

URINARY TRACT INFECTIONS AND NEONATAL JAUNDICE

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ABSTRACT:

The aims of this study were to determine the incidence of UTI in asymptomatic jaundiced neonates in the first two weeks of life, and to determine which historical and laboratory parameters are associated with UTI in those neonates. The study included 153 full-term jaundiced neonates less than two weeks old who had been admitted in hospital for management of jaundice. Work-up for hyperbilirubinemia as well as urinalysis and urine culture were performed in all patients. Patients were considered to have UTI, if $\geq 100\ 000$ colony-forming unit per ml of single pathogen was isolated from urine samples collected by urine bags. Sonography was requested to all cases with UTI. Ten (6.5%) of 153 patients had UTI. The isolated organisms were *E. coli* (60%) followed by *Klebsiella* (30%) and *Proteus* (10%). There was no significant association between gender, gestational age, body weight, mode of feeding, total serum bilirubin (TSB) levels and UTI, but there was significant in onset of jaundice, direct (conjugated) bilirubin level and mean of decrease serum bilirubin level with phototherapy among neonates with and without UTI. One (10%) of 10 patients with UTI had abnormal ultrasound result. In conclusion, the study revealed that UTIs can occur in asymptomatic jaundiced neonates, and it seems better to perform urine cultures if they have high level of direct bilirubin, onset of jaundice after 8 days of life and slow decrease in serum bilirubin level with phototherapy especially in male bottle-fed infants.

INTRODUCTION :

Jaundice is frequently encountered problem during the newborn period, up to 60% of term newborns have clinical jaundice in first week of life (1). The causes of neonatal jaundice are numerous, and may include infections, hemolytic, metabolic and endocrine disorders (2). Urinary tract infection (UTI) is common serious bacterial infection in young infants (3). Its incidence varies from 0.1-1% in neonates (4), and 5%-11% among febrile infants aged less than 8 weeks (5) and about 8% in newborn with jaundice (6-8). The clinical manifestations of UTI in neonate are extremely variable ranging from severe illness to non specific signs and symptoms such as lethargy, poor

feeding, fever and poor weight gain (9). Jaundice may be the first sign of UTI in asymptomatic infants before other signs and symptoms become evident (7), therefore some studies recommended that laboratory evaluation for UTI should be included as part of evaluation of infants with asymptomatic jaundice, but the American Academy of Pediatrics do not recommend an evaluation for such infections (10). The incidence of urinary tract abnormalities in infants with UTIs is between 30%-55% and the most common being vesicoureteric reflux (11,12). The aims of this study were to determine the incidence of UTI in neonates with asymptomatic, unexplained jaundice in the first two weeks of life, and to determine

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which historical and laboratory parameters are associated with UTI in those neonates .

MATERIALS & METHODS

This prospective study of 153 jaundiced neonates less than two weeks of age with TSB level >15 mg/dl who had been admitted for management of jaundice in maternity and children teaching hospital in Thi-Qar from June 2008 to December 2009. Clinical jaundice was defined as any yellow or green-yellow discoloration of skin , mucus membranes or sclera. Premature neonates, those with jaundice developed during the first 24 hr and those with fever or signs of sepsis were excluded from the study. Demographics and historical factors such as gender , gestational age ,bodyweight, mode of feeding , circumcision status and onset of the jaundice were recorded. Blood samples were taken from all the cases and their complete blood count ,serum bilirubin level (total and direct),coomb's test ,G6PD level ,maternal and neonatal blood group were evaluated.Serum bilirubin level rechecked 24 hr after phototherapy. In addition ,urine analysis and urine cultures were performed on specimens collected from clean voided urine by urine bags at time of admission . Urine culture considered positive if $\geq 100\ 000$ colony – forming units per ml of single pathogen was isolated After initial evaluation and treatment of the infants ultrasound were requested to all cases with UTI . The data were analyzed using SPSS soft ware. Descriptive data were reported as mean $\pm$ SD . Statistical significance was defined as P value < 0.05 .

RESULTS:

Of 153 patients enrolled in the study 81(53%) were male and 72(47%) were female. All male were uncircumcised .The

mean gestational age of all neonates was 38.6 weeks range (37-41weeks) and mean body weight was 3.32 kg range(2.61-4.25kg). Ten(6.5%) out of 153 jaundiced neonates were diagnosed to have UTI (based on positive urine culture). The most common bacterial pathogen isolated was E.coli (60%) , followed by Klebsiella(30%) and Proteus(10%). Bilirubin work-up was shown that dysmorphic RBC ,G6PD deficiency and fetomaternal incompatibility in ABO or Rh were of the most important causes of hyperbilirubinemia.Table(1) shows 6(60%)of patients with UTI were male and 4(40%) of them were female ,but this difference was not statically significant ($p > 0.05$). Although not statistically significant UTIs were observed more commonly in bottle-fed infants than breast-fed infants (10.8% vs 4% , $P > 0.05$). There was no significant difference between neonates with UTI and without UTI in respect of gestational age ,body weight and TSB at time of admission . Table (2) shows 126 (82%)of neonates had jaundice reported before or at 8 days of age and 27(18%) after 8 days. Patients with the reported onset of jaundice after 8 days of age had higher incidence of UTIs,(80% vs 20%respectvely, $p < 0.05$). A increase in the direct bilirubin level was found in 3(30%) of 10 patients with UTI, while non were noted in those without UTI ($P < 0.05$). The renal ultrasound revealed urinary tract abnormalities in one (10%)patient which is hydronephrosis

DISCUSSION:

In the present study the incidence of UTI among neonates with jaundice was 6.5% , and the most common pathogen isolated was E.coli. These findings are consistent with the results of other studies conducted by Garcia and Nagar (7)and Bilgen (13) ,where incidence of UTI was (7.5%, 8%) respectively, but the incidence was higher than reported (2.9%) by Chavalitdhamrong (14) in small series of asymptomatic jaundiced infants . Similar to the data indicated in the literatures and other studies (15,16) UTIs were found to

be more frequent in male .It is conceivable that the urethra of male is unable to prevent ascending infection during the first months of life and that perineal bacteria are present in large enough numbers at the meatus to allow attachment and ascension to the bladder (17). In this study UTIs were more frequent in formula -fed infants than breast -fed infants these results are in line with the study of Kring and Maisels(18),this difference is suggested to be due to immunological factors of the breast milk (19).Similar to that found by Garcia our study showed neonates with the reported onset of jaundice after 8 days of age when physiologic jaundice expected to have improved or resolved had higher incidence of UTIs. Although, It is well known that UTI can occurs without apparent signs , and jaundice is an important and sometimes the presenting sing of UTI (20), the initial TSB levels of the neonates with and without UTIs did not show significant differences , but significant differences was detected in direct bilirubin levels and mean of decrease in serum bilirubin levels with phototherapy,this results coincided with Sarici et al (21),conjugated hyperbilirubinemia is more commnly observed in jaundiced infants who have UTI when compared with infants with jaundice but without UTI.Similar results were obtained by Lee et al(22) newborns infants with UTI present with unconjugated hyperbilirubinemia in early stage but conjugated hyperbilirubinemia later. The mechanism by which UTI causes cholestasis is not clear , but possible mechanisms include microcirculatory changes in the liver , direct effects of

bacterial products and or endotoxin-induced mediators (23,24). Similar to other studies (7,13,25), body weight and gestational age were not associated with UTI. In contrast to the results of other studies (7,26,27) which showed high rate of urinary tracts abnormalities of infants with UTIs, this study showed urinary tract abnormalities in 10% of neonaes with UTI, this difference may be due to the smaller number of patients with UTI.

CONCLUTIONS:

The study revealed that UTIs can occur in asymptomatic jaundiced neonates in the first two weeks of life .In addition ,neonates with direct hyperbilirubinemia ,slow decrease in serum bilirubin levels and onset of jaundice after 8 days of life were more likely to have UTIs. Therefore , we suggest that UTIs must be considered in ineonates with jaundice and it is advised to perform urine culture if they have one or more of the following conditions:

- 1- High direct bilirubin level .
- 2- Slow decrease in serum bilirubin level with phototherapy .
- 3- Onset of jaundice after 8 days of age especially in male, bottle -fed infants .

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Table1:

distribution of demographic and historical characteristics of 153 neonates with and without UTI .

Characteristic	neonates with UTI (n=10)	neonates without UTI (n =143)	p. value
Gender:			>0.05
Male n (%)	6 (60%)	75 (52.4%)	
Female n (%)	4 (40%)	68 (47.6%)	
Gastational age (weeks):			>0.05
mean± SD	38.6 ± 0.7	38.5 ± 0.8	
Body weight (Kg) :			> 0.05
Mean ± SD	3.28 ± 0.59	3.4 ± 0.46	
Feeding status :			>0.05
Breast feeding n(%)	3 (4%)	71 (96%)	
Mixedfeeding n(%)	3 (7%)	39 (93%)	
Bottle feeding n(%)	4 (10.8%)	33 (89.2%)	
Onset of jaundice (days)			<0.05
≤ 8 days n(%)	2 (20%)	124 (86.7%)	
> 8days n (%)	8 (80%)	19 (13.3%)	

Table 2:

jaundice data of 153 neonates with and without UTI

Jaundice data	neonates with UTI (n=10)	neonates without UTI (n=143)	p.value
TSB (mg/ dl)			>0.05
Mean± SD	17 ± 1.94	17.2 ± 1.71	
Decrease of TSB after 24hrs			< 0.05
Of photo therapy mean ±SD	1.2 ± 1.65	3.8 ± 1.51	
Direct hyperbilirubin			<0.05
N (%)	3 (30%)	0	

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التهابات المسالك البولية واليرقان الولادي

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الخلاصة :

أهداف هذه الدراسة هو تحديد معدل الإصابة بالتهاب المسالك البولية في حديثي الولادة المصابين باليرقان الولادي والذين ليس لديهم أعراض مرضية في أول أسبوعين من العمر ، وتحديد أي من المقاييس التاريخية والمختبرية المتعلقة بالتهاب المسالك البولية عند أولئك المرضى . شملت الدراسة (153) مريضاً مصاب باليرقان الولادي الذين تم إدخالهم المستشفى لغرض العلاج الضوئي حيث تم إجراء تحاليل لليرقان الولادي بالإضافة إلى عمل فحص وزرع البول لجميع المرضى واعتبر المريض مصاباً بالتهاب المسالك البولية ، إذا تم عزل $100\ 000 \leq$ مستعمرة بكتيرية لكل مل من البول من عينات البول التي جمعتها أكياس البول حيث طلب أيضاً فحص الموجات فوق الصوتية لجميع الحالات المصابة بالتهاب المسالك البولية .

وكان معدل الإصابة بالتهاب المسالك البولية هو (6.5%) . والبكتريا المعزولة هي الاشريشيا القولونية (60%) تليها الكلبسيلا (30%) والبروتياس (10%). ولم تكن هناك علاقة بين معدل الإصابة بالتهاب المسالك البولية والجنس ، و مدة الحمل ، و وزن الجسم ، و طريقة التغذية والمستوى الكلي للbilirubin ولكن هناك فروق ذات دلالة إحصائية بين معدل الإصابة ومستوى bilirubin المقترن ، وبداية ظهور اليرقان ومعدل انخفاض bilirubin للعلاج الضوئي. نستنتج من هذه الدراسة أن عدوى المسالك البولية يمكن أن تحدث عند حديثي الولادة المصابين باليرقان الولادي والذين ليس لديهم أعراض مرضية ونقترح إجراء فحص وزرع البول لكل حديث ولادة مصاب باليرقان إذا كان لديه مستوى عالي من bilirubin المقترن أو انخفاض بطيء في مستوى bilirubin للعلاج الضوئي أو ظهور اليرقان بعد اليوم الثامن من العمر وخاصة عند الذكور والذين رضاعتهم من الزجاجة .