Worcestershire Acute Hospitals NHS Trust

Jaundice (PIP)

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The following guidance is taken from the Partners In Paediatrics (PIP)

JAUNDICE IN NEONATES

Jaundice in neonates aged >7 days (aged <7 days see **Neonatal** guidelines)

RECOGNITION AND ASSESSMENT

Symptoms and signs

- Any visible yellow colouration of skin in any infant
- Yellow conjunctivae in dark-skinned infants
- In an infant aged >14 days (or >21 days preterm infants <37/40)

Assess for red flags

- Stools (pale and/or chalky; refer to CLDF stool colour chart) and urine colour (yellow or orange is abnormal and suggests conjugated hyperbilirubinaemia. Most infants have colourless urine)
- Pallor (haemolysis)
- Poor feeding, drowsiness (neurotoxicity)
- Poor weight gain (plot on centile chart, is growth satisfactory and has infant regained birth weight?)
- Hepatosplenomegaly (blood-group incompatibility or cytomegalovirus, liver disease)
- Splenomegaly (e.g. haemolytic anaemia, spherocytosis)
- Dysmorphic features

Causes of persistent jaundice >14 days in term infants and >21 days in preterm

- Physiological/breast milk jaundice
- Prematurity
- Increased bilirubin load (e.g. bruising, blood group incompatibility)
- G6PD deficiency and other red cell enzyme deficiencies
- congenital spherocytosis
- cephalohaematoma
- Rarely infection (e.g. UTI, congenital infection)
- Metabolic disorder (e.g. galactosaemia, tyrosinaemia)
- Endocrine disorders (e.g. hypothyroidism, hypopituitarism)
- Biliary atresia
- Liver disease (e.g. neonatal hepatitis, alpha-1-antitrypsin deficiency)
- TPN-induced cholestasis

Investigations

All

- Total bilirubin
- Conjugated bilirubin on all babies aged >14 days. Can wait until next working day in the absence of red flags (as above)
- Document stool and urine colour
- Blood glucose if baby is unwell

Second-line investigations – indicated if ≥1 red flags present

- Check routine metabolic screening has been performed (serum and urine organic acid)
- If conjugated bilirubin >20% of total bilirubin, seek advice of specialist liver unit as infant may require further investigations
- If conjugated bilirubin >20% of total bilirubin perform following:
- save stool sample for senior review
- U&E and bicarbonate
- LFTs (ALT/AST, alkaline phosphatase, gamma GT, albumin)
- pre-feed blood glucose, perform for at least first 24 hr of admission
- FBC, retics and blood film
- blood group and direct Coombs' test
- coagulation screen including PT and/or INR [give 300 microgram/kg phytomenadione IV (vitamin K) if prolonged and repeat after 12 hr]
- G6PD screen in African, Asian or Mediterranean patients
- thyroid function tests: ask for 'FT4 priority and then TSH'

- congenital infection screen:
  - CMV PCR: in urine first 2 weeks of life, later test newborn blood spot card
  - toxoplasma ISAGA-IgM and
  - HSV PCR
- metabolic investigations:
  - blood galactose-1-phosphate uridyltransferase
  - urine dipstick for protein
  - urine for reducing substances
  - urine for amino acid and organic acid
  - alpha-1-antitrypsin level and phenotype
  - cortisol
  - cholesterol and triglycerides
  - immunoreactive trypsinogen (IRT)

Third-line investigations that may be recommended by paediatric gastroenterologist or hepatologist

- Liver and abdominal ultrasound
- DESIDA or HIDA radionucleotide scan
- Lactate, ammonia and pyruvate
- Very long chain fatty acids
- Urine and serum bile acids
- Acyl carnitine
- Isoelectric focussing of transferrin
- Ferritin and transferrin saturation
- Muscle biopsy
- Bone marrow for storage disorders
- Skin biopsy for fibroblast culture
- Liver biopsy
- If Alagille syndrome suspected: CXR to look for butterfly vertebrae
- Syphilis serology
- Ophthalmological examination (for Alagille syndrome and panhypopituitarism)

If conjugated bilirubin elevated at any age (>20% of total bilirubin), discuss with consultant urgently

Limits (micromol/L) for phototherapy and exchange transfusion for infants ≥38 weeks' gestation

Age (hours)	Repeat transcutaneous bilirubin/serum bilirubin (6–12 hours)*	Consider phototherapy#	Phototherapy	Exchange transfusion
0			>100	>100
6	>100	>112	>125	>150
12	>100	>125	>150	>200
18	>100	>137	>175	>250
24	>100	>150	>200	>300
30	>112	>162	>212	>350
36	>125	>175	>225	>400
42	>137	>187	>237	>450
48	>150	>200	>250	>450
54	>162	>212	>262	>450
60	>175	>225	>275	>450
66	>187	>237	>287	>450
72	>200	>250	>300	>450
78	>212	>262	>312	>450
84	>225	>275	>325	>450
90	>237	>287	>337	>450
96+	>250	>300	>350	>450

***** Result in this category repeat transcutaneous measurement in 6–12 hr
[#] Result in this category repeat serum bilirubin measurement in 6 hr whether or not phototherapy started

- For other gestations see **Neonatal** guidelines

TREATMENT OF UNCONJUGATED JAUNDICE

- Adequate fluid and energy intake
- Phototherapy

Phototherapy

- If bilirubin near exchange threshold or still rising:
  - increase power number of lights
  - increase area exposed (e.g. biliblanket and overhead)

Exchange transfusion

- See **Exchange transfusion** in **Neonatal** guidelines

IVIG

- For dose information see https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/216671/dh_131107.pdf for dose information
- Use as an adjunct to multiple phototherapy in rhesus disease when bilirubin continues to rise by >8.5 micromol/L/hr

MONITORING TREATMENT

- If haemolysis present, check bilirubin 4–6 hrly until rate of rise flattens
- If bilirubin concentration approaching threshold for exchange transfusion, or rising rapidly (>10 micromol/hr), check 4-hrly

SUBSEQUENT MANAGEMENT

- When bilirubin concentration has fallen below threshold for phototherapy (see above), discontinue phototherapy
- If jaundice persists after aged 14 days, review and treat cause

TREATMENT OF CONJUGATED JAUNDICE

- Fat soluble vitamins (A,D,E and K)
- Ursodeoxycholic acid (after discussions with liver unit)

FOLLOW-UP

Conjugated jaundice

- Conjugated bilirubin <20% of total bilirubin in a well baby without red flags
  - discharge to routine community care
  - advise parents to look out for 'worrying features'
- Conjugated fraction >20%
  - discuss with consultant as this will depend on cause and severity of conjugated jaundice

Unconjugated jaundice

- GP follow-up with routine examination at 6–8 weeks
- If exchange transfusion necessary or considered, request development follow-up and hearing test
- In babies with positive Coombs' test who require phototherapy, check haemoglobin at aged 2 and 4 weeks because of risk of continuing haemolysis and give folic acid daily