Frequent concerns about recently discharged neonates

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Western Health
Overview

1. Failure to thrive and weight loss
2. The late preterm infants
3. The NICU graduates
4. Prolonged jaundice
5. Abnormal movements
6. A lump in the groin
7. Birth marks
Case 1

Issac was born at 41 weeks gestation with a birthweight of 3.8kg.
- Antenatal history: uneventful. Low risk for T21 on MSST. Normal morphology scan at 20 weeks
- Family history of neonatal deaths and malignancy in maternal cousins. Healthy parents who were second cousins. They had a healthy 3 yo son.
- Issac was discharged home on day 2 of life, breastfeeding on demand. His mother breastfed his brother until he was 18 months old.
- Domiciliary visit on day 5 – sleepy baby, soft cry, “easy baby”, demand feeds, good number of wet nappies. Weight 3.5kg
- MCHN home visit on day 10 – vomiting, weak suck, poor attachment at breast, “always sleepy”, “doesn’t cry much”, weight 3.2kg

Is this normal?
Possible reasons for Issac’s poor weight gain?

Feeding disorders:
1. Difficulties with coordination of sucking, swallowing, breathing
2. Anatomic malformations: cleft lip/palate
3. Neuromuscular weakness: eg. congenital weakness, botulism
4. Developmental immaturity, oral aversion

Gastro-oesophageal reflux disease

Oesophagitis

Malabsorption

Child neglect
Don’t forget to consider…

Possibilities of rare but life threatening and potentially treatable conditions

- Malrotation
- Heart failure secondary to critical congenital heart disease
- Congenital adrenal hyperplasia
- Metabolic disorders
Case 1 Baby Issac

Issac – 41/40, BW 3.8kg

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What additional information would you like to know?
Approach to management of failure to thrive

Persistent weight loss or poor weight gain over 1 to 2 weeks warrants careful evaluation.

• Observation of feeding usually gives clues to possible causes.
• Any suggestions of difficulty feeding? eg. floppiness, cleft palate, prematurity
• Symptoms suggestive of GOR disease: irritability with feeding, feed refusal, arching and turning of the head, frequent regurgitation while feeding, blood stained vomiting. Pain associating with oesophagitis can also cause pallor and cyanosis.
• Inadequate breastfeeding or supply of formula, drug use in parents
• Is there a recent introduction of formula? Vomiting, diarrhoea, abdominal distension, and/or blood stools suggests cow’s milk protein enteropathy. Greasy stool is a sign of fat malabsorption, eg. cystic fibrosis
Potential life threatening conditions may masquerade as failure to thrive

Is there bilious vomiting?
What is bilious vomiting?

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- ✓Wasabi
- ✓Lime
- ✓Spinach
• Is there excessive vomiting? Is it bilious? (colour chart)
• Is the baby sweaty, breathless, or blue during feeding?
• Is the breathing noisy?
Infant with respiratory distress (including orthopnea and tachypnea) caused by pulmonary volume overload.

- Perspiration and tense, anxious facies
- Flared nostrils
- Sternal retraction
- Intercostal retractions
• Is there excessive vomiting? Is it bilious? (colour chart)
• Is the baby sweaty, breathless, or blue during feeding?
• Is there fever, decreased intake and fewer wet nappies?
• Any abnormal odour to skin or urine, eg. mousy/musty (phenylketouria), cabbage (tyrosinaemia), sweet smelling urine (maple syrup disease)
• Is there excessive vomiting? Is it bilious? (colour chart)
• Is the baby sweaty, breathless, or blue during feeding?
• Is there fever, decreased intake and fewer wet nappies?
• Any abnormal odours, eg. mustiness (PKU), cabbage (tyrosinaemia), maple syrup (maple syrup disease)

• Abnormal movements?
• Family history of neonatal death or problems?
Case 1 Baby Issac

Issac – 41/40, BW 3.8kg.
  • Family history of neonatal deaths from congenital neuromuscular neuropathy.
  • Consanguineous parents
  • Floppy and weak. Significant weight loss
  • Concerns regarding difficulty feeding due to weakness

What will you do next?
When to refer for medical evaluation?

**Immediately to the Emergency Department if:**

- fever
- floppy or ill appearing infants
- cyanosis – at rest or during feeding
- bilious or projectile vomiting
- abdominal distension
- blood stained stool
- mottling, breathlessness at rest or during feeding
- noisy breathing
- weak or irregular pulses
- seizure, irritable inconsolable infants
- (suspected child abuse)
When to refer for medical evaluation?

Within 3-5 days if:

• The baby looks well despite poor weight gain
• Concerns regarding GORD, cow’s milk protein intolerance
• Difficulty feeding
• Concerns regarding malabsorption

What would you do whilst waiting for a medical appointment?

• Parent(s) to keep a diary of feeding patterns, stooling frequency/texture/colour, urine output, baby’s crying patterns
• Weight check at least every 48 hours
• Discuss your concerns on the phone with the family GP or the oncall paediatrician at your local hospital
Hunter was born at full term gestation, following a normal pregnancy.

BW 3.6kg

He was the first child to healthy parents.

Dom visit on day 5 – wt loss < 10% (wt 3.3kg)

1st MCHN visit day 7 – parents concerned re. noisy breathing, vomiting milk through his nose. Wt 3.1kg

On examination, small chin, not obviously dysmorphic, cleft palate, stridor at rest, RR 60, pink and well perfused.

What would you do next?
Case 3

Mia was born at 34+5 weeks gestation by emergency C/S
BW 1.8kg
Emergency C/S was due to maternal chorioamnionitis
Apgars 6 at 1 minute and 8 at 5 minutes of life
Admission to SCN following birth for IV antibiotics and establishment of feeding
NGT dependent for 2 weeks.
Discharged home at 38 weeks corrected age. Weight 2kg

Potential problems post discharge?
The late preterm infant 34+0 to 36+6 weeks

Common problems post discharge from hospital:
- Readmission for weight loss or poor weight gain
- Jaundice requiring phototherapy
- Respiratory tract infections – commonly bronchiolitis

Long term outcomes:
- Increased risk of cerebral palsy, developmental delay, & ADHD
- Risk of CP is higher if history of chorioamnionitis
- (no evidence late preterm is a risk factor for autism)

Growth and developmental follow up can be done by GP and MCHN.

When to refer to a paediatrician?
- Persistent poor growth
- Concerns regarding developmental delay
Case 4

Ethan was born at 26 weeks gestation by NVD.

BW 820g

Antenatal history – mother G5P3, 3 healthy full term children. Normal morphology on U/S scan at 20/40. Previous GBS positive.

Apgars 7 at 1 minute and 8 at 5 minutes of life

Issues prior to hospital discharge:

1. Chronic lung disease (ventilated for 5 days, followed by CPAP for 3 weeks. Low flow oxygen until 36 weeks corrected gestational age)

2. Patent ductus arteriosus, with ductal ligation at 28 weeks

3. Unilateral grade III IVH (ventricular haemorrhage with enlarged ventricle)

4. One blood transfusion for anaemia

5. Three episodes of sepsis
The NICU graduate

Who are they?
• Preterm infants,
• Birth weight < 1000g, and
• Critically ill term infants
The NICU graduate

Knowledge of the infant’s NICU course and persisting medical problems is important.

- Chronic lung disease (CLD) and home oxygen
- Intraventricular haemorrhage: severity and complications (hydrocephalus, seizures, cystic periventricular leukomalacia)
- Retinopathy of prematurity and requirement for laser treatment
- Anaemia and blood transfusion
- Bone disease and previous fracture(s)
- Previous major septic episode(s), meningitis
- Cooling therapy
- Previous surgery: bowel resection, stoma, cardiac surgery
What to anticipate post discharge from NICU?
Potential medical problems post discharge

CLD with requirement for **home oxygen**
- At risk of growth failure, pulmonary hypertension, frequent respiratory tract infections

**Sudden infant death syndrome**
- Preterm compared with term infants are at a greater risk for SIDS with a peak risk at 50 to 52 weeks corrected age. They may have home apnoea monitors, but there is no evidence that monitoring decreases the rate of SIDS

**Gastro-oesophageal reflux**
- Common in premature infants and in those with CLD and neurological impairment
- Complications include poor weight gain, aspiration, choking, oesophagitis, laryngospasm, and irritability

**Seizures**
- Anticonvulsant(s) may cause drowsiness, leading to poor feeding and developmental delay

**Anaemia of prematurity**
- In preterm infants, the nadir for Hb is 7 to 10g/dL at 4-8 weeks after birth

**Feeding problems**
- Common among the extremely preterm infants and those with neurological impairment – delayed feeding skill development, oral aversion, hypersensitivity, bulbar weakness
- May be NGT dependent

**Hernias**
- Both umbilical and inguinal hernias are common in preterm infants. Most umbilical hernias usually resolve spontaneously by 2 years of age. Inguinal hernia should be referred promptly for surgery

**Developmental delay**

**Poor growth**
Community care for the NICU graduate

- Close monitoring of growth, vision, hearing, and development in the first 2 years of life.
- The preterms are generally function at the developmental level of their gestational age and not their chronological age.
- Poor growth and developmental delay may be major concerns. Causes multifactorial.
- Request earlier medical review if concerns
- Monitor for early signs of cerebral palsy, learning and language delay, visual and hearing impairment, behavioural problems and autism.
- Remember hearing test at 3 and 12 months
- Referral to Early Childhood Intervention may be necessary.
- Immunisation: schedule, plus Fluvax and RSV. Overnight hospital observation may be required post immunisation if previous history of apnoeas.
## Enhanced immunisation schedule Victoria – Children

<table>
<thead>
<tr>
<th>Age</th>
<th>Disease</th>
<th>Vaccine brand* (live vaccine *)</th>
<th>Recommendations</th>
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<tbody>
<tr>
<td>From 6 months to 59 months (inclusive) Aboriginal &amp; Torres Strait Islanders</td>
<td>Influenza</td>
<td>As supplied</td>
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<tr>
<td>12 months</td>
<td>Measles-mumps-rubella</td>
<td>Priorix* or M-M-R-II*</td>
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<tr>
<td></td>
<td>*Haemophilus influenzae type b-menigococcal C</td>
<td>Menitorix</td>
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<tr>
<td>12 months of age premature baby &lt; 32 weeks gestation or &lt; 2000g birthweight</td>
<td>Hepatitis B</td>
<td>H-B-Vax-II Paediatric</td>
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<tr>
<td>12 months of age premature baby &lt; 28 weeks gestation or with underlying medical risk factors</td>
<td>Pneumococcal</td>
<td>Prevenar 13</td>
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<tr>
<td>18 months</td>
<td>Measles-mumps-rubella-varicella (chickenpox)</td>
<td>PrioixTetra* or ProQuad*</td>
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<tr>
<td></td>
<td>Diphtheria-tetanus-pertussis</td>
<td>Infanrix or Tripacel</td>
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<tr>
<td>4 years - from 3 years 6 months</td>
<td>Diphtheria-tetanus-pertussis-poliomyelitis</td>
<td>Infanrix IPV</td>
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<td>4 -5 years of age with underlying medical risk factors</td>
<td>Pneumococcal</td>
<td>Pneumovax 23</td>
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Vicvax application on iTunes (by RCH)

Immunisation Schedule

This is the Victorian Schedule. Other states are very similar but please check here. See also check here for special risk groups.

<table>
<thead>
<tr>
<th>Age</th>
<th>Schedule</th>
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<tbody>
<tr>
<td>Birth</td>
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<td>12 months</td>
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<tr>
<td>18 months</td>
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</table>
• Also consider the long term impacts of NICU on the parent(s):
  • Social, financial and psychological stresses
  • High incidence of maternal depression post NICU discharge
  • Vulnerable child syndrome: separation difficulties, sleep problems, overprotective parent(s)
Case 5
Jaundice on the two-week well baby check

Baby Jackson was born at 36+4/40
Birthweight of 3.9kg

Antenatal history:
- Mother type 1 diabetes, poorly controlled
- Fetal macrosomia, GBS positive,
- AN diagnosis of interrupted IVC and aberrant subclavian artery

Emergency CS due to risk of shoulder dystocia
SCN admission for 3 days
Inpatient cardiology review – normal ECG, interrupted IVC
Abdominal US – normal spleen and liver positions
Jaundice at 72 hrs old and required phototherapy for 24 hours

At 2-week visit: persistent jaundice
Pale stool
Poor weight gain
Prolonged jaundice

• **Common causes:**
  • Benign breast milk jaundice
  • Resolving haemolytic jaundice
  • Urinary tract infection

• **Less common but important not to miss:**
  • Cholestasis – eg.
    • Biliary atresia
    • Hepatitis
    • Metabolic disease
  • Hypothyroidism
Breast milk jaundice

- Typically presents after the first 5 days of life, peaks within 2 weeks, then slowly resolves over 3 to 12 weeks
- Needs to be distinguished from breastfeeding failure jaundice (suboptimal intake) resulting in excessive weight loss
- Pigmented stool colour
- Hyperbilirubinaemia is usually mild, but does require monitoring and occasionally phototherapy
- Possible mechanisms:
  - The presence of beta-glucuronidase in breast milk promotes deconjugation of intestinal bilirubin, causing increased intestinal absorption of bilirubin
  - Possible gene mutation (UGT1A1 gene) in a Japanese study
Neonatal cholestasis

Many disorders can present with cholestasis, however
- 70-80% caused by hepatitis and biliary atresia
- 5-15% caused by alpha-1 antitrypsin deficiency

Key features:
- Jaundice
- Dark urine
- Clay coloured stool
**Stool colours of cholestasis**

<table>
<thead>
<tr>
<th>Abnormal</th>
<th>Normal</th>
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<tbody>
<tr>
<td><img src="image1" alt="Abnormal stool 1" /></td>
<td><img src="image2" alt="Normal stool 4" /></td>
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<td><img src="image3" alt="Abnormal stool 2" /></td>
<td><img src="image4" alt="Normal stool 5" /></td>
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<td><img src="image5" alt="Abnormal stool 3" /></td>
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<td><img src="image7" alt="Abnormal stool 4" /></td>
<td><img src="image8" alt="Normal stool 7" /></td>
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</table>
Neonatal cholestasis

Key features:
- Jaundice
- Clay coloured stool
- Dark urine

Step-wise approach to evaluation of neonatal cholestasis

1. Rapid diagnosis and treatment of treatable disorders (sepsis, metabolic disorders)

2. Early diagnosis of biliary atresia by ultrasound and liver biopsy, because early surgical intervention results in improved outcome

3. Additional testings for specific conditions and complications (eg. coagulopathy)

Key message: Urgent referral for further investigations
Case 6

Aiden was born at 39 weeks gestation
Birth weight 3.6kg

Antenatal history:
• First child to 23yo mother
• Low risk first trimester screen
• Normal serology and antenatal ultrasound

Unexpectedly flat at birth, required resuscitation and ventilation for 3 days

Discharged home on day 7 of life

First MCHN visit on day 9 – his mother showed this recording
What do you see?

What will you do next?
Neonatal seizures

Key messages:

• Common in the first few days of life.
• Clinical manifestations are varied and subtle.
• Recurrent seizures are harmful to the developing brain.
• Delayed diagnosis of treatable causes can lead to disastrous consequences.

Require urgent referral to ED
Subtle seizures may be mistaken for normal newborn behaviours.
• Ocular phenomena: staring, blinking, eye deviation
• Oral-buccal-lingual movements: chewing, lip smacking
• Peculiar limb movements: rowing, pedalling
http://www.youtube.com/watch?v=iM9fj4qw7CA
Focal clonic seizures involve one side of the body.
• Rhythmic, fast and slow components
• The baby may not be unconscious.
http://www.youtube.com/watch?v=0j-pwZSKOpc
https://youtu.be/aVoJtslvqOU
Infantile spasm
Prognosis

• A single prolonged seizure may not cause brain injury. But recurrent seizures, not necessarily prolonged, are associated with long-term functional deficits and neuronal developmental abnormalities.

• Prognosis also depends on the cause, EEG and imaging findings.

• “good” if clinical seizures only and normal neurological examination

• “poor” if heavy seizure burden, abnormal background EEG, abnormal neurological examination
Case 7 - A lump on the groin and scrotal swelling

**Inguinal hernia**
- History of intermittent inguino-scrotal bulge, with associated irritability
- May be easily reducible at first
- Require surgical review within 1 week.

**Other possibilities:**

**Hydrocele**
- Soft, non-tender swelling adjacent to testis; testis can be felt to be normal in simple hydrocele; transilluminates brightly.
- Close spontaneously in the first year. If still present at 2 years, surgical referral should be made for consideration of repair.

**Testicular torsion**

**Testicular tumour**

**Key message:**

Refer to ED immediately if
- Firm, tender, irreducible inguinal hernia
- Suspect testicular torsion

Don’t forget baby girls can present with inguinal hernia too!
Strawberry naevi

When to refer?

- Urgently if they are on the eyelids, nose, ears or large and on the face
- Ulceration, painful and non healing
- The child has problems with their appearance when they reach school age

Types of treatment:

1. Medications
   - Cortisone: oral or by direct injection into the haemangioma
   - Others: propranolol, vincristine and interferon may be used.

2. Laser therapy: can sometimes be used, especially if used very early in life while the haemangioma is still flat.

3. Surgery: usually deferred for for several years until the haemangioma has shrunk
Baby Ryan

When Ryan was born, a dark red birthmark covered his left eyelid and part of his forehead

What is the diagnosis?

→ Port wine stain – a common type of birthmark

Rarely - a sign of Sturge-Weber syndrome (SWS) - a rare condition in which extra but abnormal blood vessels grow on the brain’s surface.

The unusual blood flow can lead to seizures, developmental delays, glaucoma and weakness or paralysis on one side of the body.

Always refer this type of birth mark for further evaluation.
What is one thing, right now, that you are totally sure of?