Four Cases in October

Neil Mullen, MD, FAAP, FACEP
Pediatric Grand Rounds
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Objectives:
1. Review the many manifestations of meningococcal disease
2. Discuss Rapid Sequence Induction
3. Discuss the causes of belly pain in adolescents
4. Briefly discuss RAD and its presentations
5. Discuss the variable patient response to our care
6. Discuss how we respond to the response of others

The Hot and Laughing Child
It was the dirt on the linoleum.
I saw it, so clear, so black.
And I saw the laughing infant child and the frightened mother
and her friend.
I saw it all.
And inside I laughed, I laughed and laughed,
The child and I, we laughed, as the mother wailed,
and told of fevers and chills, and sickness
So Severe,
hers words a thin layer over her fear.
And her friend nodded behind her,
like a Greek chorus: Yes. Yes. Yes.
The child, too, said yes, but laughing,
Laughing, hot to touch, but laughing.
And I knew the mom and her fear,
and I knew the laughing child.
And it was that dirt on the linoleum that made it all so clear,
The Child and the Mother and her Friend,
and me,
And the child laughed, and I did too.

October, 2002
1. Oct. 3\textsuperscript{rd} JR 4.5 mos died of meningococcemia
2. Oct. 16\textsuperscript{th} BB 15yo 1 mo s/p CABG, developed pericardial effusion, cardiac arrest, now PVS

3. Oct. 22\textsuperscript{nd} SG 13yo w/ Belly pain; 5 days later diagnosed as intestinal obstruction
4. Oct. 29\textsuperscript{th} KR 10yo diagnosed as viral pneumonia; 2 hours later presented to PCP very SOB and wheezing, better after 6 SVNs

Pt. 1:
JR 4.5 mo hispanic male, presents at 1430 to doctor’s office with fever, sent to ER for work-up.

HX: He had been well until 4 hours PTA when he awoke from a nap with fever and nasal d/c. He was given no antipyretics and was brought in for evaluation

Immunizations were UTD
Sibling in the house with URI
Pt had had fever as 1 month old
=> sepsis w/u; cultures (-)
Parents speak very little English. I speak some Spanish. They adamantly refuse a spinal tap.

PE: On exam, he was well appearing with T 103.9, RR 32, BP72/30, HR185 O2Sat 99% (RA). He was interactive, looking about, sucking avidly on a bottle. No smile

His AF was flat. He was not especially fussy; he cries briefly during the exam but then would focus on a light and quiet easily in mother's arms.

Head is without lesions. TMs are pearly grey. Mouth is without e/o infection. Clear nasal discharge is present. Neck is supple. Chest is clear; belly is soft. Ext all have FROM with good pulses and cap refill is nl. No rash is noted. Neuro exam shows good tone, grasp and suck.

WBC 3,300, with ANC 2,200
(NOTE: pathologist's reading the next day: 22% metamyelocytes. UA (-). Parents continue to refuse LP.

Four hours later patient returned to ED with diffuse purpura, no palpable pulses, HR 70, no BP, apneac. Intubated and given 250cc NS over 10 minutes without response. Started on dopamine and epinephrine. Rocephin given but child expired within 2 hours of arrival of ICU.

Blood culture grew out Neisseria meningitidis. Parents left for Mexico and never returned.
Presentations of meningococcal disease.
1. Surface Disease
2. Bacteremia
3. Localized infection (meningitis, pneumonia, joints, skin)
4. Sepsis (meningococcemia)

1. Surface disease:
   a. Ano-genital – usually asymptomatic or causes local sx
   b. Conjunctivitis – rare; 10% progresses to severe disease
   c. Naso-pharyngeal – seen in 5-10% of the population

Nasopharyngeal carriers: usually non-typable strains and asymptomatic. They cross react with pathogenic strains and are the source of natural immunity.

Pathogenic serotypes may be found. Immunity develops within about two weeks. Why some people develop symptoms during this time and others do not is unknown.
2. Bacteremia:
- Approx. 5% of patients with Occult Bacteremia will grow N. meningitidis. These may resolve spontaneously or seed other organs. They are not typically associated with a leukocytosis.

Rarely, chronic bacteremia will develop, with joint paint, indolent fever and blanching skin rash.

3. Localized infection:
- Due to bacteremia which seeds meninges, lungs, joints, etc., and so will often have a (+) blood culture.

4. Sepsis (meningococcemia):
- Classically develops rapidly with shock, fever (60% >104) and purpura (>50%)

Markers for severe disease:
- Petechiae < 12 hours
- Lack of meningitis
- ESR <10mm
- Hypotension
- WBC <10,000
Mortality >90% if >3 markers met; <10% if <2 markers met

Mechanism of shock is LPS release and subsequent cytokine effect. Endotoxin equally potent to enteric endotoxin but has a 10-fold affinity to skin.
Jarisch-Herxheimer reaction common at onset of therapy.

Feigen, RJ  NEJM 1982; 307: 155-57
5 children from a single classroom presented with meningioccocal disease over a 5 day period. All were considered co-primaries. 40% of the class were carriers

Day 1:  Pt. 1 overwhelming sepsis; died in the ED
Day 1:  Pt. 2 sepsis and DIC, was hospitalized on pressors in the ICU for 17 days
Day 2:  Pt. 3 meningitis and a (+) blood culture
Day 4:  Pt 4 three days of fever and a septic knee for one day
Day 5:  Pt 5 fever for four days and (+) blood culture

Pt. 2
BB 15yo, found unresponsive by father. EMTs find cyanotic pt able to answer questions with apical (only) pulse of 120; no BP. O2 applied and NS bolus ordered

HX: Kawasaki’s disease at age 2y, w/ subsequent coronary aneurysm. Silent MI at age 14 and CABG 1 month PTA.
6d PTA developed SOB and 4d PTA large pericardial effusion discovered. 1000cc fluid drained 3d PTA and child was sent home 1 day PTA with no f/u CXR
NOTE: All care was preformed at another facility; no old records, xrays, EKG, etc available

PE: On arrival pt is plethoric, able to follow commands, no palpable pulses in wrist, barely palpable pulse in antecubital fossa.

HR 140, BP 80/60 O2 sat 94% on 15L NRBM No JVD at 30° Lungs with dec TV, ronchi, ?rales. Heart tones sharp. No HSM

CXR with large heart, clear lung fields.

EKG with no STTW changes, nl size QRS complexes.

Question: Big heart due to recurrence of effusion? Or cardiomyopathy?
ABG: pH 7.38, pCO2 41 HCO3 29
2 liters NS ordered and dopamine at 10mic/kg/min started

Pt. improved: BP 100/70, HR 122, perfusion better, pulses palpable at wrist. ICU, cardiology and CT surgery consulted and echo tech called in. CT surgeon states child has a nl sized heart: effusion was back.

Plan: Await echo and cardiologist. Tap effusion if child deteriorates.

Child's VS deteriorated. She was sedated with Versed 2.5mg IV x 2 without effect and I elected to intubate her prior to tapping her effusion.

Vecuronium (.01mg/kg) and then succinylcholine 1.5mg/kg. Pt became flaccid except for persistent trismus. Bagging was difficult and HR dropped. Second dose of succinylcholine given and patient intubated within 2 minutes.
HR did not improve after bagging with 100% oxygen (good BS, good pCO2 color change). Pericardial tap and CPR started and atropine (.5mg IV x 2) and then epinephrine (.5mg) was given. HR increased after approx. 10 minutes of bradycardia.

Pericardiocentesis with 20g LP needle removed 400cc clear fluid; VS all improved. An additional 500cc was removed later under US guidance.

Pt. developed seizures that night and was later diagnosed as having a severe hypoxic encephalopathy. She remains in a persistent vegetative state to this day.

Possible discussion points:
- Kawasaki’s diseases with coronary artery development?
- Post-pericardotomy syndrome?
- Masseter spasm with succinylcholine use?
- Why for the grace of God was I scheduled on that Thursday night?

Rapid Sequence Induction in the pediatric age group.
3 groups of patients:
A. Respiratory Failure
B. Shock
C. Head Trauma

3 categories of drugs:
A. “Pre-Ops”
B. Sedatives
C. Paralytics

A. “Pre-Ops”
1. Atropine: .02-.03mg/kg
   - Decreases vagal response (bradycardia) to laryngoscopy
   - Used in children <8 years
2. Lidocaine: 1-1.5mg/kg
   - Decreases ICP surge with intubation in head trauma; ?asthmatics
   - Must be given >5 minutes prior

B. Sedatives:
1. Benzodiazepines: dose varies with drug
   - May decrease BP
2. Etomidate: 0.3mg/kg
   - No effect on BP, ICP
   - Lasts 10-15 minutes
   - ?Adrenal suppression so should not be used in sepsis

C. Paralytics:
1. Succinylcholine: 1-2mg/kg IV; 4mg/kg IM
   - Drug of choice in most EDs because of rapid onset of action, short duration
   - Drug of choice in most EDs because of rapid onset of action, short duration
   - Many potential complications: do not use in CP/muscular dystrophy patients, renal disease, crush injuries/burns (>48 hours old)
   - Increases BP, ?ICP; causes bronchodilatation
   - Increases secretions; should be used with .01mg/kg atropine
2. Vecuronium (.1mg/kg) or Rocuronium (1mg/kg)
   - Both with onset of action approx. 2 minutes, duration approx. 30 minutes
   - Safe to use in almost all patients
   - Onset of action quicker with priming dose of vecuronium (.01mg/kg)

Pt. 3:
13yo awoke with severe belly pain. Entirely well previously; awoke him from sleep. Non-bilious vomiting x 2. Epigastric. Took OTC antacid with ?relief

Dad: “I think he has an intestinal obstruction”.
Why: “Because he’s acting the same way I did when I had an intestinal obstruction”.

HX: At home, pt was intermittently asymptomatic, with no pain at all, sitting up and walking about. At other times he was doubled over, crying in pain.

Denies fever, diarrhea. No back pain, UTI sx, previous similar sx, cough, fever. Long hx of severe constipation. Appendectomy 6 years PTA. No fam hx gall stones, kidney stones
PE: On exam, pt is miserable, in pain, writhing about on the bed. Exam is essentially normal: abdomen is schaphoid with nl BS. There is mild epigastric tenderness to palpation. Rectal: large wad of stool; guaiac (-). No CVA tenderness.

DDX acute intermittent belly pain in children:
- peptic ulcer disease/GERD
- constipation/fecal impaction
- Kidney/gall stones

A. PUD: Not uncommon. Typically presents with belly pain which awakens child from sleep and is associated with vomiting. Pt will complain of generalized belly pain but tenderness in epigastrium is key. If stool is guaiac (+) check CBC.

Most will improve with GI cocktail (30cc antacid with .5cc/kg 2% viscous xylocaine). Children often vomit this; if so, try sucralfate 10cc (1gr) which is better tolerated and almost as effective. (NOTE: Tab will dissolve in water).

Discharge on ranitidine 2.5-5mg/kg/day (max: 300mg daily) given BID for four weeks and antacid PRN. F/U with PCP in 2-3 days if not better or if stool guaiac +

Reassure parents that psychological issues are rarely the etiology of PUD sxs in children, and medical treatment is adequate unless there are other psychosocial issues present (drug use, depression, school problems, etc.)
B. Constipation/fecal impaction:
2nd most common cause of belly pain in an ER (after gastroenteritis). May cause SEVERE bouts of pain which cause the child to writhe about on the floor then resolve completely, then recur over a period of 60-90 minutes.

Pt. may be having regular bowel movements, and so may empty sigmoid and have a (-) rectal exam, but a KUB which is FOS.

F/u with PCP if sxs continue

C. Kidney and gall stones are very uncommon but history is usually diagnostic. Everybody gets a UA
ED Course: UA dip was (-). Antacid/xylocaine was given but vomited up; sucralfate 2g given with little relief. Pt was up and walking around in the ED but said he felt no better.

Father repeatedly brought up the question of intestinal obstruction; x-rays were obtained which showed good bowel gas pattern, no A/F levels and no e/o obstruction. Moderate amount of stool was noted.
Fleet’s enema was given without improvement. CBC, Chem 7, LFT’s and lipase were all wnl. Famotidine 20mg IV was given with little improvement. 2mg morphine was given with marked improvement.

Pt was watched for 3 hours without return of his pain. His PCP was contacted and pt was sent to his office that morning, watched for another 4 hours and still had no further return of his pain. He was sent home to f/u prn.

5 days later pt developed severe belly pain and had dilated loops of bowel on KUB with A/F levels.

He was taken to the OR where adhesions from his appendectomy were lysed and 7 cm of necrotic bowel was resected.
Pt. 4:
KA, 10 yr old male, presents at 11PM with cough, fever, SOB.

Pt. entirely well until 2 days PTA. Tonight child is “coughing all the time”. Mother (nurse) thinks she has heard wheezing. No hx of RAD in child, but (+) hx in sibs, parents.

PE: Miserable but non-toxic, with RR30 HR122 T99.9 O2SAT 94% (RA). Pt is sl. dyspneac, with much cough. No wheezing but prolonged expiration and mild retractions.

Pt. given albuterol aerosol (2.5mg) prior to my exam. I questioned nurse who said she had not heard any wheezing either.

Pt’s peak flow was 100cc (NL = 300cc), but nurse reports child “not compliant”; CXR shows no obvious infiltrate but diffuse bronchiolar thickening.
Pt. sent home on antipyretics and close follow-up, with DX: “Viral pneumonitis”. Mother told sxs may worsen before they improved. PCP contacted and f/u arranged PRN worsening of sxs.

Follow-up: Mother met in hall 2 days later. She tells me that pt. worsened, and was seen by PCP 6 hours after D/C, had 6 SVNVs over 4 hours, then developed audible wheezing.

He improved, and did well at home on albuterol and prednisone

4 Cases in October:
1. Meningococcemia:
   - DX missed, patient dies
2. Pericardial effusion:
   - DX unclear, pt. now in PVS
3. Intestinal Obstruction:
   - DX missed, pt. to OR 5d later
4. Tight RAD:
   - DX missed, pt does well
Pt. 1: Uncommon presentation of an uncommon disease
- Medical care adequate?
- Risk management potential?

Pt’s family left for Mexico, but……..

Pt. 2: Uncommon complication of an uncommon procedure, complicated by an uncommon complication of a common procedure
- Medical care adequate?
- Risk management potential?

Pt’s family originally very appreciative, but became litigious after child’s PVS noted. Much intra-hospital finger pointing followed.

Family later sued both hospitals, CT surgeons, cardiologist and ER doctor for $23 million, and settled for approx. $8 million.

Pt. 3: Uncommon presentation of common complication of common procedure
- Medical care adequate?
- Risk management potential?
Pt’s family very appreciative of ER physician on second presentation: “Finally we found someone who agrees with us!”

They were very upset but calmed down when second “good” doctor also read the original x-rays as normal.

Pt. 4: Common presentation of common illness
- Medical care adequate?
- Risk management potential?

In hallway, mother added: “He got worse, just like you said he might.”
And: “We really appreciated your care that night.”
And: “When you open your own practice, can we come?”

REMEMBER!
There is a fine line we walk, every time we see a patient, between success and failure. Praise and condemnation, from both patients and peers, is often only vaguely connected to what really happened.

We must acknowledge our failures, and cherish our successes; if not us, then who?

Medicine is fun, but we too often forget how difficult and very stressful it is. Most successes and failures are silent. Each of us often is the only one who can offer appropriate praise and critique.
Pericardiotomy Syndrome

- Prior injury to pericardium
- Latent period
- Tendency for recurrence
- Responsiveness to anti-inflamatories

Usually presents with chest pain several days to several weeks after cardiac surgery.

Post-operative effusions are very common (85%) but usually symptomatic in <25%.
Typically present with fever, leukocytosis and elevated ESR.

Thought to be due to antigen/antibody reaction, with elevations of antiactin and antimyosin antibodies present.

Treatment is with aspirin, NSAIDs or steroids. Colchicine is sometimes used for recurrent cases.