

FexNet Collated Answers:

Neonates

1. Jaundice
2. Neonatal Resuscitation
3. Meconium
4. Shock
5. Shock
6. Shock
7. Vomiting
8. Jaundice
9. Jaundice (almost identical to Q8)

Question 1

A concerned first-time mother has brought her 2-week-old baby to the ED because the baby is jaundiced.

- i. What is the name of the pathological condition caused by neonatal jaundice? (1 mark)

- Kernicterus - chronic bilirubin encephalopathy

- ii. If left untreated, what are 2 sequelae of this condition? (2 marks)

- Acute: seizures, coma
- Chronic: cerebral palsy, developmental delay, death

- iii. List 2 benign causes of neonatal jaundice (2 marks)

- Normal physiological jaundice due to ?immature hepatocytes
- Breast milk jaundice – Can last up to a couple of weeks, tends to be settling by week 3

- iv. List 4 pathological causes of neonatal jaundice (4 marks)

- Sepsis (onset anytime)
- Haemolysis: Rhesus, ABO (onset usually in 1st 24h)
- Liver trouble e.g. hepatitis, congenital abnormality e.g. biliary atresia, metabolic e.g. alpha-1 antitrypsin deficiency
- Bowel obstruction
- Hypothyroidism
- Other e.g. breakdown of blood from cephalhaematoma

v. What 5 historical features will guide your assessment of this child? (5 marks)

- Prematurity
- Time of onset
- Duration of symptoms > 3/52
- Obstructive symptoms – pale stools, dark urine, vomiting
- Duration of symptoms > 3/52
- Signs of lethargy eg poor suck
- Formula feed?
- Symptoms of sepsis ?fever

vi. How can a serum bilirubin assist your assessment? (2 marks)

- The higher the total bilirubin level, the greater the risk. Interpretation depends on prematurity (term babies handle higher levels)
- Conjugated versus unconjugated bilirubin. Conjugated is bad because it indicates an obstructive cause.

vii. List 5 other investigations you might consider (5 marks)

- Sepsis – FBC, CRP, blood and urine culture, LP
- Hemolysis - FBC & film again, group & hold, haptoglobins, LDH, Coombs test, G6PD
- Tests for liver function/obstruction – LFT, US
- TFT
- Other – serum ammonia, pyruvate, lactate

Question 2 (15 marks)

A woman unexpectedly gives birth in your emergency department at 38 weeks gestation. You are tasked with resuscitating the newborn. Immediately after cutting the cord a female infant is placed on the resuscitaire in front of you.

She is floppy with no spontaneous movement and no respiratory effort

She is cyanosed

Heart rate 50 bpm

There is copious meconium stained liquor on the baby

- i. Before addressing the airway, what steps will you undertake? (3 marks)

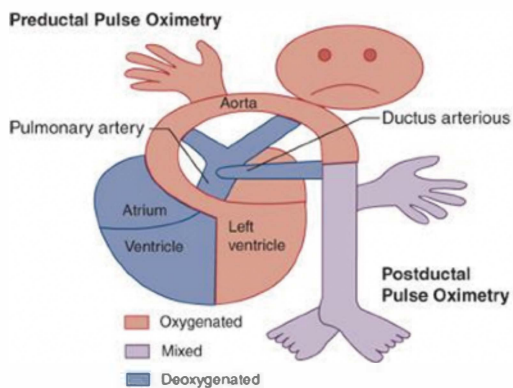
Maintain normal temperature (dry & wrap)

Stimulate

Call for additional help

SpO₂ monitoring

- ii. Explain why oxygen saturations are measured on the right hand (rather than left hand) of a newborn baby (3 marks)



Source: J.E. Tintinalli, J.S. Stapczynski, O.J. Ma, D.M. Yealy, G.D. Meckler, D.M. Cline:
Tintinalli's Emergency Medicine: A Comprehensive Study Guide, 8th Edition
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- iii. After ensuring adequate head positioning, airway opening & suctioning of secretions the baby still has inadequate respiratory effort. Outline the

advantages and disadvantages of a T-piece ventilation device compared to a self-inflating bag in neonatal resuscitation (3 marks)

- T-piece system reliably delivers PEEP. Has manometer to measure/display actual PEEP. (self-inflating bag with PEEP valve poor in this regard) Important in recruiting lung volume.
- T-piece systems allow blending of room air & O₂ – generally use FiO₂ 21-30%
- Self-inflating bag will still work if gas supply fails – T-piece will not

iv. List the initial T-piece system settings you would use in this setting (4 marks)

FiO ₂	Start with air – increase > 21% if not reaching target saturations in time
Rate	40-60 breaths/min
PEEP	5-8 cm H ₂ O
Positive Inspiratory Pressure	30 cm H ₂ O (20-12 prem < 32 weeks)

v. Describe how you would identify the umbilical vein (for catheter insertion) in an umbilical cord that has just been cut under the clamp (2 marks)

- Examine the cut end of the cord and identify the two arteries (small, thicker walled and constricted) and the single vein (more gaping and thin walled).
- Grasp the edge of the cord with a suture forceps and use a probe or the fine toothed forceps to tease open the vein. It will usually open up easily.

Question 3

A 36 hour old neonate presents with a community nurse because of failure to pass meconium. There has been mucous-like vomiting but the neonate otherwise looks well. PR, BP, RR and saturations are within normal ranges.

i. With regard to this presentation, (4 marks)

(a) A normal digital rectal examination excludes which diagnosis?

Imperforate anus

(b) The successful passage of an NG tube excludes which diagnosis?

Oesophageal atresia

(c) What is the characteristic X-ray appearance of duodenal atresia?

Double bubble sign

(d) Name a congenital condition associated with neonatal bowel obstruction.

Down syndrome, Cystic fibrosis

ii. Prior to transport to a specialist paediatric centre name 5 essential actions you should perform in ED to ensure the safety of the neonate in transfer (5 marks)

Vital signs documentation

Oxygen as required to maintain saturations

Temperature measurement and balance

BSL measurement and correction if $< 3\text{mmol/L}$

Establish iv access and place nbm

Establish iv fluid maintenance

Place a ng tube on free drainage

Abdominal X-ray

iii. Describe the intravenous maintenance fluid choice and maintenance fluid rate you would prescribe for this neonate prior to transfer. (2 marks)

Fluid; N/2 +10% dextrose or N/4 + 10% dex

Rate 4ml/kg/hr; might state 3.75-5ml/kg/hr or 90-120ml/kg/day

iv. Name 2 other potential causes of neonatal intestinal obstruction at this age not

Enteric duplication cysts, Gastric volvulus, Gastric atresia, Microgastria, Duodenal web Malrotation. Jejunal stenosis and atresia. Small bowel obs. Ileal atresia Intestinal mal rotation. Meconium ileus, meconium plug Small left colon syndrome. Intussusception. Intestinal atresia, Colonic atresia, Hirshsprungs. Anal atresia, Anorectal abnormalities

Question 4 (7 /10)

1.

Vital signs – shocked child from any cause esp sepsis, congenital heart problems, urgent resuscitation may be required

Weight, length, head circumference – to plot on growth chart and compare with birth

Fontanelle – raised ICP eg from NAI would have bulging fontanelle

Chest exam – looking for pulmonary oedema or other respiratory dysfunction that would impair feeding

CVS – murmurs / hepatomegaly / coarctation

Jaundice – at this age would indicate serious pathology eg biliary atresia

Bruising – NAI

Many other reasonable answers

2.

BSL – hypoglycaemia in metabolic conditions, sepsis

ECG – tachyarrhythmias can present as failure to thrive

VBG – assess degree of hypoperfusion – eg lactate / metabolic acidosis

Bilirubin / LFTs – esp if jaundiced – exclude congenital liver problem

FBC – anaemia from congenital haemolytic cause

Septic screen – urine / CXR / LP where indicated from examination to exclude infection

Urine for metabolic screen – where suggested by hx or metabolic acidosis

Others OK

Question 5

A four day neonate presents to the Emergency department. The child is shocked. Observations are RR60, HR 190, Capillary refill time centrally is 5 secs. They are responsive to pain.

List three antenatal / perinatal risk factors for neonatal sepsis (3 marks)

Maternal colonisation with group B streptococcus (positive high vaginal swabs for GBS), prematurity, maternal peri-partum illness / fever / infection, prolonged rupture of membranes (greater than 24hrs prior to delivery)

Give three differential diagnoses of neonatal collapse other than sepsis (3 marks)

Inborn error of metabolism, **congenital cardiac disease**, non-accidental injury

What empiric therapy would you commence (be specific) (3 marks)

Move to resuscitation area, cardiac and saturation monitoring, high flow oxygen, IV access, **fluid bolus 20mls/kg of Normal saline**, IV antibiotics (must state which one/s) , IV antivirals ((must state which one) , dextrose if low BSL

List 6 investigations you would order (3 marks)

Bloods (FBC, UEC, Blood culture

FBC

UEC

Blood cultures

Bedside glucose, chest xray

VBG

LP - delayed

Question 6: (9 Minutes)

(18 marks)

Passmark: 11/18

A 5 day old baby girl is brought into the emergency department. She has had poor feeding for the last 24 hrs and has had increasing lethargy. The baby appears pale, floppy and mottled.

The child is 3.8kg.

Initial vital signs are:

HR	190
RR	60
Cap refill	5secs
BP	Unable to record
Sats	Not reading

I. List eight (8) differential diagnoses for this presentation (8 Marks)

- Cardiac (Duct dependant lesion)
- Sepsis
- Electrolyte disturbance
- Metabolic/Endocrine - CAH
- Formula dilution or overconcentration
- Inborn errors of metabolism
- Intestinal catastrophe
- Toxins
- Seizures
- Trauma (Accidental or non accidental)

II. List four (4) immediate actions you would take (4 Marks)

- Oxygen 15L non-rebreather
- IV/IO/UV access
- Fluid bolus – 10-20ml/kg bolus
- IV Cefotaxime + ampicillin or reasonable alternative
- Check Blood sugar level

III. You decide to intubate the baby. (6 Marks)

List six (6) pieces of equipment (including sizes –multiple sizes do not count as separate answers) that you would prepare for the intubation of this child.

- Bag/valve mask/neopuff/anaesthetic circuit
- ETT size 3.5 cuffed (Accept 3 and 4)
- Paedcap/capnography
- Laryngoscope size 1 & 2 miller and/or mc blade
- Ventilator
- Suction catheter
- Oropharyngeal/nasopharyngeal airways
- Stylet/bougie
- LMA (Size 1)

Question 7

With regards to this vomiting neonate presentation – list 3 obstructive and 3 non-obstructive causes for the vomiting. (6 marks)

Obstructive

- Obstructed hernia
- Necrotising enterocolitis
- Biliary atresia
- midgut volvulus
- pyloric stenosis

Non-obstructive

- Acute gastroenteritis
- Sepsis
- Inborn errors of metabolism
- Non-accidental injury (space occupying lesion e.g. SDH)

Identify the most significant clinical finding on the abdominal film and the likely diagnosis (2 marks)

- Pneumatosis intestinalis (gas in bowel wall)
- Pathognomonic for Necrotising Enterocolitis

Outline your further management for this child. Candidates can assume that apart from the NGT insertion and IV access obtained no further management has been performed. (6 marks)

- IV fluid bolus – fluid bolus of suitable crystalloid 10-20mls/kg – Aim CRT<3 sec
- IV Fluids maintenance (NaCl 0.9% + 5%D) – accept other suitable
- Nil by mouth / bowel rest –fluid solutions but must have dextrose in
- Nasogastric Tube on free drainage
- IV Antibiotics – Amoxycillin 50mg/kg QID, Gentamicin 7mg/kg, Metronidazole 12.5mg/kg
- Emergent surgical review

Question 8
(6 Minutes) (Total Pass mark 7/12 12 Marks)

A 5-day old neonate is brought in to ED by his mother after being discharged from hospital following a normal vaginal delivery.

His mother reports poor feeding for last few hours and she has noticed an increasing yellow discoloration of his skin:

His vital signs are:

HR 160
RR 32
CRT 2-3 sec
AVPU

The child is jaundiced.

Questions:

Answer:

1. List 5 likely causes for his jaundice

3/5

- Physiological (day 2-3)
- Breastmilk jaundice
- Sepsis
- Haemolysis
- TORCH infections
- Biliary atresia
- Hypothyroidism
- G6PD
- Metabolic disease / storage diseases

2. List 4 red flags during history and examination that warrant admission to the hospital.

2/4

- Prematurity
- Low birth weight or small for gestation
- Previous baby with significant jaundice or kernicterus
- Unwell infant
- Signs of kernicterus
- Parental concerns
- Onset from birth
- Too high (Bili >200 mmol/L) – bilirubin measured above the treatment nomogram
- Conjugated bili >25%

3. List 3 investigations required in ED and justify each one of them.

2/3 marks

This is an easy question – they must provide a reasonable rationale to get the full mark

- FBC (and film) – hemolysis – Hb- smear – spherocytosis – reticulocyte count – for hemolysis
- ELFT's – liver function and biliary obstruction
- BC, Urine, LP – sepsis screen
- USS of abdomen if conj bili is high – biliary atresia and duct dilation
- Blood group – rule out incompatibility / may need transfusion
- TFT's – thyroid function tests
- Direct Coombs test – evidence of hemolysis

Question 9

Answers:

1. List 7 likely causes for his jaundice (7 marks) – 4/7

- Physiological (day 2-3)
- Breastmilk jaundice
- Sepsis
- Haemolysis
- TORCH infections
- Biliary atresia
- Hypothyroidism
- G6PD
- Metabolic disease / storage diseases

2. List 6 red flags during history and examination that warrant admission to the hospital. (6 marks) – 5/6

- Prematurity
- Low birth weight or small for gestation
- Previous baby with significant jaundice or kernicterus
- Unwell infant
- Signs of kernicterus
- Parental concerns
- Onset from birth
- Too high (Bili >200 mmol/L) – bilirubin measured above the treatment nomogram
- Conjugated bili >25%

3. List 6 investigations required in ED and justify each one of them. (6 marks) – 4/6

- FBC (and film) – hemolysis – Hb- smear – spherocytosis – reticulocyte count – for hemolysis
- ELFT's – liver function and biliary obstruction
- BC, Urine, LP – sepsis screen
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- Direct Coombs test – evidence of hemolysis

4. This baby did not require therapy and no serious cause was found for his jaundice.

List 4 Conditions this child needs to meet for safe discharge him home: (4 marks) – 3/4

- Reassuring physical examination, ie well-looking
- Period of observation and feeding
- Bili <200
- Conjugated Bilirubin <25%
- No concerning cause found.
- Adequate follow up arranged – GP or child health nurse / paediatrician

Passmark: 16/23 Adjust to ../10 please