

Crash Cart therapy for Severe Jaundice

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Objectives

- Assessment & stabilization
- Role of Investigations
- Management principles

Steps for a crash-cart approach

- Assess Risk
- Laboratory Tests (**Do not wait for labs**)
- Immediate Interventions
- Definitive Therapy

Assessment of Severity

- ? Visual assessment
- Age of Onset (hrs)
- Clinical signs of encephalopathy
- Assess for Risk factors

Transcutaneous Bilirubin and Serum Bilirubin

Visual Assessment

- Skin pigmentation
- Plethora
- Decreased ambient light
- Prior exposure to Phototherapy

S. Bilirubin- Must!!

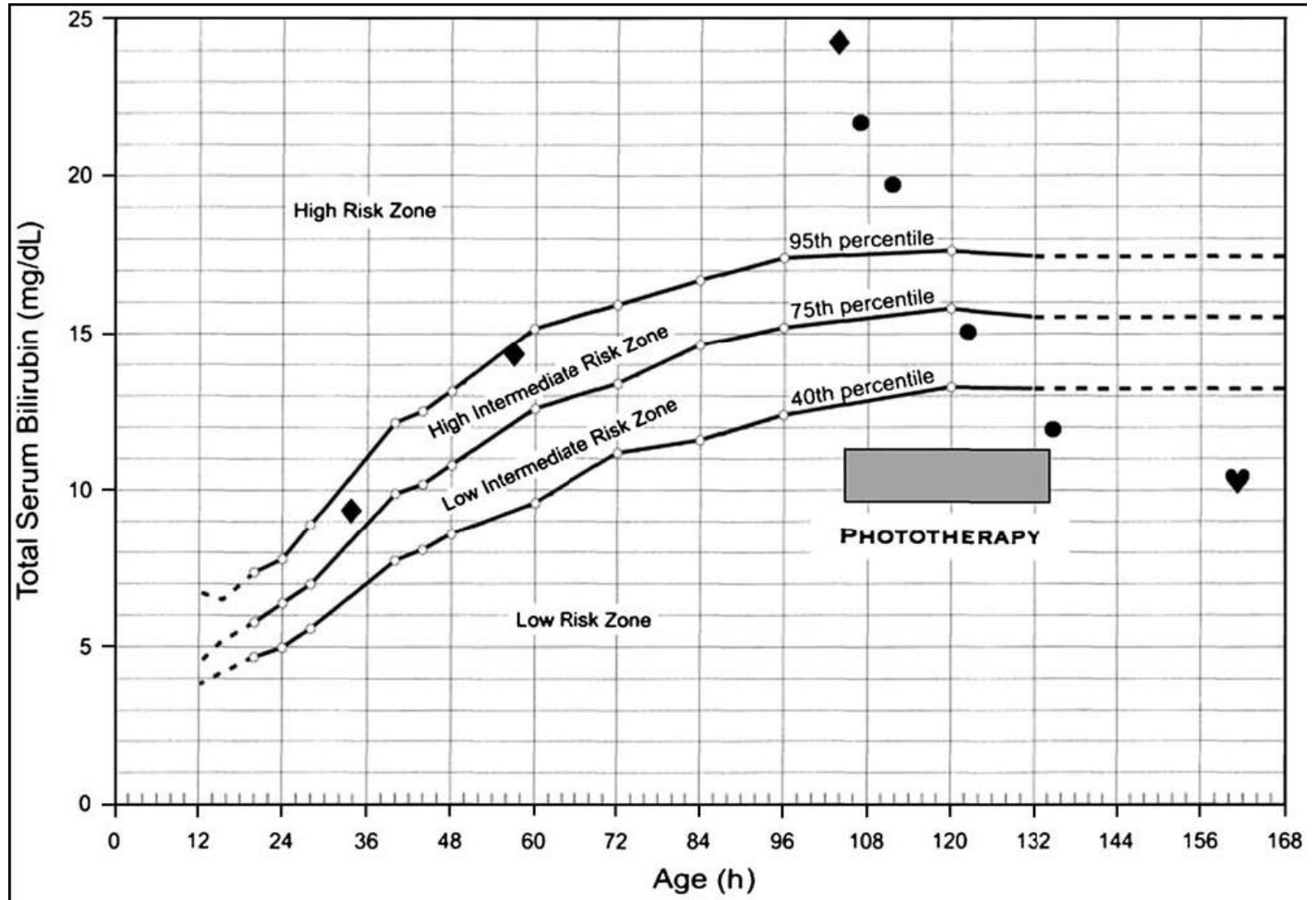
Risk Factors for severe Jaundice

- Jaundice in first 24 hours
- Rh/ ABO
- Pre-Discharge TSB in high risk zone
- Cephalhematoma/Bruising
- Weightloss
- Late Preterm
- Previous baby with Hyperbilirubinemia

Can we Predict severe Jaundice?

- Hour-specific Bilirubin values
- Presence/Absence of Risk-factors

How to identify?



Risk Factors for BIND

- Gestation And birth weight
- Hemolysis and G6PD
- Asphyxia
- Sepsis
- Metabolic Acidosis
- Temperature Instability
- Albumin <3g/dl

Table 1. Risk Score for Neonatal Hyperbilirubinemia

<i>Variable</i>	<i>Score</i>
Birth weight:	
2,000 to 2,500 g (4 lb, 7 oz to 5 lb, 8 oz)	0
2,501 to 3,000 g (5 lb, 8 oz to 6 lb, 10 oz)	3
3,001 to 3,500 g (6 lb, 10 oz to 7 lb, 11 oz)	6
3,501 to 4,000 g (7 lb, 11 oz to 8 lb, 13 oz)	9
4,001 to 4,500 g (8 lb, 13 oz to 9 lb, 15 oz)	12
4,501 to 5,000 g (9 lb, 15 oz to 11 lb, 1 oz)	15
Oxytocin (Pitocin) used during delivery	4
Vacuum-assisted delivery	4
Breast and bottle feeding	4
Exclusive breastfeeding	5
Gestational age < 38 weeks	5

NOTE: A total score of 8 or more suggests an increased risk of hyperbilirubinemia; total serum bilirubin or transcutaneous bilirubin level should be obtained.

Clinical Signs of BIND

- Mental Status
- Muscle Tone
- Cry

Condition	1 point	2 points	3 points
Mental Status	Sleepy, poor feeding	Lethargy, irritability, very poor feeding	Semicoma, seizures, apnea
Muscle Tone	Slight decrease	Moderate hyper- or hypotonia depending on arousal state, mild arching, posturing, bicycling	Severe hyper- or hypotonia, opisthotonus, fever
Cry	High-pitched	Shrill and frequent or too infrequent	Inconsolable or only with stimulation
Total score:	1-3 points	Stage IA: minimal signs of encephalopathy	
	4-6 points	Stage IB: progressive, but reversible with treatment	
	7-9 points	Stage II: advanced, largely irreversible, but severity decreased with treatment	



Crash Cart Approach

- Thermal stability
- Intravenous fluids if dehydrated
- Cross match and Organize for blood
- Intensive Phototherapy
- Repeat TSB within 4 hours
- If TSB still $>$ ET threshold Immediate ET

Crash Cart Approach

- Severe Jaundice with neurological Injury:
Exchange Transfusion
- Severe Jaundice without encephalopathy:
Interventions to reduce Bilirubin

Clinical Assessment

- Head to toe physical
- Weight deficit
- Assess hydration and feeding adequacy
- Signs of Bilirubin encephalopathy

Emergency Laboratory Tests

- Serum Bilirubin levels
- DCT, Retic count
- Haemogram and PBS
- Mother and Babies blood group
- G6-PD
- S. Albumin, electrolytes

Bilirubin reducing measures

- Intravenous Fluids
- Intensive Phototherapy
- Exchange Transfusion

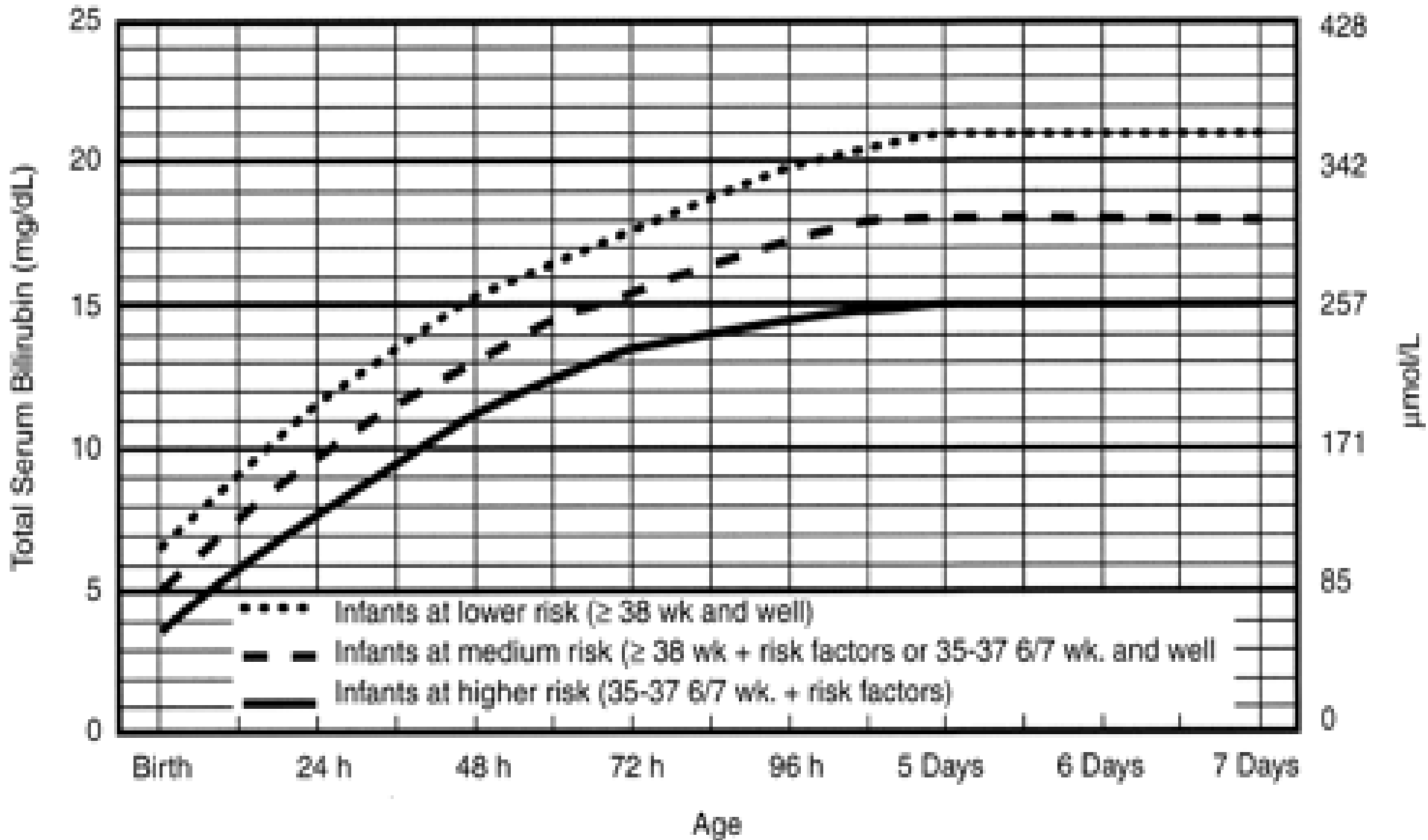
Phototherapy

- How to give Effective Phototherapy?
- What to monitor?
- When to Stop Phototherapy?

Starting PT

- AAP nomograms
- Weight and gestation
- Age of life in hours
- Risk factors for BIND

AAP Nomogram for PT



Effective Phototherapy

- Intensity of light
- Spectrum of Light (460 to 490 nm)
- Surface area of Exposure
- Baby Characteristics
 - Hydration, Feeding, Temperature

LED Phototherapy



Distance of the light source

- Irradiance is maximized if PT is close to the infant as possible
- As close to the baby as possible without overheating

Reflecting lights

- Aluminum foil or white cloth placed on either side of the infant to reflect light will increase irradiance

Hansen et al; Semin Perinatol. 2011;35(3):171-4

Djokomuljanto S; Arch Dis Child 91:F439-F442, 2006

Care during PT

- Repeat TSB after 2-4 hours of initiation of PT
- Continue feeding/ Tube feeds
- Ensure Hydration
- Continuous and uninterrupted PT

Monitoring and Stopping PT

- When baby is under PT : Monitor with TSB
- Frequency of monitoring : Level of bilirubin
- Stop PT
 - If level of bilirubin is 1 to 2 mg/dl below threshold
- Monitor for rebound 12 to 24 hours later

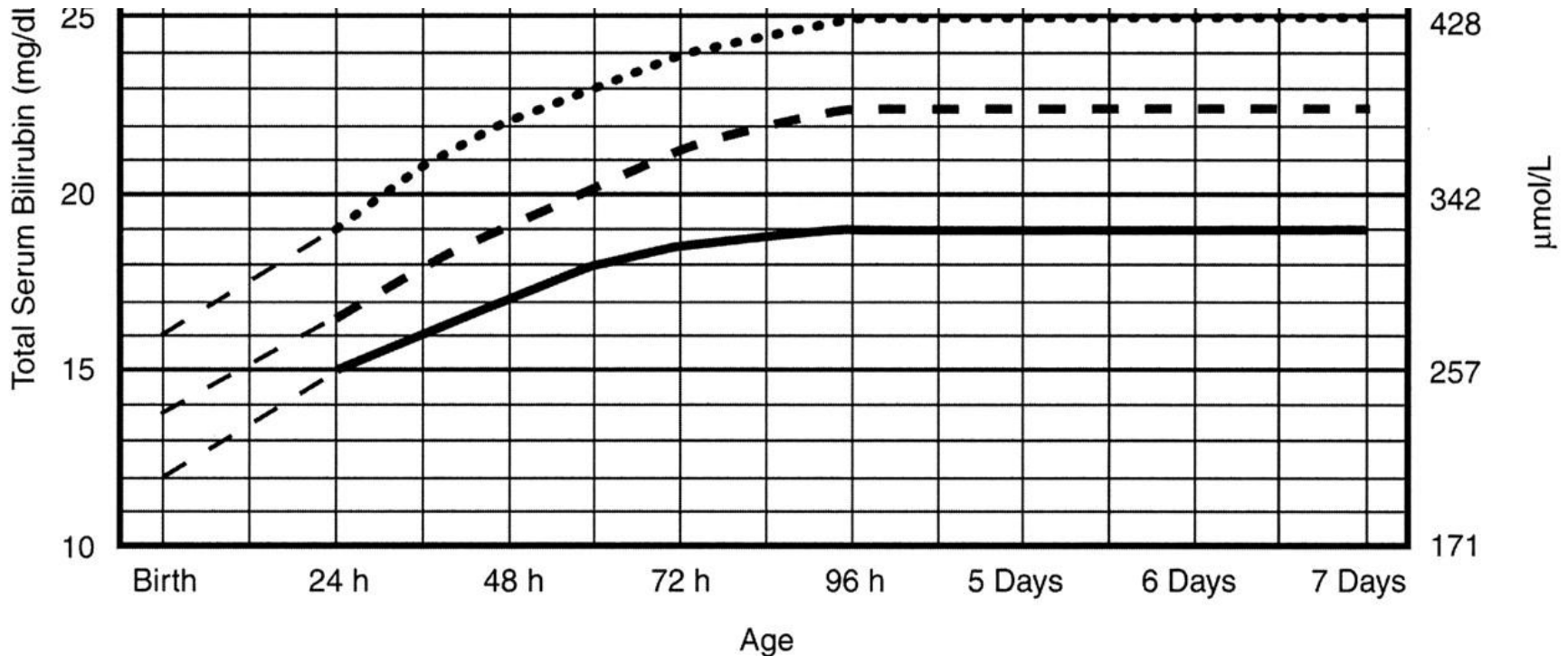
Exchange Transfusion

- TSB levels (AAP Nomogram)
- Intensive PT fails to produce a significant TSB reduction i.e. > 0.5 mg/dL per hour or > 2 mg/dL drop in 4 hours

Exchange Transfusion

- Rh Negative
 - Hydrops
 - Cord Bilirubin $>5\text{mg/dl}$
 - Rate of Rise $>1\text{mg/dl/hour}$
- AAP Nomogram for ≥ 35 weeks of gestation
 - $>$ Threshold for 6 hours after starting PT
 - Bilirubin Encephalopathy
 - If Bilirubin/Albumin Ratio >0.7 in term infants

AAP Nomogram For ET ≥ 35 weeks



- The dashed lines for the first 24 hours indicate uncertainty due to a wide range of clinical circumstances and a range of responses to phototherapy.
- Immediate exchange transfusion is recommended if infant shows signs of acute bilirubin encephalopathy (hypertonia, arching, retrocollis, opisthotonos, fever, high pitched cry) or if TSB is ≥ 5 mg/dL ($85 \mu\text{mol/L}$) above these lines.
- Risk factors - isoimmune hemolytic disease, G6PD deficiency, asphyxia, significant lethargy, temperature

Procedure of Exchange

- Double Volume
- Push and Pull Technique
- As early as possible
- Ensure stability

Blood for ET

- Depends on mothers blood group
 - If Mother is O, Donor blood be O group
 - If mother is Negative, Donor blood be Negative
 - Other cases Baby's blood group

<u>Mother</u>	<u>Baby</u>	<u>Donor group</u>
O +ve	A -ve	O -ve
B -ve	A +ve	A -ve
AB -ve	B + ve	B -ve

Parenteral fluids

- Dehydration
- Weight loss > 10 %
- S. Sodium > 150
- Poor oral intake
- Monitor electrolytes

Pharmacologic Options

- Limited role

Albumin Infusion

- Albumin infusion (1 g/kg) was considered before
ET
- TSB doesn't correlate with total body Bilirubin
hence clinical role not justified

IVIG

- Severe Hyperbilirubinemia due to blood group incompatibilities
- IVIG (0.5-1 g/kg over 2 hours) is helpful if the TSB is rising despite intensive phototherapy or if the TSB is within 2 to 3 mg/dL of the exchange level

Alcock GS et al: Cochrane Database Syst Rev 3:CD003313, 2002

Phenobarbitone

- It accelerates Bilirubin excretion by increasing hepatic clearance
- No longer recommended
- Sedation, slow onset of action

Tin Mesoporphyrin

- Heme oxygenase inhibitor
- Not approved for use

Carry Home Messages

- Severe Jaundice- medical emergency
- Start Intensive PT immediately
- Assess and send lab
- Neurological involvement: ET
- Hydration
- Preparation for ET
- Aggressive Supportive care

Thank you