthostatic BP drop on arising), *or...* 3. **Private room & Paradigmatic Presentation** (ESRD,[d] vasovagal, migraine, Meniere, or panic)
Or, if symptoms are more recent... 1. **PAINLESS** headache/neck pain, if present, usually sound like migraine or tension-type headaches, and ***must not be any of the following...*** • **SEVERE** • **SUDDEN** (peak in intensity <30min) • **SUSTAINED** (duration >72hr) *Plus, if there is vomiting...* 2. **PROPORTIONAL PUKING:** vertigo worse than vomiting might be o.k., vomiting worse than vertigo is bad *Plus, if there is loss of consciousness...* 3. **PROTOTYPICAL PASSING OUT:** classic vasovagal syncope (with typical provocation & prodrome) is o.k.; anything else is probably bad	***No** Vascular Inner Ear Symptoms...* 9. **Deafness** (new transient or bilateral hearing loss is bad; abrupt-onset unilateral loss [esp. if severe] may also be bad, but could be benign) ***No** Cardiovascular Symptoms...* 10. **Dyspnea** (any cardiorespiratory symptoms, unless clearly related to vasovagal or panic attack are bad)	**'STILL DIZZY':** *If symptoms persist, confirm AFP by excluding brainstem or cerebellar, & middle ear signs* **"IF SAFE & CLEAR THEN I'LL SEND HIM ON HOME"†** 1. **Intact Fields** (no visual field cut) 2. **Stands Alone** (able to stand no assistance) 3. **Face Even** (no weakness or droop, nor ptosis) 4. **CLear Enunciation** (no slurred or loose speech) 5. **Accurate Reaching** (no drift, normal reaching, RAM) 6. **THErmal Normal** (equal thermal or sharp sense) 7. **Isocoria in Low Light** (equal pupils in dim light)[e] 8. **Straight Eyes** (normal ocular alignment, esp. vertical) 9. **Not Deaf** (no moderate to severe hearing loss) 10. **Head Impulse Misses** (abnormal head thrust VOR)[f] 11. **One-way Nystagmus** (unidirectional, horizontal)[g] 12. **Healthy Otic & Mastoid Exam** (pearly, no pimples, pus, perforation, or pain on palpation of mastoid)

JOKE / QUOTE OF THE WEEK

? Dracula in south west Sydney

Triage Comment – CTN: ATE STAKE LAST NIGHT, FEELS LIKE IT IS STUCK ON CHEST.

Editor: Peter Wyllie



Please forward any funny and litigious quotes you may hear on the floor (happy to publish names if you want)

THE WEEK AHEAD
Tuesdays - 14:30 – 15:30 Intern & JMO teaching -Thomas & Rachel Moore
Wednesday- 0800-0900 Critical Care Journal Club. ICU Conf Room / 14:30 – 15:30 Intern & JMO teaching -Thomas & Rachel Moore
Thursday 0730-0800 Trauma Audit. Education Centre / 0800-0830 MET Review Education centre / 1300-1400 Medical Grand Rounds. Auditorium.

Editor: Peter Wyllie