Intramuscular administration of this vitamin would have prevented the following CT findings in this 5 wk old previously healthy infant who presented with a 1 day history of lethargy and full fontanelle.

*Vitamin K*
**Eye & Thighs - $100**

- Vitamin K Deficiency Bleeding
- Inability to activate clotting factors II, VII, IX, X
- Early (≤24h), Classic (2Day-2wk), Late (2-12wk)
- Mild cases to Severe (ICH)—usually late disease
- IM Vit K, recommended since 1961, ↓ Late bleeds 81 fold
- Parental refusal rising, especially in out of hospital births
- Multiple follow up studies failed to confirm this
- Oral vit K decreases rate of early and classic VKDB
- Multiple PO doses of Vit K still aren’t as effective as IM Vit K in preventing late onset VKDB
- Infants are at risk due to poor placental Vit K transfer, breast milk has little Vit K, poor stores, poor GI flora

**Eye & Thighs - $100**

- VKDB lab findings (can send PIVKA test, too)
  - Increased PT and PTT
  - Normal platelets and fibrinogen
- Therapy
  - Vit K 1 mg IV will correct clotting studies w/in 2-3 hr
  - Don’t wait for lab studies if you suspect ICH
  - Rapid increase in II, VII, IX, X w/in 20-30 min
  - If life threatening, can also give
    - FFP
    - rFVII
    - Whole blood
- Outcome: depends on severity of ICH

**Eye & Thighs - $200**

- A term infant born to a mother with no prenatal care develops profuse, purulent eye discharge, which is sent for gram stain and culture, revealing the following gram negative intracellular diplococci....
Gonorrhea

- Gonorrheal Conjunctivitis (0.3/1000 births)
  - rare but severe, used to be leading cause of neonatal blindness
  - usually covered by prophylaxis
  - Textbook treatment: ceftriaxone 25-50 mg/kg IV/IM once
  - Evaluate for systemic infection (Blood and CSF cultures)
  - If systemic, need to treat up to 2 weeks
  - Untreated GC (+) mother, treat infant w/25-50 mg/kg ceftriaxone (cefotaxime alternative—especially jaundiced or preterm infants)

Other Bacterial:
- Staph
- Pseudomonas—serious, double IV coverage + topical
- Chlamydia (8/1000): not covered by antibiotic prophylaxis, develops at 1-2 wk, usually milder; treat with oral erythromycin (20-30% failure rate)

The following newborn presents with a prominent port-wine stain over the right forehead. Referral to pediatric ophthalmology reveals findings of.......
Sturge Weber Syndrome - $300

- Triad of vascular malformations of forehead, eye, and leptomeninges
- Forehead port wine stain
- Intraocular vascular malformation with glaucoma—may be present at birth
- Cerebral vascular malformation with stasis leading to cerebral atrophy and calcifications
- Contralateral focal seizures
- Work Up: pediatric ophth exam, MRI
- Therapy: aspirin for anti-thrombotic effect

Eye & Thighs - $400

- A first born female infant is delivered by c-section due to breech presentation. Pregnancy was complicated by oligohydramnios presumed due to maternal hypertension. Upon inspection of the hips, the following is noted...
  - Galeazzi Sign—developmental hip dysplasia

**Eye & Thighs - $400**

- **Developmental Dysplasia of Hip**
  - Typical: neurologically NL baby (most common)
    - Usually dislocatable, but not dislocated at birth
  - Teratologic: underlying neurologic abnormality
- **Risks:** First born (60%), Female (9:1), Breech (30-50%), Oligo, FHx (20%), Congenital torticollis and metatarsus adductus
- **Dx:** exam (Ortolani, Barlow, asymmetrical folds, limited abduction, abnormal gait), ultrasound
- **Treatment:** Positioning, Pavlik Harness (94% successful if w/in 3 mo), Surgery

**Eye & Thighs - $500**

- 10 day old neonate develops watery bilateral conjunctival injection. Erythromycin eye ointment was given. Mother single, 22 yo, had prenatal care. No fever. Bacterial culture and gram stain showed normal flora. Giemsa staining of conjunctival scraping reveal the following intracellular inclusions, diagnostic of...

- **Chlamydia conjunctivitis**

**Eye & Thighs - $500**

- **Chlamydial Conjunctivitis**
  - More common, but usually less severe, than gonorrhea. Not prevented by prophylaxis
  - If mother has chlamydia, 50% chance infant will develop oropharyngeal, rectal, genital, or eye colonization
  - 30-50% chance colonized infant will develop conjunctivitis
  - Can treat with PO erythromycin or azithromycin
  - Erythromycin: 20% failure rate, pyloric stenosis
An LGA female infant is delivered by vacuum extraction on the fourth application of the vacuum. Over the next 1-2 hours, her scalp becomes boggy, fluctuant, and bigger and the infant appears pale with decreased responsiveness.

Subgaleal Hemorrhage

Subgaleal hemorrhage

May follow vacuum or forceps delivery, or occur spontaneously

Tearing of emissary veins, skull fracture or diastasis

Potential space between periosteum and aponeurosis may hold 260 ml

A 38 wk male infant is born by STAT C-section 30 min after cord prolapse following ROM at home. Infant is apneic at birth, requires PPV, 2 min of chest compressions, and intubation at birth for persistent apnea. First blood gas showed pH 7.10, PCO2 27, PO2 120, HCO3 12, base deficit 19. Lactate is 15.

The infant is transferred to a regional NICU for this therapeutic intervention.
Neonatal Neurology - $200

- Therapeutic Hypothermia—cool to 33.5°C for 72h
- First therapy widely-accepted to improve outcome for infants with acute asphyxia
- Begin early—currently within 6 hr
- Continue to support physiology
  - Avoid temperature elevation
  - Normalize BP and perfusion, oxygen saturations, glucose
  - Treat seizures

Neonatal Neurology - $300

- An 4.6 kg male infant of diabetic mother is delivered by VD complicated by shoulder dystocia, which was relieved by the McRoberts procedure and suprapubic pressures. He requires PPV after birth due to apnea, but responds well. Apgars 1, 8. After birth, one arm appears to is limp alongside the infant, while the other actively moves as the infant cries.

- Brachial Plexus Injury

Neonatal Neurology - $300

- C5-C6: Erbs—90% recovery
- C5, C6, C7: Erbs + Flexion of wrist = waiter’s tip position
- C8-T1: Klumpke—paralysis of hand muscles (<50% recovery)
- More severe: C5-T1 with Horner’s Syndrome (ptosis, miosis, anhydrosis, iris heterochromia) usually does not recover
- Therapy: early stretching/PT, neurology referral, surgery
- Medicolegal worry for obstetricians

http://www.clinicalexams.co.uk/
http://www.pediatricsconsultant360.com/
http://newborns.stanford.edu/
http://orthoinfo.aaos.org
A 3 week old neonate presents to the ER with a chief complaint of apnea and low tone. Parents report listlessness and poor feeding for a day with decreased stooling for several days. Parents live in a semi-rural area with local housing construction causing dust exposure.

**Infantile botulism**

Ingestion of spores that germinate and produce toxin (different from adult botulism) impairing presynaptic acetylcholine release

- Descending paralysis, may have history of constipation
- Pupillary response to light is impaired—particularly with repeat stimulation
- EMG abnormalities: incremental response in motor action potential at higher simulation rates
- Treatment: support respiration, BabyBIG (get from California Dept of Health Services)

Prolonged ventilation and tube feeds often needed (weeks to months)

**Dx:** isolate toxin from stool, grown C. Botulinum.


BabyBIG within 7 days shortens symptoms by about 50% (See NEJM, 2006;354:462-71)
A newborn infant born at 34 weeks appears “floppy” with club feet. Pregnancy was complicated by polyhydramnios and premature labor. Infant breathes shallowly, has a “droopy” face with mouth open in a “tent”-like appearance. Mother has temporal-wasting, a long thin face with open mouth, and thin lower extremities. She appears concerned and, after shaking your hand, has difficulty releasing.

Congenital Myotonic Dystrophy
Can be severe with multisystem muscular failure (respiratory, cardiac, GI)—morbidity/mortality
Poor long-term outcome
Often premature following polyhydramnios
AD with anticipation, usually maternal inheritance
May also be giving mother her diagnosis.

A GBS positive mother presents with a precipitous VD at 38 5/7 wk without receiving a dose of penicillin at least 4 hours prior to delivery. ROM was < 1 hr. Infant appears well and is afebrile. There was no clinical evidence of chorioamnionitis. Treatment plan consists of...

Observation for 48 hr
A 21 day old infant presents to the ER with 38.9°C fever. Evaluation reveals a Serious Bacterial Infection (SBI). The most likely source to isolate bacteria on culture is.....

Urine
Start Antibiotics - $300

- A mother with no prenatal care delivers at home. Infant develops a maculopapular rash and persistent runny nose. Upon presentation to pediatric urgent care, physician notices a rash on mother’s hands and suspects ....

- Syphilis

Congenital Syphilis - $300

- Often (2/3rds) asymptomatic
- Must know mother’s RPR prior to discharge of infant
- Variety of manifestations
  - Snuffles, hemorrhagic rhinitis
  - Hepatoplenomegaly
  - Bony Involvement & Pseudoparalysis
  - Rash (bullous, condylomata lata, palmar/plantar rash)
  - Hemolytic anemia (DAT neg), DIC
  - JUGS
  - Mucus patches

Congenital Syphilis - $300

- Probability of congenital infection varies by stage
  - Primary syphilis: 29% infected (3% stillbirth, 26% w/active disease)
  - Untreated secondary: 59% infected (20% stillborn, 39% live born)
  - Untreated Early Latent: 50% infected (17% stillborn, 33% alive)
  - Untreated Late latent: 13% infected (5% stillborn, 8% alive)

- Treatment: (10 Days)
  - Aqueous crystalline PCN G IV x 10 days or
  - Aqueous procaine PCN G 50,000 units/kg IM qDay

- Hutchinson Teeth   Mulberry molars
- Perforated Hard Palate
- Saber Shins
- Saddle Nose

University of Chicago Pediatric Clerkship Website
A term newborn presents with respiratory distress and hepatosplenomegaly. Mother has recently immigrated to the US and lives in a homeless community. Physical exam reveals hepatomegaly.

- Congenital tuberculosis

Congenital TB - $400
- Rare—think about it in septic infant not responding to antibiotics or if viral studies/TORCH workup is (-)
- Maternal hx is important—but 60% asymptomatic
- Transplacental or aspiration of infective secretions
- PPD usually negative (only 15% positive)
- Gastric or ETT aspirate (+) for AFB in 80%
- Liver biopsy can be diagnostic
- Treatment: Isoniazid + companion drugs consult ID

Start Antibiotics - $500
- A mother with history of oral HSV 1 delivers a term infant by C-section due to first-episode HSV 2 genital infection. Cultures of infant are negative for HSV 1 and 2. Proper current treatment of infant includes...

- Intravenous Acyclovir 60 mg/kg/day div q8h x 10 days
Perinatal HSV- $500

- HSV—serious, but uncommon, neonatal infection
- Acquisition (antenatal, perinatal, post natal)
- Classification: Skin/eye/mouth, CNS, disseminated
- High mortality and morbidity
- Infectivity: primary v secondary outbreak
- “First episode primary” v “first episode non-primary”
- Use type of infection and classification of infection to determine duration of IV acyclovir therapy
- After IV, DC home on PO acyclovir x 6 months

Get an X-Ray - $100

- A 36 wk infant is born by CS without labor due to worsening maternal hypertension. Although infant is vigorous and crying, moderate to severe respiratory distress is apparent in the DR with decreased breath sounds over right chest. CPAP is applied at 6 cm H2O and 40% with improvement. CXR shows...

Get an X-Ray - $100

- Pneumothorax
A 39 wk infant develops respiratory distress following SVD. Pregnancy complicated by polyhydramnios. Exam shows moderate retractions with decreased breath sounds over left chest and a relatively flat to sunken abdomen. CXR reveals

- Congenital diaphragmatic hernia

- Intubate
- Replogle to suction
- Gentle ventilation
- Tolerate desats
- Surgery delayed until PPHN improves
- Survival 50-70%
- Long term issues

A term newborn appears dusky after birth but is not in respiratory distress. O2 saturations are in 80s (Pre/post ductal). Oxygen applied by hood increases saturations to low 90s. Radiologist calls to report a “boot-shaped” heart.

Get an X-Ray - $300

- Get an X-Ray - $300

- Get an X-Ray - $300
A term newborn appears deeply cyanotic after birth with respiratory distress. O2 saturations are 50-60%. Intubation and ventilation with 100% oxygen produces mild improvement. CXR reveals

- Neonatal presentation is severe
- Displacement of tricuspid valve into RV
- Severe R→L shunting
- Enormous RA
- Maternal lithium is a risk
**Get an X-Ray - $500**

- A 37 wk male with copious oral secretions develops mild to moderate respiratory distress after SVD following pregnancy complicated by polyhydramnios. Nurses attempt to place an NG, but it keeps coming back up near the mouth. CXR reveals....

**Esophageal atresia with TE fistula**

http://www.apicareonline.com/?p=1976

**Do not place barium in esophageal pouch**
- Place replogle to pouch and aspirate
- Begin antacid and GERD positioning
- Antibiotics
- Echo to assess heart
- Search for other anomalies (VACTERL)

**Neonatal Potpourri - $100**

- A term LGA male is breathing comfortably 10 min after uncomplicated VD ending an apparently uncomplicated pregnancy. He appears cyanotic with oxygen saturations 83% in lower extremities and 75% in right hand.

- d-TGA (transposition of great vessels)—cyanosis with reverse differential saturations
dTGA -- $100

- PA arises from LV
- Aorta arises from RV
- Inadequate mixing
- If inadequate mixing → urgent balloon atrial septostomy (BAS)
- PGE to maintain ductal patency (watch for apnea)
- Definitive therapy: arterial switch operation
- "Congenitally Corrected" TGA (L-TGA): Great vessels and ventricles are switched—often NL at birth—Long term issues with ventricular function and heart block.

Neonatal Potpourri - $200

- This newborn male infant was well until develops green vomiting after feeding.
- Polyhydramnios
- Abdominal X-ray obtained, revealing….

Trisomy 21 - $200

- “Double Bubble”
- Duodenal Atresia
- Place replogle or NG and keep stomach decompressed
- Refer to pediatric surgery center
Neonatal Potpourri - $300

- A newborn male infant appears fussy about 9 hours after uncomplicated VD. Term, GBS neg mother. Upon changing diaper, the newborn nursery nurse notes that the right hemi-scrotum is swollen and purple. Testicle is tender and firm to palpation. Scrotal ultrasound reveals.....
  - Absent blood flow due to acute testicular torsion

Testicular Torsion - $300

- Considered surgical emergency—but rarely salvageable
- Dx: doppler ultrasound
- Operation within 6 hr: 80-90% recovery versus 20% if > 12 hr
- May be bilateral
- Need to secure contralateral testis

Neonatal Potpourri - $400

- 7 day old male presents to ER with 1 day history of poor feeding and listlessness, without fever. He appears dehydrated and weight is 12% below BW. Upon placement of a PIV for NS volume expansion, an electrolyte panel is sent, revealing sodium 121, potassium 7.8, bicarbonate 12, glucose 28. Suspecting congenital adrenal hyperplasia, the following STAT medication is ordered....
  - Hydrocortisone (intravenous)
Neonatal Potpourri - $500

- A term newborn infant is cyanotic after birth and apneic. HR 70 to 80. PPV is started with onset of vigorous respirations in 15 to 30 seconds. HR remains about 60. Additional PPV given for another 30 sec. Infant is vigorous and resists placement of bag/mask on face. HR remains about 60 and perfusion is normal. EKG reveals...

Neonatal Potpourri - $500

- Congenital heart block due to maternal lupus.
- Anti-Ro/Anti-La Antibodies
- Uncommon, but well recognized
- May need pacemaker
- Can try isoproterenol to accelerate heart rate

Final Jeopardy

- A newborn infant has a “really fast” heart rate after birth. He remains well perfused and active. CR monitoring reveals HR about 270 bpm. The tachycardia abruptly broke upon checking the infant’s rectal temp. Echo reveals multiple small masses within the heart.
Rhabdomyomas due to tuberous sclerosis

Boston Children’s Hospital