Primary Care RAP July 2020 Written Summary

Editor-in-Chief: Neda Frayha MD
Associate Editor: Kenji Taylor MD, MSc

Intro: Embracing Uncertainty

Neda Frayha MD, Paul Simmons MD

Pearls:

- **Uncertainty, which is heightened during the COVID pandemic, is an ever-present part of medicine. Actions we can take to address it include acknowledging those feelings in the moment, focusing on the current task at hand and showing the same level of compassion you would towards your patients to yourself.**
- **Reader question: Causes of peripheral neuropathies can be thought of in four broad categories: toxic/metabolic, trauma/anatomic, autoimmune, infectious**

- **Coping with Uncertainty in the time of COVID pandemic - perspectives**
    - Historical:
        - We have faced other pandemics before in the past and probably won't be the last
        - Good we are facing this in 2020 instead of 1920 where we have lots of technology and scientific technology available to use that we haven't had in the past
    - Philosophical:
        - Focus on what you can control and being a good doctor in the moment
        - One exercise is to think of the worst that could happen not to worry about it but to realize that you have the same tools today that you'll have to deal with in the future
    - Culture of medicine:
        - Modern culture does not tend to leave much room for uncertainty → we learn facts, lists, protocols leaving a very "black and white" approach to our work and lead to feelings of failure for not knowing the answer
        - Today's pandemic is humbling reminder that modern medicine is not omnipotent.
- **Actions to cope with uncertainty:**
    - Saying outright to ourselves and patients, "We don't know enough about this right now."

    - In the moment of feeling overwhelmed focus on what you are doing now and doing that well (ie: physical exam, differential diagnosis generation, treatment)
    - Take a break from the news and updates, go outside or doing something else to remember that the rest of the world still exists
- **Takeaways about uncertainty**
    - Doctoring has not changed regardless of the pandemic: standing by human suffering and bringing what we can to those moments with compassion
    - When feeling anxious or overwhelmed, stop and acknowledge those feelings

REFERENCES:

1. Simpkin AL, Schwartzstein RM. Tolerating uncertainty - the next medical revolution? *N Engl J Med* 2016; 375:1713-1715. DOI: 10.1056/NEJMp1606402
2. Gheihman G, Johnson M, Simpkin AL. Twelve tips for thriving in the face of clinical uncertainty. *Medical Teacher* 2019. DOI: 10.1080/0142159X.2019.1579308
3. Campbell JI. Art and the Uncertainty of Medicine. *JAMA* 2014;312(22):2337–2339. doi:10.1001/jama.2014.10773
4. Kim K, Lee YM. *Korean J Med Educ* 2018 Sep; 30(3):181–188. Published online 2018 Aug 27. doi: 10.3946/kjme.2018.92
5. Luther VP, Crandall SJ. Commentary: ambiguity and uncertainty: neglected elements of medical education curricula? *Acad Med* 2011;86:799–800.
6. Malterrud K, Guassora AD, Jutel A. Embracing uncertainty to advantage diagnosis in general practice. *Br J Gen Pract* 2017; 67(659): 244–245. doi: 10.3399/bjgp17X690941
7. West AF, West RR. Clinical decision-making: coping with uncertainty. *Postgraduate Medical Journal* 2002;78:319-321.

Pediatric Burns and the Cup-O-Noodles

Matthieu DeClerck MD, Lisa Patel MD, Ilene Claudius. MD & Mizuho Morrison, DO

Pearls:

- ❏ When calculating the total body surface area burned, only include areas of partial or full thickness injury.
- ❏ A good burn area estimation tool is that a child's hand is ~1% of their total BSA.
- ❏ Any partial and/or full thickness burn involving >15% of the total BSA requires immediate burn center referral.
- ❏ Topical antibiotic ointment is now preferred over silver sulfadiazine for superficial partial thickness burns.
- ❏ All full thickness burns and partial thickness burns to the hands, face, genitals, or over joints should be seen within several days by a pediatric burn specialist.
- When considering burns in children, it is useful to classify them into 3 categories: life threatening, common, and negligible burns.
    - Superficial burns (ie: those with erythema only) are of no clinical consequence.
- **When using a burn formula to calculate the total body surface area (BSA) involved, only the areas of partial and full thickness areas of burn count (ie: with blistering and/or loss of skin).**

    - Partial thickness burns involve the papillary (superficial partial) or reticular (deep partial) layers of the dermis.
        - These are generally very painful.
    - Full thickness burns involve any tissue below the dermis (e.g. fat, muscle, bone etc).
        - These are commonly less painful because the nerves have been destroyed.
    - **Overestimation of burned surface area is common, especially in children.**
        - Most pediatric burns have a small area of partial thickness surrounded by extensive superficial burn.
        - A common pitfall is to count the entire area of injury in the estimate of the percent of total BSA burned.
- **When estimating the percent of total BSA affected in children, the "rule of 9's" (commonly used in adults) does not work because the proportional anatomy of children is different.**
    - The Lund Browder Chart (see references) is useful for estimating total BSA burned in children.
    - **1% of a child's BSA is also roughly the size of the palm and fingers on one of their hands.**
- Serious burns may require immediate burn center referral or outpatient follow-up depending on anatomic areas affected and the percent of total BSA burned.
    - **Burns involving >15% of the total BSA require immediate burn center referral because of the risk of significant fluid losses**.
        - Lactated Ringer's is preferred over Normal Saline because of the risk of acidosis.
            - In an ED/ICU setting, fluid management is guided by monitoring urine output.
        - If possible, it is reasonable to begin IV fluids from UC while arranging emergent burn center referral.
    - **Heat loss and risk of hypothermia can be significant for children with large burns and covering children with a warm, dry sheet can help mitigate this while arranging transfer.**
        - Burns are very painful, so liberal use of topical and oral analgesia for severe burns is critical.
    - **Smaller areas partial thickness burns involving the *hands, face, genitals, or extending over a joint or complete circumference of an extremity* can cause serious cosmetic and functional impairment and are best managed with close burn center follow-up.**
    - **All full thickness burns will require non-urgent burn center follow-up (ie: within several days) because skin grafting will usually be required to allow for healing.**
- Recommended topical wound/burn care depends on the depth of burn.
    - Superficial burns require no wound care but aloe products or petroleum jelly can soothe discomfort.
    - Superficial partial thickness burns with intact blisters seem to become infected less often and heal faster if the blister is drained and debrided, but this remains controversial.
        - It is appropriate to NOT debride blisters that are thick walled or <0.5cm in diameter.

        - **Basic care for the area of skin loss involves simply washing gently with soap and water, applying antibiotic ointment, followed by a non-adherent dressing and should be performed twice daily.**
            - Oral analgesic agents given 30 minutes before dressing changes can minimize pain associated with cleansing and dressing.
- **For superficial partial burns, silver containing topical antimicrobials (e.g. Silvadene™) use is also controversial because it may impair wound healing and is contraindicated in pregnant patients and infants <2 months of age and so antibiotic ointment such as bacitracin is now generally preferred.**
    - For deep partial thickness and full thickness burns, silver sulfadiazine (Silvadene™) is still recommended because it is a more potent antimicrobial.
- Providing burn care for minor burns is an excellent opportunity to discuss common sense prevention strategies with parents to reduce the likelihood of future burns (e.g.: keeping hot liquids on the back burners of stove tops).
    - **Consider non-accidental trauma especially if the story has inconsistencies.**

References:

1.) Norman G et al. Antiseptics for burns. Cochrane Database of Systematic Reviews 2017, Issue 7. Art. No.: CD011821. DOI: 10.1002/14651858.CD011821.pub2
2.) "Lund Browder Chart," https://www.goodfellowunit.org/sites/default/files/Burns/Lund_and_Browder_chart.pdf

Nephrogenic Systemic Fibrosis (NSF)

Neda Frayha MD, Paul Simmons MD

Pearls:

- **NSF is a rare progressive, debilitating and untreatable fibrosis of the skin/organs related to gadolinium used as a contrast agent for MRIs.**
- **It seems to be related to the ligand bound to the gadolinium. New agents appear to be much safer.**
- **Prevention and awareness is the key**
    - **If GFR > 60, whichever contrast agent is fine**
    - **If GFR 30-59, better to use a class 2 or 3 agent**
    - **If GFR < 30, avoid gadolinium-based agents if possible**

- **Nephrogenic systemic fibrosis (NSF):**
    - Progressive fibrosis of the skin and soft tissues associated with gadolinium contrast agent used for MRIs
        - Unable to prove causation but there is a strong association
    - Looks and acts like scleroderma
    - Most common presentation: acute / subacute onset of limb edema that starts in the legs accompanied by violaceous papules and plaques over dermal and subcutaneous fat. Skin looks tight, thick, woody and stretched
    - Can also affect muscles and organ (heart, lungs, esophagus)
    - Not just debilitating but dangerous

- **Pathophysiology:**
    - Largely unknown
        - Maybe increase in circulating fibrocytes that get activated by free gadolinium ions that have dissociated from the ligand contrast medium
        - Activation of cytokine release (VEGF, TGF-beta) and inflammatory response gone haywire
        - Kidneys may not be able to get rid of excess free gadolinium quickly so it sets off this cascade
- **Epidemiology:**
    - Rare - total cases EVER is in hundreds to maybe low thousands
    - Highest prevalence in those with end-stage kidney disease where prevalence is 2-6%
    - Mostly middle-aged people but can happen at any age
    - Equally in men and women
    - More in the US and Europe
    - May happen 2-10 weeks (median 5 weeks) after exposure to gadolinium contrast agent
    - Incidence decreased since 2010
        - Increased awareness leading to avoidance of use of gadolinium in patients with renal failure
- **MRI and gadolinium:**
    - *Does the MRI need contrast or not?*
        - A good place to start is with the ACR appropriateness criteria
    - *Gadolinium:*
        - Most MRI contrast agents use it
        - Toxic on its own so bound to chelating agent / ligand
        - The ligand is what impacts rates of NSF
            - In recent years we have gotten better about the ligands that don't cause NSF
            - Unclear the exact mechanism
    - *Categories of ligands per the American College of Radiology*
        - Group one (most associated with NSF): linear ligand
            - Most places don't use these ligands anymore
        - Group two and three (far fewer cases of NSF): macrocyclic ligand
- **What patients in particular should we worry about NSF?**
    - End-stage kidney disease on hemodialysis or peritoneal dialysis
        - Higher prevalence in those on peritoneal dialysis compared to HD
    - Active kidney injury
    - End-stage kidney disease with GFR < 30
- **Diagnosis:**
    - Clinical + histopathology from skin biopsy
    - Yale international registry scoring system

    - Pearl: If you make diagnosis, report to the FDA because it is still rare enough that they are including these patients into larger studies
- **Prognosis:**
    - ⅓ will die
    - ⅓ will have no improvement
    - ⅓ will have slight improvement
- **Treatment:**
    - No treatment at the moment because the toxins have already set off the inflammatory cascade leading to permanent damage
        - Trial using Imatinib showing it may be helpful but continues only if patient uses it
    - Prevention and awareness is the key
        - If GFR > 60, whichever contrast agent is fine
        - If GFR 30-59, better to use a class 2 or 3 agent
        - If GFR < 30, avoid gadolinium-based agents if possible

REFERENCES:

1. Girardi M, Kay J, Elston DM, et al. Nephrogenic systemic fibrosis: clinicopathological definition and workup recommendations. *J Am Acad Dermatol* 2011; 65:1095.
2. Kaewlai R, Abujudeh H. Nephrogenic systemic fibrosis. *American Journal of Roentgenology* 2012; 199(1):W17-W23. https://www.ajronline.org/doi/10.2214/AJR.11.8144
3. Marckmann P, Skov L, Rossen K, et al. Nephrogenic systemic fibrosis: suspected causative role of gadodiamide used for contrast-enhanced magnetic resonance imaging. *J Am Soc Nephrol* 2006; 17(9):2359. Epub 2006 Aug 2. PMID 16885403
4. Zhang B, Liang L, Chen W, Liang C, Zhang S. An updated study to determine association between gadolinium-based contrast agents and nephrogenic systemic fibrosis. *PLoS One* 2015; 10(6):e0129720. Epub 2015 Jun 15. PMID 26076348
5. ACR Appropriateness Criteria: https://www.acr.org/Clinical-Resources/ACR-Appropriateness-Criteria

Proceed with Confidence: Vasectomies

Paul D Simmons, MD, FAAFP and Lyrad Riley, MD, MPH, FAAFP

Pearls:

- **Before performing vasectomy, make sure the patient is 100% certain they want it and are a good candidate.**
- **The most important part of the procedure is being able to palpate the vas deferens and bring it to the skin surface.**
- **Good counseling about post-vasectomy care and the semen test after 3 months, 20 ejaculations to ensure success.**

- **Vasectomy:**

    - Permanent method of sterilization for males that involves interrupting the vas deferens as it leaves the testicle
    - Half a million are done each year
    - Of couples that go the surgical route of sterilization, 10% are using vasectomies
    - Much simpler, safer and less expensive than a tubal ligation
        - Same day
        - Not intraabdominal
        - Home the same day
        - Return to work in a couple of day
- **Risks:**
    - Small risk of infection, scrotal hematoma
    - About 20% have a small knot at the end of the vas deferens where the body's making a immunologic reaction to the sperm that are now exposed
    - Congestive epididymitis - aching thought to be due to some back pressure in the epididymis
    - Failure rate (pregnancy) is 1 in 200 and lower once you have a negative post vas deferens semen analysis
    - 1-2% risk of chronic scrotal pain
- **Good candidates:**
    - Never had surgery
    - No anatomic abnormalities
    - No anticoagulants
    - Chronic opioid use or chronic pain
    - 100% certain because even if conception is possible afterwards, not always successful and is expensive
- **Procedure:**
    - Preparation:
        - If Medicaid need 30 days wait and less than 6 months after signing consent
        - Need a ride home because of the medication
        - Clip hairs on scrotum but don't shave it to lower risk of infection
        - No need to fast but don't have a large meal prior to procedure
        - No antibiotics necessary
        - Bring athletic support or snug-fitting briefs to support scrotum for a couple of days post procedure
    - Pre-medication:
        - Vary widely by provider
        - Dr. Riley uses diazepam 10mg and Percocet as anxiolytic and to relax the cremaster muscles
    - Procedure details:
        - Sterile area of the fenestrated drape and skin prepped with disinfectant like betadine or chlorhexidine
        - Grasp vas deferens through the skin with middle finger and thumb. It feels like al dente spaghetti

        - Make a bleb in the skin with lidocaine 1%
        - Stretch open the skin with special forceps to 6-8mm rather than a scalpel to make an incision
        - Use the vas clamp to grasp the vas deferens through the incision
        - Put additional lidocaine right along course of spermatic cord to try and take out the two nerves that travel along spermatic cord
        - Clean layers off around the vas deferens until you see the smooth, shiny white serosa on the vas deferens for a 2cm segment
        - Grasp the vas deferens about 2cm apart and excise about 1cm with an iris scissor
        - Use small battery-operated electrocautery unit to go into the vas deferens lumen and cauterize each tip
    - Post-procedure:
        - Tuck a little gauze right over the scrotum underneath the athletic supporter
        - Escort out to their ride
        - Rest for a couple of days
        - No sex/ejaculation for a week
        - Ice or frozen bag of vegetables for 10-15 minutes the first couple of a days
        - 3 months and about 20 ejaculations to flush out any remain sperm before checking with a sperm test to make sure it worked
        - Post-op exam is usually unnecessary unless there is significant pus/discharge, swelling, pain, fever
        - +/- pathology to make sure you got the vas deferens

REFERENCES:

1. Rayala BZ and Viera AJ. Common questions about vasectomy. *Am Fam Physician*. 2013 Dec 1; 88(11):757-761.
2. Dassow P and Bennett JM. Vasectomy: an update. *Am Fam Physician*. 2006 Dec 15;74(12):2069-2074.
3. Sharlip I, Belker A, Honig S, et al. Vasectomy: American Urological Association (AUA) guideline. AUA 2012 May, updated 2015.

Neonatal Abstinence Syndrome (NAS)

Michael Baca-Atlas, MD, Matt Zeitler, MD

Pearls:

- **While NAS usually presents pretty quickly and is recognized in the hospital, they may be missed and extend into the outpatient setting.**
- **Non-pharmacological management with ESC (Eat-sleep-console) is promising and may be superior to pharmacologic management.**

- **Neonatal abstinence syndrome:** set of characteristic behaviors of drug withdrawal in a newborn exposed to substances in utero
    - Newborns are never addicted to substances but they develop dependence in utero
    - There is now the term neonatal opioid withdrawal syndrome (NOWS) that is more specific than NAS
    - Nicotine, benzodiazepines, SSRI's can exacerbate severity of NAS from opioids
- **Epidemiology:**
    - Rising incidence of maternal use of opioids leading to rising incidence of NAS
        - In past 10 years, opioid use disorder among deliveries has increased from 1.5 to 6.5 per thousand events
        - 80% of this population is in the Medicaid population
- **Pathophysiology:**
    - Altered levels of norepinephrine, serotonin, dopamine in response to withdrawal from substances in use on maternal side that cross the placenta
    - May be some relation to genetic polymorphisms
    - Other things that affect presentation:
        - Nutrition
        - Stress
        - Infection
        - Placental opioid metabolism
        - Genetics
    - Preterm infants have lower incidence that decrease as gestational age decreases
        - Premature infants may have immature nervous system and reduced total time of exposure
- **Presentation:**
    - Jitteriness, irritability, seizures (worst case scenario), nasal congestion, vomiting, diarrhea
    - Tachypnea, poor weight gain
    - Can happen with recent exposure, may be delayed by 5 days or later and depends on the half-life of the drug
- **Diagnosis:**
    - Combination of history, urine drug screen of mother and infant, symptoms and exam findings
    - NOT defined by need for pharmacotherapy

- **Differential:**
  - Sepsis - especially if prolonged labor with chorioamnionitis, GBS untreated
  - Hyperthyroid - especially if mother had hyperthyroid
  - Polycythemia - especially if mother had diabetes or infant was LGA (large for gestational age)
  - Electrolyte disturbance or HIE (hypoxic ischemic encephalopathy)
- **Work-up:**
  - UDS for mother and infant
  - Infant stool and meconium is more sensitive, can detect as early as second trimester
- **Management:**
  - Monitor symptoms
    - Finnegan scale (>37 weeks) is popular but there are many options
  - Eat-Sleep-Console (ESC)
    - Eat greater than 1 ounce per feed or breastfeed well
    - Sleep undisturbed for at least an hour at a time
    - Be consolable when crying or irritable within 10 minutes
  - If they aren't meeting ESC then:
    - First-line - supportive care (dim lights, swaddle, noise machine, more frequent on demand feeding, empower mother to be attentive to baby cues)
    - Second-line - medications
      - Morphine
      - Methadone
      - Buprenorphine may be on the horizon but contains substantial ethanol amounts
- **Discharge planning:**
  - Usually cleared after 4-7 days of life
  - If infants do end up requiring pharmacotherapy, they may be discharged after 24 hours of observation after last dose of morphine
- **Long-term effects:**
  - Data is still evolving
  - In the MOTHER study (MAT in pregnancy) did NOT see differences in growth, neurodevelopmental outcomes at about 36 months with both buprenorphine versus methadone, or those children who received NAS medications for withdrawal versus those who did not receive medications

REFERENCES:

1. Dysart K, Hsieh H-C, Kaltenbach K, et al. Sequelae of preterm versus term infants born to mothers on a methadone maintenance program: differential course of neonatal abstinence syndrome. *J Perinat Med*. 2007;35(4):344–346.
2. Uebel H, Wright IM, Burns L, et al. Reasons for rehospitalization in children who had neonatal abstinence syndrome. *Pediatrics*. 2015 Oct;136(4):e811–20.

3. Covinsky JO. New therapeutic modalities for the treatment of elderly patients with ischemic heart disease. *Am J Med.* 1987 Jan 26;82(1B):41–46.
4. Holmes AV, Atwood EC, Whalen B, et al. Rooming-In to Treat Neonatal Abstinence Syndrome: Improved Family-Centered Care at Lower Cost. *Pediatrics.* 2016;137(6).
5. Raffaeli G, Cavallaro G, Allegaert K, et al. Neonatal abstinence syndrome: update on diagnostic and therapeutic strategies. *Pharmacotherapy.* 2017 Jul 2;37(7):814–823.
6. Jansson LM. Neonatal Abstinence Syndrome. In: Kim M, ed. *UpToDate*. Waltham, MA.: UpToDate; 2020. www.uptodate.com. Accessed Dec 12, 2019.
7. Jones HE, Fielder A. Neonatal abstinence syndrome: Historical perspective, current focus, future directions. *Prev Med.* 2015 Nov;80:12–17.
8. McQueen K, Murphy-Oikonen J. Neonatal Abstinence Syndrome. *N Engl J Med.* 2016 Dec 22;375(25):2468–2479.
9. Pryor JR, Maalouf FI, Krans EE, et al. The opioid epidemic and neonatal abstinence syndrome in the USA: a review of the continuum of care. *Arch Dis Child Fetal Neonatal Ed*. 2017 Mar;102(2):F183–F187.
10. Grossman MR, Berkwitt AK, Osborn RR, et al. An initiative to improve the quality of care of infants with neonatal abstinence syndrome. *Pediatrics.* 2017 Jun;139(6).
11. Blount T, Painter A, Freeman E, Grossman M, Sutton AG. Reduction in length of stay and morphine use for NAS with the "eat, sleep, console" method. *Hosp Pediatr.* 2019 Jul 8;9(8):615–623.

What's That Lab: Ferritin

Paul D Simmons, MD, FAAFP

Pearls:

- **Ferritin is an intracellular protein that stores iron.**
- **Useful lab for understanding iron-deficiency and iron overload.**
- **Also an acute phase reactant that can lead to a falsely elevated result despite true iron deficiency.**

- **Ferritin:** an intracellular protein that stores iron and functions as an iron carrier from tissue to tissue. Small amount secreted from cells into the serum where it is measured
    - Nearly universal protein in biology that is evolution's solution to storing the toxic form of iron (ferrous) to less toxic form (ferric)
- **Normal range:** 30-300ng/mL for men and post-menopausal women
    - Premenopausal women have menses so they have lower iron stores on average
    - Multiple ways labs measure ferritin but they're all pretty equivalent and equally accurate
- **Clinical uses:**
    - Useful in telling us about iron stores if trying to figure out causes of low iron
        - Iron-deficiency anemia

        - Anemia: often a late manifestation of iron deficiency because bone marrow tries to keep up red blood cell production at all costs. Ferritin is an earlier sign of iron deficiency before seeing drop in hemoglobin/hematocrit
        - Fatigue
        - restless leg syndrome
        - Celiac disease
        - Hypothyroidism: associated with less production of ferritin
        - Vitamin C deficiency: co-factor in iron absorption
    - Elevated ferritin: hemochromatosis
    - Acute phase reactant
        - Elevated in response to stressors like infection. One theory that body ramps up ferritin to remove free iron from bacteria that need iron
        - Anemia of chronic disease or chronic inflammation → ferritin is normal/elevated but patient is actually anemic
    - Falsely low ferritin
        - Hook effect: excess ferritin around that binds up all the immuno-chemical reagent leading to falsely low numbers

REFERENCES:

1. Theil EC. Ferritin protein nanocages—the story. *Nanotechnol Percept*. 2012;8(1):7–16. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3816979/.
2. Burnett D, Crocker J. *The Science of Laboratory Diagnosis*. Chichester, West Sussex, England; Hoboken, Nj: Wiley; 2005.
3. Garcia-Casal MN, Peña-Rosas JP, Urrechaga E, et al. Performance and comparability of laboratory methods for measuring ferritin concentrations in human serum or plasma: A systematic review and meta-analysis. Szecsi PB, ed. *PLOS ONE*. 2018;13(5):e0196576. doi:10.1371/journal.pone.0196576
4. Bacon BR. Clinical manifestations and diagnosis of hereditary hemochromatosis. In: Timauer J, ed. *UpToDate*. Waltham, MA.: UpToDate; 2020. www.uptodate.com. Accessed Jan 30, 2020

Mumps

Micaela Robb Bowers MD, Neda Frayha MD

Pearls:

- **While we think of mumps as a childhood illness, adults who end up being symptomatic are actually more likely to have severe symptoms (orchitis, parotitis, oophoritis) than children.**
- **During an outbreak, everyone in the area should get a third mumps vaccination due to waning immunity.**

- **Mumps:**
  - Highly contagious viral illness that is spread by droplets, direct contact with infected patients, fomites in the environment
  - Incubation period is about 2-3 weeks during which you are shedding virus and actively contagious
- **Symptoms:**
  - Fever, headache, myalgias, fatigue, anorexia
  - Within 48 hours of symptom onset: salivary gland swelling, parotitis (unilateral or bilateral)
    - Pearl: Most infectious 5 days BEFORE they develop parotitis
  - 20% of adults infected are asymptomatic but adults who are symptomatic tend to have worse symptoms
  - Disease resolves after a a few weeks
- **Complications:**
  - Orchitis is seen in 15-30% of post-pubertal males, usually presents 5-10 days after the parotitis
  - Oophoritis is seen in 5% of post-pubertal females
  - About 10% can get aseptic meningitis - more common in men and less common in areas of widespread immunization
  - Acute sensorineural hearing loss is another compilation that resolves
- **Diagnosis:**
  - Mumps PCR on buccal swab, best within 3 days of symptom onset
  - Serum sample PCR and IgM/IgG
    - IgM positive within 5 days of after symptom onset and stays positive for only 4 weeks
    - Those who are vaccinated have negative IgM, positive IgG
- **Management:**
  - Supportive care
    - Warm or cold compresses for parotitis
    - Acetaminophen and/or NSAIDS for pain
    - Supportive underwear for swollen testes
  - Long-term complications:
    - 30-50% of unvaccinated patients will have testicular atrophy

        - A very small percent have decreased fertility
        - Potential link to mumps orchitis and testicular cancer
- **Vaccination:**
    - Live virus vaccine approved in 1967 and recommended nationally since 1977
    - Recommended two dose series in 1989
        - One dose efficacy is 78%
        - Two dose efficacy is 88%
    - Contraindications:
        - Severe immunodeficiency
            - Chemotherapy
            - Uncontrolled radiation therapy
        - Pregnancy
        - Anaphylaxis to neomycin
    - People who should exercise caution:
        - Patients with TTP
        - Personal or family history of seizures
        - Those who have received IVIG in the past year
    - Immunity wanes over time
    - During outbreaks:
        - Individuals living in areas where they might be exposed to mumps during an outbreak, if received the two doses of MMR vaccination they get third dose
    - If unvaccinated, recommendation is to exclude you from areas where you could be exposed to the virus (ie: exclusion from college dorm until 26 days after the last person was sick)

REFERENCES:

1. Davison P, Morris J. Mumps. NIH.gov. https://www.ncbi.nlm.nih.gov/books/NBK534785/. Published November 23, 2019.
2. Hviid A, Rubin S, Muhlemann K. Mumps. *Lancet.* 2008; 371(9616):932-944. DOI:https://doi.org/10.1016/S0140-6736(08)60419-5
3. Kuehn B. Mumps Outbreak Preparedness. *JAMA*. 2018;320(10):966. doi:10.1001/jama.2018.12455
4. Latner DR, Hickman CJ. Remembering Mumps. *PLoS Pathog.* 2015;11(5):e1004791. doi:10.1371/journal.ppat.1004791
5. Plotkin SA. Mumps: A Pain in the Neck. *J Pediatric Infect Dis Soc.* 2018; 7(2):91–92. https://doi.org/10.1093/jpids/piy038
6. Cardemil CV, Dahl RM, James L, et al. Effectiveness of a Third Dose of MMR Vaccine for Mumps Outbreak Control. *N Engl J Med.* 2017; 377:947-956. DOI: 10.1056/NEJMoa1703309

Colorectal Cancer Screening for the PCP

Sandra Quezada MD, Paul D Simmons MD, Neda Frayha MD

Pearls:

- **Average risk patients should start screening at age 50. Colonoscopy is done every 10 years or earlier depending on findings, while a FIT test can be done as an alternative every year.**
- **High risk patients are those with a family history (see details), personal history of colon cancer, IBD, PSC or genetic polyposis syndromes.**

- **Colon cancer:**
  - Second most deadly cancer
  - Fourth most common cancer
  - While median age of colon cancer is 68 and has been decreasing, there has been a rise in colon cancer in those under age 50.
  - 60% of people who are eligible for colon cancer screening are not getting it
- **Average risk screening guidelines:**
  - American Cancer Society now recommends screening at 45 based on their National Cancer Institute Study that showed increased risk in younger patients
  - Other societies still recommend starting at age 50
- **Higher risk screening guidelines:**
  - Risk factors:
    - History of colon cancer
    - Family history
      - First degree relative with colon cancer or advanced polyp at age < 60
        - Pearl: advanced polyp = >1 cm or high risk features like high-grade dysplasia or villus features
      - Should start at age 40 or 10 years before age of diagnosis of relative, whichever is earlier
      - 5 years is the longest possible interval between screening until you get to age 60, at which point you can go to every 10 years again
    - Inflammatory bowel disease with involvement of more than ⅓ of their colon who've had the disease for 8 or more years
    - IBD + PSC (need annual colonoscopy)
    - PSC
    - Genetic polyposis syndromes like FAP or HNPCC
- **Polyps and screening interval:**
  - Hyperplastic: average risk interval
  - Adenomatous polyp (one or two): 5 years
  - Adenomatous polyp (3+): 3 years
  - Adenomatous polyp (10+): 1 year
  - Adenomatous polyp (>1cm, regardless of number): 3 years

- **When to stop:**
    - Stop after 85
    - Gray area between 76 to 85
        - If they are healthy, low risk and have > 20 years of life to live, then reasonable to consider
        - If they have multiple comorbidities that make them high risk, may need to stop screening
- **Other tests:**
    - FIT (fecal immunochemical test) = measures hemoglobin in the stool, annual
    - FIT DNA = FIT that also measures DNA methylation changes associated with colon cancer, every 3 years
        - 10x more expensive than regular FIT
        - Lose specificity
    - Sigmoidoscopy, every 5 years
    - CT colonography
    - Serologic test (Septin-9):
        - Not recommended
        - Very low sensitivity (48%)
        - Very expensive
- **Benefits of colonoscopy:**
    - A little bit more sensitive
    - Remove the polyp right away

REFERENCES:

1. Gupta S et al. Recommendations for follow-up after colonoscopy and polypectomy: A consensus update by the US Multi-Society Task Force on Colorectal Cancer. *Gastroenterology.* 2020 Feb 7; [e-pub]. (https://doi.org/10.1053/j.gastro.2019.10.026)
2. Lieberman DA, Rex DK, Winawer SJ, et al. Guidelines for colonoscopy surveillance after screening and polypectomy: a consensus update by the US Multi-Society Task Force on Colorectal Cancer. *Gastroenterology*. 2012;143(3):844–857. doi:10.1053/j.gastro.2012.06.001

When X-Rays Lie

Arun Sayal, MD & Neda Frayha, MD

Pearls:

- ❏ Evaluating patients before ordering x-rays prevents bias and premature closure which can occur when we see the x-ray before the patient.
- ❏ Examine the unaffected side/extremity first to determine what "normal" is for the patient.

- **Optimal interpretation of musculoskeletal x-rays requires it be done in conjunction with a good history and physical exam.**
    - Examining the patient's unaffected side before the symptomatic side provides valuable insight to what is normal for the patient.
    - Ordering and reviewing MSK x-rays before evaluating patient can undermine the importance of the H&P by biasing us based what we see (or don't see) on the XR.

- **By evaluating the patient before ordering films, we can develop a differential first and ensure that we are X-raying the appropriate regions with the appropriate views (e.g. wrist vs. forearm vs. hand etc.).**
    - X-rays are more powerful after we have already developed a clinical expectation of what they are likely to show based on our evaluation of the patient (ie: "based on my exam, I expect a fracture or a large effusion or dislocation etc.").
    - By evaluating patient first, we can also identify the specific areas of tenderness and concern.
    - This is actually standard practice for orthopedic surgeons.

- **Remember the "SCARED OF" mnemonic for can't miss diagnoses in patients presenting with extremity pain where x-rays do not show an obvious fracture:**

    S - Septic Joint
    C - Compartment Syndrome
    A - Abuse (not a negative x-ray, but a mechanism that should be considered)
    RE - Referred pain
    RE - Report from radiologist misses fracture
    D - Dislocation

    O - Operative soft tissue injury (ie: Achilles' rupture)
    F - Fracture (occult)

-Remember, Normal x-ray is not a diagnosis and patients will often be frustrated if all they are informed is that they do not have a fracture.

Paper Chase #1 - Association of Aspirin with Hepatocellular Carcinoma and Liver-Related Mortality

Tom Robertson MD, Steve Biederman MD

Simon TG, Duberg A-S, Aleman S, Chung RT, Chan AT, Ludvigsson JF. Association of Aspirin with Hepatocellular Carcinoma and Liver-Related Mortality. N Engl J Med. 2020;382(11):1018-1028. doi:10.1056/nejmoa1912035

Pearls:

- **Use of low-dose aspirin was associated with significantly lower risk of hepatocellular carcinoma and lower liver-related mortality in patients with chronic viral hepatitis**

- **Objective:** To assess the association of aspirin for hepatocellular carcinoma and liver-related mortality in patients with chronic viral hepatitis
- **Method:** Retrospective study that compared those with Hep B or C who took aspirin versus those who did not in Sweden
    - Primary outcome: new hepatocellular and liver related mortality using cancer and cause of death registries over a 10 year period
- **Results:**
    - 50,000 total adults with Hep B or C
    - 14,000 used aspirin
    - Hepatocellular carcinoma: 4% in aspirin users, 8% in those who did not
    - Ten year liver mortality: 11% in aspirin users, 18% in those who did not
    - Most benefit seen for use greater than 5 years
    - Similar rates of bleeding between the groups
- **Bottomline:** Use of low-dose aspirin was associated with significantly lower risk of hepatocellular carcinoma and lower liver-related mortality in patients with chronic viral hepatitis

Paper Chase #2 - A Comprehensive Evaluation of Rhythm Monitoring Strategies in Screening for Atrial Fibrillation: Insights from Patients at RIsk

Tom Robertson MD, Steve Biederman MD

Diederichsen SZ, Haugan KJ, Kronborg C, et al. A Comprehensive Evaluation of Rhythm Monitoring Strategies in Screening for Atrial Fibrillation: Insights from Patients at Risk Long-Term Monitored with Implantable Loop Recorder. Circulation. March 2020 [epub]. doi:10.1161/CIRCULATIONAHA.119.044407

Pearls:

- **Compared with implantable loop recorders, the diagnostic yield of detecting Afib improved with increased number of screenings and duration of screenings.**

- **Objective:** To assess the diagnostic yield of different Afib screening and detection strategies

- **Method:** Patients over 70 with at least one risk factor for afib. All got implantable loop recorders for over 3 years. Using that database of real time recordings, researchers then simulated the performance characteristics of different afib detection methods using a random sampling model
    - Afib defined as that lasting longer than 6 minutes
    - Removed patients who were placed on treatment due to already detected afib
- **Results:**
    - 650,000 days of continuous rhythm monitoring across almost 600 people
    - Sensitivity for afib detection:
        - Single 10 second EKG: 1.5%
        - Yearly EKG: 2.3%
        - Twice daily 30-second EKG for 14 consecutive days: 8.4%
        - Continuous 24-hour monitor: 11%, increases 2% per day up to 21% sensitivity for 7-day monitoring
        - 30-day monitor: 34%
        - Sensitivity increases as the intervals spread out (ie: 3-24 hour sessions is better than 1-72 hour session)
- **Bottomline:** Compared with implantable loop recorders, the diagnostic yield of detecting Afib improved with increased number of screenings and duration of screenings

Paper Chase #3 - Association of Physician Orders for Life-Sustaining Treatment With ICU Admission Among Patients Hospitalized Near the End of Life

Tom Robertson MD, Steve Biederman MD

Lee RY, Brumback LC, Sathitratanacheewin S, et al. Association of Physician Orders for Life-Sustaining Treatment With ICU Admission Among Patients Hospitalized Near the End of Life. JAMA. February 2020 [epub]. doi:10.1001/jama.2019.22523

Pearls:

- **Treatment-limiting POLSTs were significantly associated with lower rates of ICU admission compared with full-treatment POLSTs. However, 38% of patients with treatment-limiting POLSTs received intensive care that was potentially discordant with their POLST.**

- **Objective:** To evaluate the association between physician orders for life-sustaining treatment (POLST) and ICU admission for patients hospitalized near the end of life.
- **Method:** Retrospective cohort study of patients who had a POLST (comfort measures only vs. limited interventions vs. full treatment) and chronic illness who died and were hospitalized within six months of their death.
    - Primary outcome: association between having any POLST order and ICU admission during the last hospitalization of life

    - Secondary outcome: composite of mechanical ventilation, vasopressors, dialysis and CPR
- **Results:**
    - 1800 patients
    - 25% wanted comfort measures only → ⅓ were admitted to the ICU
    - 40% wanted limited interventions → 50% were admitted to the ICU
    - 33% wanted full treatment → 60% were admitted to the ICU
    - Overall 38% who wanted limited intervention ended up with discrepant care
- **Bottomline:** Treatment-limiting POLSTs were significantly associated with lower rates of ICU admission compared with full-treatment POLSTs. However, 38% of patients with treatment-limiting POLSTs received intensive care that was potentially discordant with their POLST.

Paper Chase #4 - Development and Validation of a Penicillin Allergy Clinical Decision Rule

Tom Robertson MD, Steve Biederman MD

Trubiano JA, Vogrin S, Chua KYL, et al. Development and Validation of a Penicillin Allergy Clinical Decision Rule. JAMA internal medicine. March 2020 [epub]. doi:10.1001/jamainternmed.2020.0403

Pearls:

- **A score of <3 on the PEN-FAST clinical decision rule was associated with a high NPV and could be used to identify low risk PCN allergies**

- **Objective:** To develop and validate a PCN allergy clinical decision rule that enables point of care risk assessment
- **Background:** Up to 90-95% of people with a penicillin allergy can actually tolerate it
- **Method:** Multicenter prospective study that used clinical variables predictive of a penicillin allergy and compared it to actual allergy testing. Regression analysis to determine four factors most predictive of an actual allergy
- **Results:**
    - Four factors - Pen-FAST:
        - F- Fiver or fewer years ago (3-points)
        - A - Anaphylaxis (3-points)
        - S - Severe cutaneous reaction (ie: Stevens-Johnson syndrome, toxic epidermal necrolysis) (3-points)
        - T- Treatment required (1-point)
    - Score < 3 had NPV 96%
- **Bottomline:** A score of <3 on the PEN-FAST clinical decision rule was associated with a high NPV and could be used to identify low risk PCN allergies

Paper Chase #5 - Declining Use of Primary Care Among Commercially Insured Adults in the United States, 2008-2016

Tom Robertson MD, Steve Biederman MD

Ganguli I, Shi Z, Orav EJ, Rao A, Ray KN, Mehrotra A. Declining Use of Primary Care Among Commercially Insured Adults in the United States, 2008–2016. Ann Intern Med. 2020;172(4):240. doi:10.7326/M19-1834

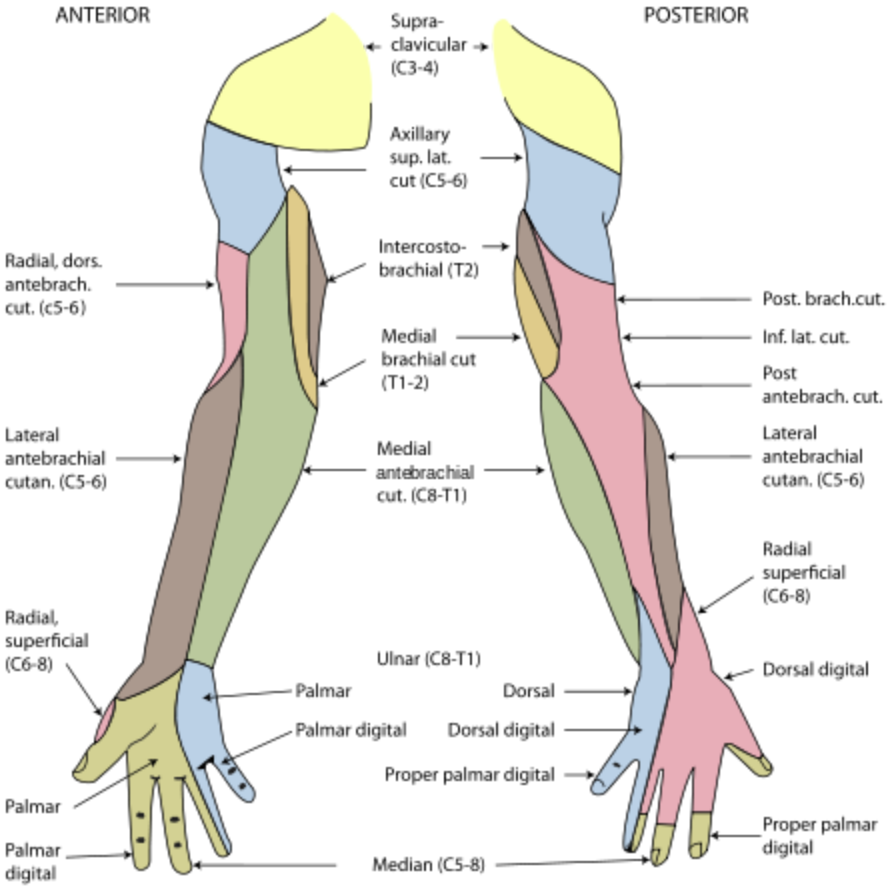
Pearls:

- **Insured adults have been visiting PCPs less often and nearly one half had no PCP visits in a given year by 2016**

- **Objective:** To describe primary care provider visit trends among adults enrolled with a large, national, commercial insurer and assess factors underlying a potential decline in PCP visits
- **Method:** Cross-sectional study of claims data for adults 18-64 enrolled in a large national carrier over a 9 year period
- **Results:**
    - 20 million adults, 142 million primary care visits
    - Visit rate decline by about 24% over that nine year span
    - Increase in proportion who had no PCP from 38-46%
    - Problem-based visits declined by about 30% while preventative visits increased by 41%
    - Out-of-pocket cost for problem-based visits increased from $30-40
    - Preventative visits cost decreased from $20-5
- **Bottomline:** Insured adults have been visiting PCPs less often and nearly one half had no PCP visits in a given year by 2016

Mailbag

- **Reader question: Upper extremity paresthesias**



This image is public domain from Gray's Anatomy (1918) via Wikipedia:

  - Review of the brachial plexus:
    - Median nerve, C6-T1
    - Radial nerve, C5-T1
    - Ulnar nerve, C7-T1
    - Not to forget:
      - Musculocutaneous nerve, C5-C7: arm flexors and biceps, sensation of lateral forearm
      - Axillary nerve, C5-C6: deltoid muscle and shoulder sensation
  - Pathophysiology:
    - Toxic metabolic - alcohol, diabetes, heavy metal poisoning, uremia, chemo
    - Traumatic/anatomic (**most common**) - spine injury, repetitive injury, entrapment
    - Autoimmune - CIDP, Guillain-barre
    - Infectious - Hep C, HIV, Lyme, Zoster, Syphilis
  - Clinical Pattern:
    - Systemic - toxic, autoimmune, infectious

- Distal prior to proximal ne
- rve effects - toxic metabolic
- Focal - traumatic/anatomic