

# The Importance of Complete Sepsis Workup in Healthy Jaundiced Neonates

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## Abstract

**Objectives:** To evaluate the importance of doing complete sepsis workup including blood culture and suprapubic urine culture (S/P) as an initial evaluation for healthy neonates presenting with jaundice early in life.

**Methods:** We prospectively evaluated 699 full-term asymptomatic infants presenting to Queen Alia Military Hospital (QAMH) in Amman, Jordan between July 2000 till January 2003 with jaundice at ages between 2-15 days. 161 neonates were excluded due to at least one exclusion criteria.

Each neonate was examined by the same pediatrician in order to determine his health status, after which the samples of blood and S/P urine culture were taken under proper asepsis techniques.

**Results:** Of the 538 neonates; 268 (48%) were females and 270 (52%) were males. None of them had a positive blood culture and only two had positive urine cultures (0.37%).

**Conclusion:** Doing complete sepsis workup in otherwise healthy jaundiced neonates as a routine initial evaluation or workup is not mandatory and it is money and effort consuming.

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## Keywords

Neonatal jaundice, neonatal sepsis, UTI.

## Introduction

Jaundice in the newborn is common, affecting nearly 60-70% of term infants and around 80% of preterm neonates during the first week of life.<sup>1,2,3</sup>

Luckily, most of the times it is a physiological event that needs no treatment,<sup>1,4</sup> but in some cases it may indicate some underlying pathological problem such as; ABO or Rh incompatibilities, infection, as well as other causes.<sup>2</sup> Sepsis is responsible for <1-2 % of cases of neonatal jaundice.<sup>5</sup> If jaundice persists beyond 3 weeks of age, measurement of total and direct bilirubin is advocated.<sup>3,6</sup>

Urinary Tract Infection (UTI) prevalence is about 5-8% among febrile infants younger than 8 weeks of life.<sup>6,7</sup> Since jaundice is one of the manifestations of neonatal UTI and occasionally the only sign of sepsis,<sup>4</sup> physicians may worry about not doing a sepsis workup for healthy jaundiced neonates.<sup>2</sup>

In QAMH, it is a routine procedure to obtain blood sample for culturing to each neonate admitted as neonatal jaundice regardless of health status, however, S/P urine for culture is taken on irregular basis depending on the age of neonate (i.e. >10 days of age), followed by treatment protocol of intravenous antibiotics and phototherapy pending culture results. This approach is time consuming, laborious and costly with invasive procedures and a minimum of 5 days in hospital is required till the initial results are obtained. And in many cases negative results were obtained.

The objectives of this study were:-

- To conduct and evaluate the incidence of sepsis and UTI in jaundiced but otherwise healthy neonates.
- To determine the importance of performing a complete sepsis workup in this age group of infants.

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## Methods

A total of 699 newborn infants presenting with jaundice that were evaluated and admitted to the pediatric floor at QAMH, Amman, Jordan, from July 2000 till June 2003 were enrolled in this study.

Only 538 newborns were qualified to enter this study according to our inclusion criteria, which is:

- Absence of any sign of sepsis excluding jaundice i.e. no fever, no hypothermia, no hypoactivity, no poor feeding, no weak cry, no increase sleepiness nor irritability.
- Direct bilirubin <15% of total bilirubin or < 1.5mg/dl.
- Birth weight >2.5kg.
- Full term baby i.e. completed 37 week gestational age.
- No history of early ruptured membranes, maternal fever or receipt of antibiotic.
- Absence of congenital anomalies or congenital infections.

These babies were all examined by the same pediatrician to confirm their healthiness, then the blood samples and S/P urine culture were performed under asepsis techniques by the same pediatrician. The blood culture results were usually obtained after 7 days and 3 days for urine culture results. UTI was considered if a growth of only one colony of the organism was obtained since it was taken suprapubically.

## Results

Of the 538 neonates; 268 (49.8%) were females and 270 (50.2%) were males with a mean birth weight of  $3.15 \pm 0.75$ kg. 88.5% were delivered by normal vaginal route. 91.8% were exclusively breast-fed. In 93% of the cases, jaundice has appeared at the 2<sup>nd</sup>- 3<sup>rd</sup> day of life. Bilirubin level at presentation ranged from 14-22mg/dl in 94% of cases. None of our neonates had positive blood culture. Two had positive urine culture; one was Klebsiella and the other one was E-coli, forming around 0.37%.

## Discussion

Jaundice is one of the most common problems occurring during the neonatal period affecting both term and preterm neonates.<sup>1, 4</sup> Although it is mostly a self-limiting, physiological phenomenon, but still in some cases it may be the presenting feature of a pathological problem like sepsis, UTI, hemolysis.<sup>2, 4</sup>

Most cited literature stated that bacteremia and sepsis is a cause of neonatal jaundice in a seriously ill newborn.<sup>6, 8-10</sup> Others noted that jaundice may be one of the first signs of bacterial sepsis even in the first days of life.<sup>5, 9, 11</sup>

Although sepsis is the cause of jaundice in <2% of cases,<sup>5</sup> but about 30- 40% of septic newborns develop jaundice during their course of illness or present with it.<sup>6, 8, 12</sup> The clinical manifestations of sepsis are usually non-specific<sup>4, 5</sup> including temperature instability, apnea, and poor feeding, irritability or increase sleepiness.<sup>4</sup>

Some studies elicited that jaundice may be the only presenting sign as that found by Linder et al in a prospective study of 5805 full term newborns. They found that 3 out of 93 infants who were younger than 7 days of age were having sepsis.<sup>9</sup> Mora and Rodriguez reported that sepsis was found in 16 babies with unexplained jaundice.<sup>10</sup>

UTI can also present with jaundice,<sup>11</sup> which is in most cases unexplained and prolonged,<sup>4</sup> resisting different modalities of treatment as: starting adequate feeding, phototherapy and finally discontinuing breast milk for 24-48 hours.<sup>4, 12-14</sup>

Considering that the manifestations of UTI are also non-specific in neonates<sup>4, 11</sup> with devastating results if missing the diagnosis, physicians do perform a sepsis workup for all infants presenting with jaundice. In one study performed by Francisco et al, they found UTI in 7.5% of asymptomatic jaundiced infants younger than 8 weeks,<sup>4</sup> while in Seeler's expanded series in 1997: 24 bottle fed infants returned with moderate signs and symptoms of illness and later were found to have UTI,<sup>15</sup> this goes with our results as to exclude only healthy not ill infants from the sepsis workup protocol. On the other hand, Maisels and Kring performed

a prospective study and found no cases of sepsis nor UTI in 306 infants presented with jaundice during their first week of life.<sup>16</sup> Another prospective study on 400 neonates was done by S.H.Fakhraee et al in which he found that non had septicemia and only 2 (0.5%) had a positive urine culture.<sup>2</sup>

In our study, none of our neonates had a positive blood culture and only two (0.37%) had UTI, which is almost consistent with the results of most studies and with the general population of healthy neonates since the incidence of UTI in all newborns is around 0.1-1% (9).

### Conclusion

- It is not recommended to do a complete sepsis workup in otherwise healthy jaundiced newborn.
- This protocol is cost effective.

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## أهمية عمل فحص مخبري إنتاني كامل للأطفال الرضع الذين يعانون من الإصفرار

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### الهدف:

لمراجعة أهمية عمل فحص مخبري إنتاني شامل زراعة الدم والبول للأطفال الرضع الأصحاء الذين يعانون من الإصفرار الولادي فقط.

### الطرق:

تم دراسة 699 رضيعاً مكتمل النمو بين عمر 2 إلى 15 يوم، تم إدخالهم إلى مستشفى الملكة علياء العسكري في الفترة الممتدة من حزيران عام 2000 حتى كانون الثاني عام 2003.

كل طفل تم فحصه من قبل نفس طبيب الأطفال للتأكد من صحته العامة، وبعدها تم سحب العينات من قبل نفس طبيب الأطفال بالطرق الصحيحة.

### النتيجة:

تم استثناء 161 رضيعاً وفقاً للمعايير المتبعة. 248 ( 48%) كانوا فتيات و 270 ( 52%) أولاد. كانت نتائج زراعة الدم سلبية لهم جميعاً، بينما اثنان فقط وجد لديهم التهاب البول ( 0.37%).

### الخلاصة:

ليس ضرورياً عمل فحص مخبري إنتاني شامل للرضع الأصحاء الذين يدخلون بسبب الإصفرار الولادي.