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**Masquerade of diaphragmatic  
eventration**



# Presentation

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- 36weeks/2200g/Female infant ,6 hours old
- Breech, difficult extraction
- Depressed at birth
- BMV 4 cycles
- Severe retractions/tachypnoea
- Intubated
- Transported to our unit



# Day 1

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- CXR Right dome of diaphragm >2 spaces higher
- Lethargic
- Miotic pupils
- Minimal spontaneous activity
- Hypotonia



# Diagnosis?

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- Eventration of right dome of diaphragm
- Perinatal ashyxia/HIE II
- Eventration:
  - ❖ Congenital absence/underdevelopment of diaphragmatic musculature



## Other observations

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- Encephalopathy resolved over next 3 days
- Paucity of spontaneous movements of b/l upper limbs
- Keeping both upper limbs adducted internally rotated at shoulders/ extended & pronated at elbow/ flexed at wrists. Grasp +
- Lower limbs flexed. Movements equal
- Paradoxical breathing



# Revised diagnosis

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- Birth injury-
- Obstetric Brachial Plexus Palsy bilateral with
- Right Phrenic Nerve Palsy



# Perinatal diaphragmatic paralysis

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- Diaphragmatic palsy perinatal very rare
- Obstetrical Brachial plexus injury-0.3-3.4/1000 live births (~1/1000)
- Phrenic nerve palsy complicates 2.4-4.2% plexus palsy
- Diaphragmatic palsy Incidence ~1 in 30,000 live births
- Mortality estimated at 10-15%
- *Bilateral brachial plexus palsy - 10%-exclusively in breech presentation*



# Risk factors phrenic nerve+OBPI

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- *Breech*
- Shoulder dystocia
- Forceps or vacuum extraction
- Prolonged second stage of labour
- Right hemidiaphragm most commonly involved





# Assessment for severity

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- Suggestive of avulsion
  - ✓ *Phrenic nerve injury*
  - ✓ Horner's syndrome



# OBPP ASSOCIATED WITH BREECH DELIVERY-

## A DIFFERENT PATTERN OF INJURY

Seminars in Plastic Surgery, Volume 18, Number 4, 2004.

- Different pattern
- Bilateral ,phrenic nerve palsy
- Worse prognosis
- **Table II. Main differences in injury pattern between breech and cephalic presentation, by percentage**

	<b>Breech</b>	<b>Cephalic</b>
Ruptures C5, C6 ± C7	16	75
Avulsion C5, C6 ± C7	81	0.5



## Course of our infant

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- Extubation tried after 7d MEV, but failed
- Extubated to CPAP successfully after 4 more days
- Weaned off CPAP after 17 d of life
- Tachypnoea, e/o paradoxical breathing-gradually improved
- Left upper limb deficit resolved
- Erb's palsy of right upper limb persisted



# Suspect phrenic nerve palsy

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- Respiratory distress at birth
- CXR elevated hemidiaphragm
- Brachial plexus palsy
- Early fluoroscopy /ultrasound recommended to assess diaphragmatic movement



# Phrenic nerve palsy management

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- Indications for surgical intervention
  - ✓ Continued need for respiratory/ventilatory support
  - ✓ Failure to thrive in first months after birth
- Time of plication –controversial
  - Conservative management for 6 weeks/ longer to wait for spontaneous recovery
  - To plicate as soon as possible



# Assessment for type of injury

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- CT myelography
- MRI
- *“Diagnosis of OBPP & assessment of severity are both made clinically based on history and examination findings.”*
- MRI can confirm early avulsion-type injuries
- *“Decision to intervene surgically is exclusively based on whether there is adequate recovery on physical examination over time, these studies typically do not aid clinical decision-making”*

\*Piatt JH. Birth injuries of the brachial plexus. Pediatric Clinics of North America. 2004;51(2):421-40



# MRI report

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- Right C5,C6,C7 avulsion with pseudomeningocele
- Suspected left C6 root avulsion
  
- MRI finding of pseudomeningocele-has a low sensitivity (50%), but high specificity (~100%) in the diagnosis of nerve root avulsion
- Valuable for preoperative planning

Piatt JH. Birth injuries of the brachial plexus. Pediatric Clinics of North America. 2004;51(2):421-40



## Follow up at 45 days

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- No respiratory distress
- Gained weight 800g/OFC 4cm
- Right upper limb Erb's palsy
- No deltoid/biceps contraction





# Brachial palsy management

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- Most infants recover well.
- A recent prospective study -full recovery in 50% by 3 m. of age, 82% by 18m.
- Roughly 1 in 5 affected infants -some degree of permanent nerve damage.



# Surgical intervention

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- Suspected avulsion/ rupture injuries where spontaneous recovery impossible/unlikely
- Gilbert and Tassin criteria- Absence of return of biceps function(MRC 3) by 3m
- 'Poor shoulder function at age 5 years and increased need for secondary procedures were noted in infants who had no biceps function at age 3 months and received no surgery'



# Surgical procedures

**Table 3 Surgical Intervention**

<b>Intervention</b>	<b><i>n</i></b>
Intraplexal reconstruction	22
Accessory nerve to	
Suprascapular nerve	46
Other nerve	5
Medial pectoral nerve to	
Musculocutaneous nerve	22
Anterior division of upper trunk	2
Other nerve	4
Hypoglossal nerve transfer	2
Intercostal nerves to	
Musculocutaneous nerve	2
Other nerve transfer	1

# Plan for our infant

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- Follow up at Dept of Plastic Surgery, Stanley Medical College Hospital
- Assessment of recovery at 3 m.

