

Source: Stevenson DK, Maisels MJ, Watchko JF: *Care of the Jaundiced Neonate*:
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前の図で間接ビリルビンと直接ビリルビンの経路を勉強してください。
英語のグラフですがここに遊離ビリルビンの事が載っていましたので
参照ください

黄疸がある乳児に関しては今後間接ビリルビンと遊離ビリルビンを測定
する予定です。

院長

ABBREVIATIONS

AAP: American Academy of Pediatrics

ABR: auditory brainstem response

ANSD: auditory neuropathy spectrum disorder

AUC: area under the curve

BAMR: bilirubin albumin molar ratio

CI: confidence interval

ET: exchange transfusion

GA: gestational age

ROC: receiver operating characteristic

SHB: significant unconjugated hyperbilirubinemia

SNHL: sensorineural hearing loss

TSB: total serum bilirubin

UB: unbound bilirubin

本文献は略語が多く
混乱しますが、
SHBは間接ビリルビンが高値
TSBは総ビリルビン
UBは遊離ビリルビンです。

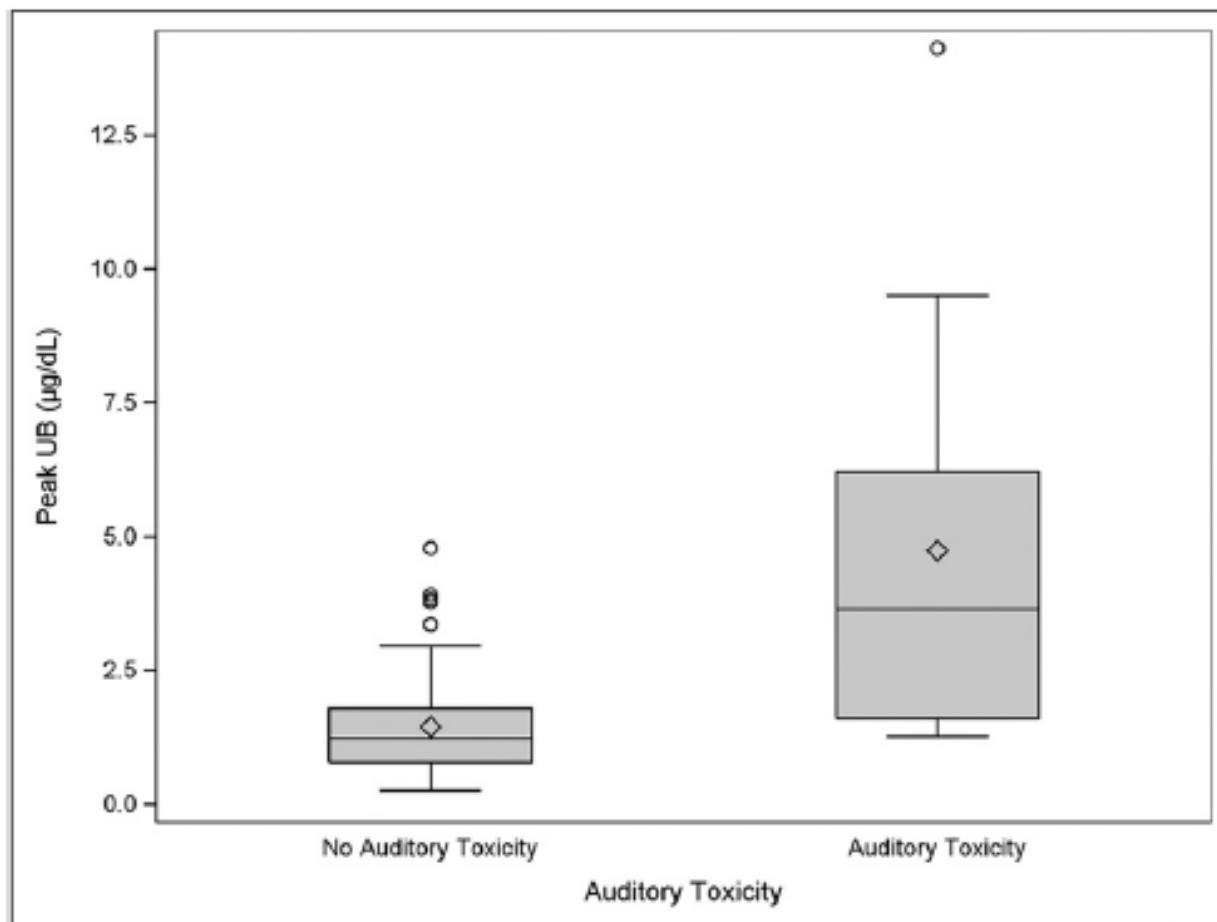


FIGURE 1

UB as a function of chronic auditory toxicity in late preterm and term infants with significant hyperbilirubinemia. In this box plot, the length of the box represents the interquartile range (IQR), or the distance between the 25th and 75th percentiles. The diamond symbol in the box interior represents the group mean. The horizontal line in the box interior represents the group median. The upper fence is defined as the 75th percentile plus 1.5 times IQR. The lower fence is defined as the 25th percentile minus 1.5 times IQR. Observations outside the fences are identified with circles.

遊離ビリルビンが聴力障害に関与しています

TABLE 2 Bilirubin Albumin Binding Variables and Chronic Auditory Toxicity in Infants With Significant Jaundice (*N* = 93)

	Infants Without Auditory Toxicity, Mean (SD) (<i>n</i> = 81)	Infants With Auditory Toxicity, Mean (SD) (<i>n</i> = 12)	Adjusted Odds Ratio (95% CI)	<i>P</i>
Peak TSB (mg/dL ^a)	23.6 (4.2)	29 (6.8)	1.10 (0.96–1.25)	.14
Peak BAMR	0.76 (0.17)	0.90 (0.24)	6.65 (0.23–188.5)	.26
Peak UB (μg/dL ^b)	1.44 (0.94)	4.74 (3.92)	2.41 (1.43–4.07)	.001

P values were based on logistic regression analyses predicting auditory toxicity.

^a Denotes multiply by 17.1 to convert to μmol/L

^b Denotes multiply by 17.1 to convert to nmol/L

慢性聴力障害は遊離ビリルビンが一番関与しています。

TABLE 4 Bilirubin Binding Variables and Chronic Auditory Toxicity (Subgroup Analyses)

	Neonates Without Auditory Toxicity	Neonates With Auditory Toxicity	Adjusted Odds Ratio (95% CI)	<i>P</i>
Neonates with TSB <25 mg/dL	Mean (SD) (<i>n</i> = 58)	Mean (SD) (<i>n</i> = 5)		
Peak TSB (mg/dL ^a)	21.6 (1.5)	22.8 (1.2)	2.06 (0.92–4.6)	.08
Peak BAMR	0.70 (0.10)	0.77 (0.18)	3714 (0.44–3.10e ⁺⁰⁷)	.07
Peak UB (µg/dL ^b)	1.19 (0.70)	1.99 (0.87)	3.31 (1.09–10.0)	.03
Neonates with TSB ≥25 mg/dL	Mean (SD) (<i>n</i> = 23)	Mean (SD) (<i>n</i> = 7)		
Peak TSB (mg/dL ^a)	28.6 (4.9)	33.4 (5.4)	1.18 (0.98–1.4)	.07
Peak BAMR	0.92 (0.20)	0.99 (0.24)	8.5 (0.12–596)	.32
Peak UB (µg/dL ^b)	2.07 (1.16)	6.69 (4.12)	7.09 (1.15–43)	.03

P values were based on logistic regression analyses predicting auditory toxicity.

^a Indicates to multiply by 17.1 to convert to µmol/L.

^b Indicates to multiply by 17.1 to convert to nmol/L.

総ビリルビンが25以上と以下の場合に分けて調べています。

新生児黄疸は殆どすべての新生児に起る（非抱合性ビリルビンでlow risk）

- 1)ビリルビンの産生過剰
産生は成人の2～3倍
Htは60%で赤血球のlife spanも短い
- 2)ビリルビンのクリアランスの低下
- 3)ビリルビンの腸管循環
母乳はこれを促進すると考えられている

low risk

- ピークは2~4日で7~9mgとなる
1~2週間で軽快するが、個々のクリアランスに関与する
2週間以降続く場合は検査

母乳の場合

- 1週間以降も続き、2週間で最高値となり、1~3か月で正常化
数週間、5mgの事あり
一般的にriskはないが時に直接ビリルビンの増加が無い事と増加傾向を調べる必要あり
高ビリルビンの場合は母乳は危険因子となる、一般的には良い

breastfeeding failur

- 哺乳力低下が関係、母乳だけの栄養の場合
hypovolemia, hypernatremia, 体重の減少、
特に、late preterm infantは哺乳力の低下がある（34w~36w）

Crigler-Najjar syndrome

2~3日でsevereとなる

Gilbert syndrome

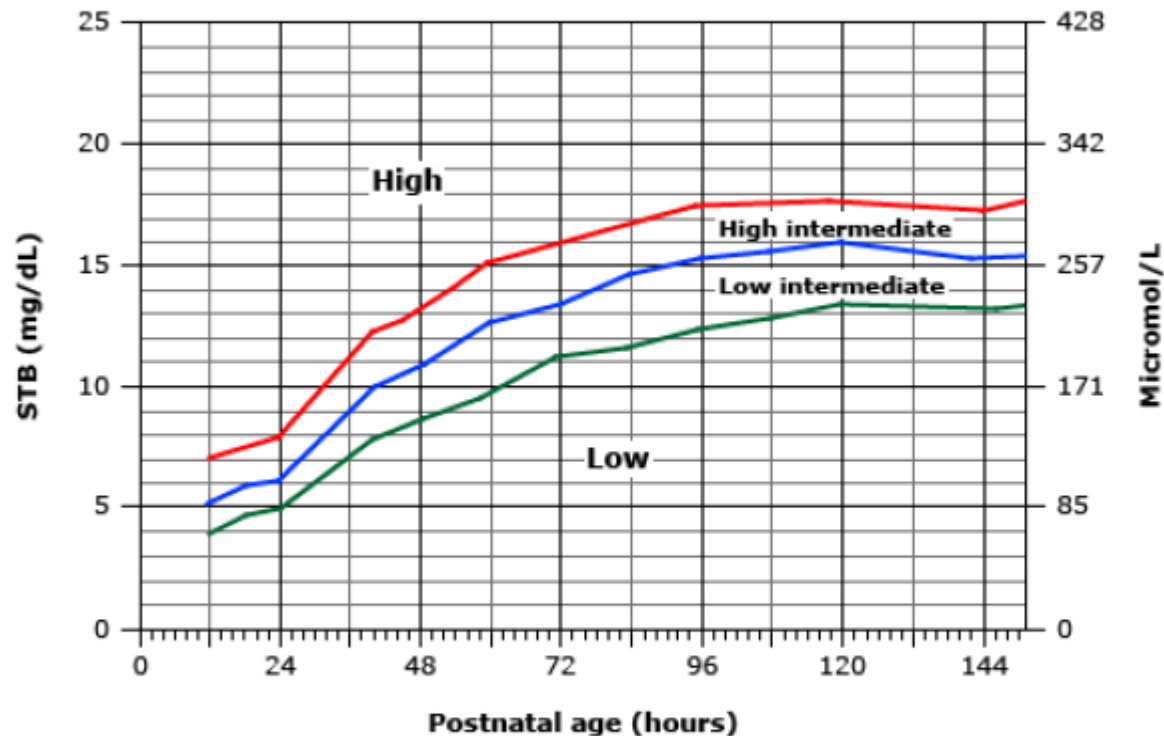
母乳の時に合併し易い

重症化の予測

- 1)24時間以内の出現
- 2)2週間後でも認められる（母乳でない場合）
- 3)直接ビリルビンが1mg以上

UPTODATEより乳児黄疸について纏めてみました。

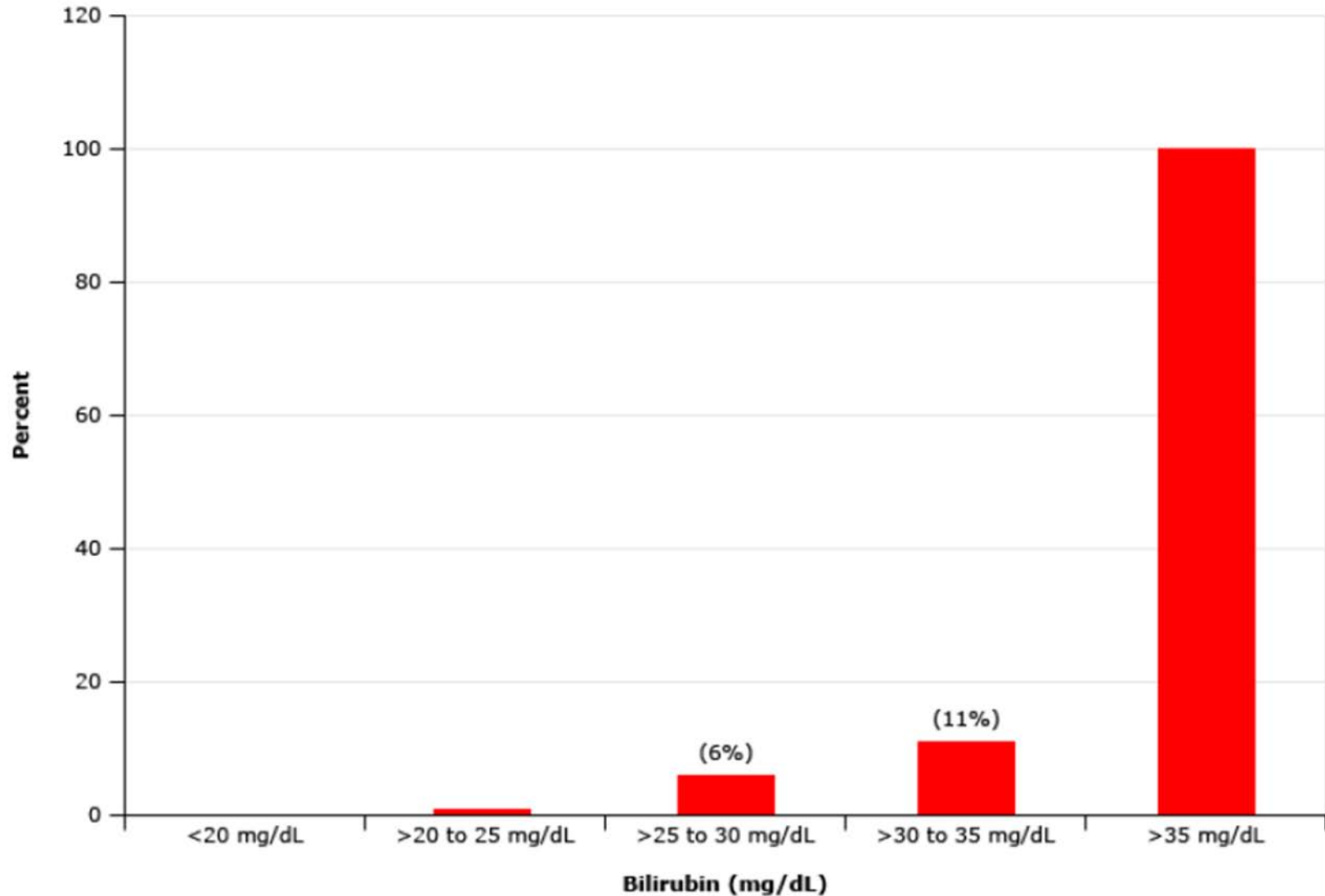
Nomogram of hour-specific serum or plasma total bilirubin (TB) concentration in healthy term and near-term newborns



The red, blue, and green lines denote the 95th, 75th, and 40th percentiles, respectively. Risk zones are designated according to percentile: high (TB ≥ 95th), high intermediate (95th > TB ≥ 75th), low intermediate (75th > TB ≥ 40th), and low (TB < 40th). Infants with values in the high risk zone are at increased risk for the development of clinically significant hyperbilirubinemia requiring intervention.

生後時間と危険度を総ビリルビンで示しています

Risk of kernicterus based on neonatal bilirubin



核黄疸の危険率を総ビリルビン値の関係で示しています。