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Pediatric Residency News

Maria Fareri Children's Hospital



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Grand Rounds

January 9
"Eat, Drink and Be Wary"
Dr. Robert Amler

January 16
"New Vaccines-2008"
Dr. Jose Munoz

January 23
Case Conference, TBA

January 30
"Sleep Disorders in
Children and Adolescents"
Dr. Lauren Broch

Resident As Teacher
December 26
"Acyanotic Heart Disease"
Dr. Leif Lovig

January 2
"Cyanotic Heart Disease"
Dr. Narendra Dereddy

Journal Club
January 3
"Body-Checking Rules and
Childhood Injuries in Ice
Hockey." Pediatrics, 2006
Dr. Danielle Tetro

Case 1: GBS Meningitis by Dr. Kristen Woodard

AF is a 3 mo previously healthy male who presented with a 1 day h/o fever, Tmax 103°F, and a 3 day h/o decreased PO intake and increasing irritability. Patient initially presented to an outside hospital where blood and urine cultures and a lumbar puncture were performed. CSF studies revealed a WBC count of 2180 (neutrophils 54%, lymphocytes 21%), RBC 50, Protein 188, and Glucose 16. CSF culture grew β-hemolytic, group B *streptococcus*. AF was initially treated with Ceftriaxone/Vancomycin until CSF culture results were obtained, at which time he was switched to Penicillin G and transferred to MFCH for further management. AF was switched to Ampicillin/Gentamicin. On HD #5 at MFCH patient developed seizure activity consisting of eye rolling, tongue thrusting, and upper extremity twitching. After the seizures were stopped with lorazepam and propofol, the patient was loaded with phenobarbital and continued on a maintenance dose for seizure control. MRI at that time showed bifrontal/temporal subdural empyemas.

Group B streptococci (*Streptococcus agalactiae*) are gram-positive diplococci that produce a narrow zone of beta hemolysis (yellowish halo of complete clearing due to production of streptolysin) on 5% sheep blood agar. Group B streptococci (GBS) are common inhabitants of the GI and GU tracts. Additionally, GBS is a major cause of perinatal bacterial infections including bacteremia, endometritis, UTI and chorioamnionitis as well as systemic and focal infections in infants up until 3 months of age. Early-onset disease (0-6 days of life) usually occurs within the first 24 hours of life and may present as respiratory distress, apnea, shock, pneumonia, and less often meningitis. Late-onset disease (7 days to 3 months) usually occurs at 3-4 weeks of life and often manifests as bacteremia or meningitis. Late onset disease may also present as focal infections such as osteomyelitis, septic arthritis, and cellulitis. Very late-onset (or "late-late onset") disease occurs after 3 months of age and is usually seen in preterm infants requiring prolonged hospitalization. The incidence of early onset disease has decreased by 81% since the widespread practice of maternal intrapartum antibiotic

prophylaxis, which is not effective in prevention of late onset disease. The transmission from mother to infant occurs shortly before or during delivery. Transmission can also occur in the community from healthy colonized people. Treatment for a newborn infant with presumptive GBS infection includes ampicillin and an aminoglycoside. Penicillin G can be given alone once GBS has been identified.



Case 2: Hypertension with Adrenal Mass by Dr. Kelly Adams

KJ is a 9 year old male found to have hypertension on routine physical exam 6 months ago. At time of diagnosis KJ was on methylphenidate (Concerta) for ADHD, which was discontinued without resolution of hypertension. Additional symptoms included intermittent headaches accompanied by nausea and vomiting, and nocturnal diaphoresis. Nocturnal hypertension on 24 hour BP monitoring was detected and abdominal ultrasound demonstrated bilateral adrenal masses. KJ was admitted to MFCH for further workup and BP control. MRI confirmed bilateral adrenal masses consistent with pheochromocytomas. KJ's hypertension was initially treated unsuccessfully with isradipine, but resolved with phenoxybenzamine. Urine was sent for metanephrines, vanillylmandelic acid (VMA), homovanillic acid (HVA), and catecholamines and an iodine I-131-labeled metaiodobenzylguanidine (MIBG) scan was scheduled.

This additional testing confirmed the diagnosis of pheochromocytoma and plan is for surgical resection of these adrenal tumors. Pheochromocytoma is a catecholamine-secreting tumor arising from chromaffin cells, most commonly in the adrenal medulla. They are located more commonly on the right; however in 20 % of affected children they are bilateral. Ten percent occur in children, the majority occurring between 6 and 14 years. They may be an isolated finding or can

be seen in association with other syndromes including von Hippel-Lindau, neurofibromatosis, multiple endocrine neoplasia (MEN) 2A or MEN 2B. The clinical manifestations result from excess catecholamines and include hypertension, headache, palpitations, abdominal pain, dizziness, vomiting, pallor and sweating. Laboratory diagnosis is made by demonstrating elevated levels of urine and plasma catecholamines, urine VMA and urine metanephrines. Radiological diagnosis is usually made with ultrasound followed by MRI. MIBG scan uses radioactive material taken up by chromaffin cells to aid in the detection of small tumors. Although the curative treatment is surgical resection, initial preoperative treatment includes both alpha and beta blockade to control blood pressure and prevent intra-operative hypertensive crisis. About 10% of pheochromocytomas are malignant, and malignant tumors are usually extra-adrenal.



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Shoelaces or Velcro?



Announcements

- Congratulations to Cindi Mondesir for accepting a position with the National Health Service Corp. in Bethel, Alaska .
- Congratulations to the Pediatric Resident Team (Dr. Mendelsohn, Dr. Koelsch, Dr. Riar) for their 1st place tie with the sub-specialty team in the Pediatric Jeopardy grand rounds.
- Join the Residents in Ice Skating at the Westchester Skating Academy on Sunday, January 13th from 1:30 pm to 4:30 pm.



Picture of the Month: Supracondylar Fracture by Dr. Cindi Mondesir

AA is a 5 y/o female who sustained an injury to her left arm after tripping on her shoelaces while playing at an after school program. Witnesses reported the child cried immediately, picked herself up and continued to play. Later that evening, the father noticed significant left arm swelling with limited range of motion. He brought the child to Orange Regional Medical Center where physical exam and radiological studies were consistent with a type III supracondylar fracture . The child was then transferred for further management. On arrival at MFCH, notable findings on physical exam included intact neurovascular function. The following day the child underwent closed reduction with manipulation by traction, supination and flexion. Immediately following, one medial and two lateral pins were placed across the fracture. She was discharged home to play another day.

Supracondylar fractures of the humerus account for 3% of all pediatric fractures. They are usually sustained when a child falls on an outstretched arm. These fractures may be difficult to diagnose because the child often appears without obvious deformity and limited range of motion with or without swelling. Physical exam must quickly to assess for signs of neural or vascular injury. The median nerve, radial nerve and brachial artery are prime targets for injury depending on the displacement of structures. Fractures classified into two types: Extension and Flexion. Extension type is further subdivided by the Gartland Classification, based on involvement of damage to posterior cortex.

Type I Non-displaced

Type II Displaced with intact posterior cortex

Type III Displaced with posterior cortex disruption and no cortical contact

Treatment is determined by type and whether there is neurovascular compromise. Type I is commonly treated with immobilization in a long arm splint. Type II and III are commonly treated with percutaneous pin fixation. Open reduction is often indicated when there is severe vascular injury or inadequate reduction.

Advocacy Corner by Dr. Emily Koelsch

Welcome to another edition of the Advocacy Corner at Maria Fareri Children's Hospital. Four Resident Advocacy Task Forces have been formed, dedicated to such areas as Nutrition/Obesity, Violence, Insurance/Legislation and Adolescent/Reproductive Health. The resident-run task forces have started meeting to plan and implement projects. In the coming months plans are in place to start incorporating medical students, involved with the Pediatrics Club at NYMC, into these task forces.

Outside of MFCH, President Bush vetoed the SCHIP bill for the second time, leaving the program under-funded and millions of children in jeopardy of losing their health care coverage. The AAP has sent a letter to Congress to urge immediate legislation for reauthorization or at least shortfall funding for the program so that millions of children do not become uninsured. Visit www.aap.org/advocacy.html for more information.

Inside the ICU: Congenital Diaphragmatic Hernia by Dr. Daniel Mooney

A full term baby boy was born via NSVD with no previous indications of perinatal distress. On delivery the baby had no respiratory effort and a 1-minute Apgar of 0. The baby was resuscitated and intubated. Breath sounds were decreased bilaterally with faint heart sounds shifted to the right. A stat chest x-ray showed findings similar to the picture shown to the left, demonstrating a left-sided congenital diaphragmatic hernia (CDH). Left-sided hernias allow herniation of both small and large bowel, as well as intraabdominal solid organs, into the thoracic cavity. In right-sided hernias (13% of cases), only the liver and a portion of the large bowel tend to herniate. Bilateral hernias are uncommon and usually fatal. CDH is characterized by a variable degree of pulmonary hypoplasia associated with a decrease in cross-sectional area of the pulmonary vasculature and dysfunction of surfactant. The lungs have a small alveolar capillary membrane for gas exchange, which may be further decreased by surfactant dysfunction. Using ultrasonography, CDH may be

prenatally diagnosed as early as the second trimester. Suggestive findings include polyhydramnios, absent or intrathoracic stomach bubble, and mediastinal and cardiac shift. A detailed examination (level II US) is typically necessary. In this case, maternal obesity limited the usefulness of prenatal US and the diagnosis was not made prior to delivery. Initial management of CDH includes rapid endotracheal intubation, NG decompression and sedation. Bag-mask ventilation should be avoided to prevent distending or inflating the stomach and small intestine, thereby further reducing tidal volume. Ventilation strategies include conventional mechanical ventilation, high frequency oscillation ventilation (HFOV) and extracorporeal membrane oxygenation (ECMO). Overall survival of infants with CDH is 67%, with spontaneous fetal demise in 7-10%. Long term consequences include bronchopulmonary dysplasia and pulmonary function changes, growth retardation, GERD and neurocognitive defects, pectus excavatum and scoliosis.



Bug of the Month
by Dr. Eileen Rivera



Respiratory syncytial virus (RSV) is the most common cause of bronchiolitis and pneumonia among infants and children under 1 year of age. Its peak incidence is between 2 and 8 months. Annually, 3.5 million children acquire RSV infection and more than 100,000 are hospitalized.

RSV is spread person-to-person via respiratory secretions from infected persons or contact with contaminated objects. Patients may present with fever, runny nose, and cough, and may progress to tachypnea, cyanosis, retractions, wheezing, or rales. Active disease lasts about 8-15 days. During the first RSV infection, 25-40% of children have bronchiolitis or pneumonia, and 0.5-2% of children require hospitalization. The majority of children hospitalized are under 6 months of age.

The incidence of bacterial co-infection is <1%. Children with RSV bronchiolitis frequently have otitis media, which is usually viral. Recurrent infection is common, however, with recurrence limited to the upper respiratory tract, acting more like a cold and lasting 7-10 days.

The mortality rate of RSV is less than 1%. However, there is an increased mortality and morbidity in high-risk patients. Infants with chronic lung disease, congenital heart disease, immunodeficiency, or prematurity, when hospitalized for RSV, have a 3-5% mortality rate. Also, these patients spend twice as long in the hospital compared with other patients with RSV infection (7-8 days vs. 3-4 days in normal full-term infants).

Diagnosis of RSV can be made by isolating the virus via culture of nasopharyngeal secretions, detection of viral antigens from these secretions, and detection of viral RNA. Most laboratories use antigen detection to diagnose infection. Chest x-ray typically shows hyperinflated lungs with diffuse increased interstitial markings. In addition to testing for RSV infection, studies have suggested that febrile newborns may have a high incidence of concurrent urinary tract infections,

and should have a urine culture performed.

Supportive care is the mainstay of treatment. Although bronchodilators have been used, there is no data demonstrating their efficacy in RSV. Physicians who choose a trial of bronchodilators must directly observe during administration for signs of improvement in clinical status, including decreased respiratory rate and decreased retractions. Children with severe disease frequently require hospitalization. Hospitalized children usually require treatment with humidified oxygen and sometimes intubation with mechanical ventilation. Ribavirin is the only antiviral agent with an FDA approved indication for treatment of RSV. Ribavirin, however, is rarely used secondary to its questionable efficacy, frequent side-effects and known teratogenicity. Although steroids are used in certain hospital settings, steroids have not been proven to alter the course of RSV in infants.

Development of an RSV vaccine is in research stages, but none are available. Current prevention options include good infection-control practices and anti-RSV humanized murine monoclonal antibody, palivizumab (Synagis). Palivizumab is a humanized monoclonal antibody directed against the F (fusion) protein of RSV. Palivizumab may be given monthly during the RSV season (November to March) to decrease the chances of hospitalization and to prevent complications in children at high risk for serious disease.

In a hospital setting, prevention is key. RSV transmission can be prevented by adhering to contact precautions, such as handwashing before and after patient contact and wearing gowns and gloves. All physicians caring for patients in a hospital setting must remember that all patients with bronchiolitis, whether RSV positive or negative, must be placed on contact precautions. There are other viruses that do not have routine laboratory testing available, including

DIRECTOR'S CORNER: DR. THERESA HETZLER

Each New Year's Eve many of us review the past year and make resolutions for the New Year. Based on self-reflection, we commit to lose weight, make time for exercise, spend more time with family or break a bad habit.

New Year's resolutions go back about 4000 years to the Babylonians, who celebrated the start of the New Year on the vernal equinox. The Babylonians' focus was a bit different; they resolved to return farm equipment borrowed over the past year. Julius Caesar later moved New Year to January 1.

Why write about this? To bring up the point that humans have been reflecting on strengths and weaknesses for years. New Year is a great opportunity for us to reflect on our professional lives and practices. (Remember that Practice-Based Learning and Improvement competency?) So start the year off making your personal resolutions, but don't forget to spend some time thinking about how to become the best pediatrician you can be.

Happy New Year.

Back to the Basics:

The Quick and Simple on Adrenergic Receptors
By Dr. Kristen Woodard and Dr. Lauren Mendelsohn

Adrenergic receptors are part of a group called G-coupled protein receptors. When the receptor is bound, this triggers a G-protein-mediated second messenger system that ultimately leads to the conversion of GDP to GTP. In α_1 receptors, this interaction leads to activation of phospholipase C which, after a series of reactions, leads to release of intracellular calcium from internal stores, and muscle contraction. There is subsequent activation of protein kinase C which activates other proteins via phosphorylation. In the case of β receptors, G protein interactions activate adenylate cyclase which converts ATP to cAMP. This activates protein kinase A which catalyzes the phosphorylation of multiple proteins.

α_1 receptors are responsible for vasoconstriction and increased peripheral vascular resistance. They are also responsible for mydriasis and urinary retention.

α_2 receptors inhibit norepinephrine release, thereby decreasing sympathetic output.

β_1 receptors are responsible for tachycardia, increased lipolysis and increased myocardial contractility.

β_2 receptors cause vasodilatation, bronchodilatation, increased glycogenolysis and glucagon release.

Introduction to Herbal Medications by Dr. Pamela Gonzalez

Several complementary and alternative medical therapies are sought by parents for their children, especially those with chronic medical conditions. This series will familiarize readers with commonly used therapies, their potential benefits and toxicities. This month's focus is on two commonly used herbal remedies, Echinacea and Chamomile.

Echinacea (Purple coneflower)

Echinacea purpurea, Echinacea angustifolia, Echinacea pallida

Purported Mechanism and Use:

Most commonly used, *Echinacea purpurea*, believed to be most potent. Oral and topical preparations made from aboveground parts and roots. Traditionally used to treat or prevent colds, flu, and other infections. Research suggests it has multiple non-specific stimulatory effects on the immune system, for example through increased production of interferon (IFN), tumor necrosis factor (TNF) and interleukin-1 (IL-1) by macrophages.

Evidence:

Has not been evaluated by the FDA for safety, efficacy, or purity. Systematic review has determined there is some evidence that *Echinacea purpurea* might be effective for early treatment of colds in adults but results are not consistent. In limited studies, Echinacea did not reduce the duration or severity of URI in children and was associated with higher frequency of rash compared with placebo.

Warnings:

GI complaints most common. More severe reactions include rash, asthma exacerbation, and anaphylaxis. Allergic reactions more likely in those with asthma or atopy; especially sensitivity to ragweed and plants in daisy family.

May inhibit CYP3A4 isoenzyme, affecting disposition of protease inhibitors, cyclosporine, benzodiazepines, calcium channel blockers and metronidazole, among others. Use with caution in renal or hepatic impairment. Avoid use in asthma, autoimmune disorders, those with active infection (e.g., TB) and the immune suppressed. Further, there is *in vitro* evidence of

Chamomile (German chamomile, English chamomile)

Matricaria recutita, Matricaria chamomilla

Purported Mechanism and Use:

German chamomile (*Matricaria recutita*) most commonly used in the US. Flowering tops used to make oral preparations, topical ointments or used as mouth rinse. Used in children mainly for GI symptoms (colic, diarrhea). Also used topically for skin conditions and chemotherapy-related stomatitis.

May have sedative, spasmolytic and anti-inflammatory properties, related to active substances including bisabolols, enindicycloether and flavonoids. Possible antibacterial activity against some *Staphylococcus*, *Streptococcus* and *Candida spp.*

Evidence:

Has not been evaluated by the FDA for safety, efficacy, or purity. Little evidence yet for or against its use for any condition. Some early studies indicate that in combination preparations (e.g., Traumeel S), chamomile may have benefits against stomatitis, dyspepsia and diarrhea, and certain skin conditions in children.

Warnings:

Reactions include rash and anaphylaxis, more commonly in those allergic to ragweed and plants of the daisy family. May inhibit CYP3A4 isoenzyme. Use should be avoided in patients with active bleeding disorders and who are on anticoagulant medications (e.g., enoxaparin), ASA, NSAIDs or antiplatelet agents.

Useful Weblinks:

NIH, National Center for Complementary & Alternative Medicine, <http://nccam.nih.gov>
Herbal Science Research, www.herbalscienceresearch.com

Quote Of The Month: "I think it was one of those little yappie dogs" - Dr. Ana Mann elicited HPI of a child bit in the face by her teacher's dog.

Puzzle of the Month by Dr. Pamela Gonzalez

A MAMAS DECLARING → MEDICAL ANAGRAMS

Rearrange letters in anagram to form one word, utilizing clue to determine correct answer.

	ANAGRAM	CLUE	ANSWER
1.	Yo I Skips School =	sideways hunchback =	_____
2.	Come Hiss =	conjunctival swelling =	_____
3.	Tangy Sums =	googly eyes =	_____
4.	Ionic Hotspot =	marked by extrapyramidal arching =	_____
5.	See Oxen Sing =	alternation of generations =	_____
6.	Cruel Nevi =	infectivity =	_____
7.	Oily Gamy Resin	marked by fluid-filled spinal cavities =	_____
8.	Nicest Tier =	the space between =	_____
9.	Ulcer Fun =	boil =	_____

ANSWERS TO BE PUBLISHED WITH FEBRUARY 2008 EDITION

January 2008 Answer: Dr. Allan Dozor