Orthopedics in the Newborn Nursery

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Focus

Hip dysplasia
Flail upper extremity
  Brachial plexus injuries
  Infection
  Fracture
Clubfoot
Metatarsus adductus
Hip Dysplasia

Incidence is 1 in 1,000

Risk Factors
- Family history of hip dysplasia
- Breach
- Female
- First born
- Oligohydraminos
- Multiple pregnancy

Exam
- Painless condition
- Leg length discrepancy may be appreciated
  - Positive Galeazzi
- Evaluate for Ortolani and Barlow
- If these are positive – refer to pedi-ortho
Galeazzi

Ortolani/Barlow

Reliable until about 12 weeks of age
• Capsular laxity decrease
• Muscle tightness increases
Ortolani Test

- A test of reducibility
- The hip lies Out (dislocated)
- Palpable “clunk” if the hip is reducible

Barlow Test

- A test of dislocatability
- Pushing the femoral head Back (and out of the socket)
Limited Abduction

• Typically seen in > 3 months old
• Unless it is a teratologic dislocation

Asymmetric Thigh Folds
Imaging

- Hip ultrasound ideal modality between 6 weeks to 4 months of age
- U/S best delayed until 6 weeks of age due to a high false-positive rate
- In patient with several risk factors but no physical signs – obtain u/s at 6 weeks of age

Imaging

X-rays: AP/Frog pelvis obtained after 4-6 months of age
When to Refer

Several studies have demonstrated that...

Unstable hip at birth → will stabilize

Without treatment in 3-4 weeks

Hip with + Ortolani or + Barlow test → should see a specialist

Within 1 week

Treatment

• Pavlik – under age 6 months
• Treatment is followed with ultrasound
• Requires close supervision
• Preference is for application by pediatric orthopedic physician
Hip Friendly Swaddling

- Arm can be secured as is typical
- When securing the legs, confirm there is room to flex and abduct the legs
- Then the blanket can be secured under the baby or on top
- Other option: sleep sacks

Video
Flail Extremity

Differential diagnosis is brachial plexus injury, fracture or infection

Evaluation

- Crepitus, swelling, and pain suggest FRACTURE
- If mild movement of the extremity is not painful - BRACHIAL PLEXUS INJURY
- INFECTION is the hardest to evaluate
  - CBC, sed rate, fever are unreliable
  - Normal CRP – 95% neg pred value

Brachial Plexus Palsy

Incidence of 0.13-3.6 per 1,000 live births

**Risk Factors**

- Maternal diabetes
- High birth weight
- Prolonged labor
- Forceps delivery
- Shoulder dystocia
- Associated with clavicle/humerus fx and torticollis
Upper Trunk Injury

- C5,6 nerve roots affected
- Most common injury pattern
- Notice shoulder internal rotation, elbow extension, and wrist/finger extension

Upper Trunk Extended Injury

- C5,6,7 nerve roots affected
- Notice shoulder internal rotation, elbow slightly flexed showing diminished triceps activation, and unopposed wrist/finger flexion
Panplexopathy

- C5,6,7,8,T1 nerve roots affected
- +/- Horner’s Sign
  - Associated with severe nerve injury and requires more immediate evaluation by specialist
  - A persistently small pupil
  - A notable difference in pupil size between the two eyes
  - Little or delayed dilation of the affected pupil in dim light
  - Drooping of the upper eyelid
- Mostly flaccid shoulder, elbow, wrist and intrinsic minus position of the fingers

Treatment & Timeline

- **OT/PT:** Maintain passive rom while nerve is recovering
- 1 out of 10 pts require surgical intervention
- Recovery of biceps function by 3 months of age is predictive of good outcomes

<table>
<thead>
<tr>
<th>Initial evaluation with multi-disciplinary, specialty clinic</th>
<th>Contractures can already be present, HEP imperative</th>
<th>Most primary nerve surgeries take place</th>
<th>“Cut off” for primary nerve surgery</th>
</tr>
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<tbody>
<tr>
<td>2 months</td>
<td>4 months</td>
<td>3-9 months</td>
<td>15 months</td>
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Care Considerations

• Don’t “Wait & See”
  – Serial assessment with a specialist leads to better clinical decision making for primary nerve surgery

• Prolonged muscle imbalance can lead to posterior dislocation of the shoulder
  – Children with less than full external rotation are at risk for dislocation as they grow

• Torticollis is associated with Brachial Plexus Palsy
  – Be sure to check for head posture preference and AROM in children with brachial plexus birth palsy

Fracture

• Birth fractures: humerus or clavicle

• If multiple fractures are present consider osteogenesis imperfecta or rickets
Fracture

• Exam will reveal crepitus, pain, and swelling
• “Psuedo paralysis” extremity
• Look at hand, wrist, elbow movement – can have associated brachial plexus injury

Fracture

• Best treated with pinning the sleeve to the chest/torso
• Heals rapidly
Infection

- Osteomyelitis/Septic Arthritis
- Very rare in healthy newborn
- Differential diagnosis for a “Flail extremity”
- S. aureus, GBS

Metatarsus Adductus

- Incidence ranges from 1-in-100 to 1-in-1,000
- Medial deviation of the forefoot to the hindfoot
- Sole of the foot is bean-shaped
Evaluation

How flexible is it?

- If you stroke the lateral border of the foot and the deformity correct – MILD
- Can it be corrected passively – MODERATE
- Cannot be passively corrected, medial crease is present – SEVERE

Treatment

- Controversial
- For mild/moderate cases: instruct families on stroking the foot and stretching the foot with daytime diaper changes, spending about a minute
Treatment

- For severe cases: casting, straight last shoes
- Majority of cases require no treatment
- Undercorrected feet are typically observed and surgical treatment is rarely indicated unless the feet are painful

Clubfoot

- Incidence is 1-2 in 1,000 live births
- Most common congenital orthopaedic condition requiring intensive treatment
- Cause is multifactorial: fetal development, genetic
Features

CAVE
- Cavus
- Adductus
- Varus
- Equinus

Treatment

Weekly serial casting (Ponsetti)
- Start at 2-3 weeks of age
- Typically requires 5-8 casts
- Most patients require an Achilles tenotomy (office procedure)
Treatment

Following casts, patient is placed in foot abduction orthosis to maintain correction.

BRACHIAL PLEXUS CLINIC SCHEDULE

Where:
Texas Children’s Hospital – West Campus
18200 Katy Fwy, Houston, TX 77094

When:
New Patient & Follow Up Clinic
• 2nd & 4th Mondays (all day)
• Plans to increase to every Monday in the Fall 2018
REFERRAL PROCESS & CONTACT

Internal Referral

• Providers are able to enter a referral specifically for the multi-disciplinary brachial plexus clinic in EPIC

• Type “brachial plexus” in the referral search and this will pull up a series of questions to answer

External Referral

• Providers outside of TCH can access referral PDF at https://www.texaschildrens.org/refer/brachial-plexus-program

• Please print, fill out, and fax this form back to the brachial plexus clinic coordinator

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