Journal of College of Education for Pure Sciences
Volume 8, Number 2, June 2018
Website: jceps.utq.edu.iq Email: jceps@eps.utq.edu.iq

Detection of neonatal jaundice and relationship with (TORCH) infections as a prolonged disease factor in Al-Nasiriya province

Ahmed N. Fayad
ahmed.fayad@sci.utq.edu.iq
Collage of Veterinary Medicine, University of Thi-Qar

Abstract

The present study included 180 infants blood samples were collected from Bint-Alhuda hospital at Al-Nasiriya province during a period of October 2016 to March 2017, ninety of them were newborn infants in the first week of their life compliant a severe hyperbilirubinemia, other 90 samples were normal healthy infants as control group.

A questionnaire sheet was filled out for each infant studied which included, age of mother ,Age of gestation, weight of baby , blood group of both mother and her infant, area of residence and medical history then statistically analyzed.Hemoglobin ,packed cell volume (PCV) and level to of total serum bilirubin were measured in all samples studied including jaundice infants.

It was noticed increases in the incidence of jaundice with infants whoseweight less was than 2 Kg and significant differences were documented between urban rural residences of mother with jaundice infants . It was also noted elevation in the level of TSB among jaundice infants, significant correlation between weight and age of infants studied or age of mother and the level of TSB , HB and PCV of studied infants.

The present study also recorded a relation between maternal blood group and jaundice where it increase with O blood specially Rh(+ve).

In concern with Torch infection (Toxoplasma, Rubella, Cytomegalovirus and Herpes) and its relation with prolong of jaundice (staying in hospital loner than 14 days), its show positive results with all samples for this group

Keywords: Jaundice,TORCH, ELISA.

مجلة كلية التربية للعلوم الصرفة - جامعة ذي قار
المجلد ٨، العدد ٢، حزيران ٢٠١٨
Website: jceps.utq.edu.iq Email: jceps@eps.utq.edu.iq

الكشف عن اليرقان الولادي وعلاقته بإصابات الـ TORCH كعامل في اطالة المرض لمدينة الناصرية

احمد ناصر فياض

ahmed.fayad@sci.utq.edu.iq

كلية الطب البيطري, جامعة ذي قار

الخلاصــة

هذه الدراسة تضمنت ١٨٠ عينة دم لرضع جمعت من مستشفى بنت الهدى في مدينة الناصرية للفترة من شهر تشرين الاول ٢٠١٦ الى شهر اذار ٢٠١٧, تسعون عينة منهم لرضع حديثي الولادة في الاسبوع الاول من حياتهم يعانون من فرط بيليروبين الدم الشديد, العينات التسعون الاخريات جمعت من رضع سليمين معافين كمجموعة سيطرة.

اعدت ورقة استبيان لكل رضيع لغرض دراستها تضمنت, عمر الام, مدة الحمل, وزن الرضيع, مجموعه الدم للطفل والرضيع, المنطقة و التاريخ الطبي وخضعت بالنهاية للتحليل الاحصائي.

تم قياس كلا من خضاب الدم, حجم الخلية الكلي و نسبة البيليروبين في مصل الدم الكلية في جميع العينات للرضع المصابين باليرقان.

لوحظ زيادة في نسبة حدوث اليرقان مع نقصان وزن الرضع عن ٢ كيلوغرام كذلك لوحظ فرق محسوس بين سكنة الريف والمدينة. سجلت مستويات البيليروبين في مصل الدم للرضع لمصابين باليرقان ارتفاعا وانحرافا محسوسا بين الوزن والعمر للرضع الخاضعين للدراسة او عمر الام ومستوى البيليروبين في مصل الدم الكلي, خضاب الدم, حجم الخلية الكلي.

فيما يتعلق بتأثير اصابات مجموعة التورج (التوكسوبلازما, الروبيلا, الفيروس المضخم للخلايا والهربس) وعلاقتها بطول فترة المرض (الرقود في المستشفى لأكثر من ١٤ يوم) , اظهرت نتائج فحص الاليزا نتائج موجبة للإصابات في جميع العينات.كلمات البحث: اليرقان, **TORCH**, الاليزا

Introduction

Neonatal jaundice or Neonatal hyperbilirubinemia is a yellowing of the skin and other tissue of a baby. A bilirubin level of more than 5mg/dl shows clinical jaundice in neonates (1). Infant jaundice is distinguished by whitening the skin with computerized weight so it uncovers basic skin and subcutaneous tissue , sclera and yellowing of the face stretching out down onto the chest (2).

In neonatal the dermal icterus is first noted in the face as the bilirubin level ascents continues caudal to the storage compartment and after that to the furthest points ,this condition is regular in infants influencing over half (50-60%) of all children in the primary seven day stretch of life (3).

Famously incorrect general guidelines have been connected to the physical exam of the embittered newborn child some incorporate estimation of serum bilirubin in view of appearance(4). One such dependable guideline incorporates babies whose jaundice is limited to the face and part of the storage compartment over the umbilicus , have the bilirubin under 12mg/dl (less risky level) .Infants whose palms and soles are yellow have serum bilirubin level over 15 mg/dl with more genuine level(5).

Contemplated have demonstrated that prepared inspectors evaluation of level of jaundice indicate direct concurrence with icterometer bilirubin estimations (6).

Newborn children jaundice can be measured utilizing obtrusive or non-intrusive strategy . In non-intrusive technique ingram icterometers and Transcutaneous bilirubin meters are utilized(7).

Delayed hyperbilirubinemia (serious jaundice) can bring about to perpetual bilirubin encephalopathy (Kernicterus)(8). Quik and precise treatment of neonatal jaundice lessens the danger of neonates creating kernicterus (8). An impact of kernicterus is a fever .A male full term neonate had hyperbilirubinemia (Kernicterus) and jaundice at 4 years old days old he showed manifestations of expanded torpidity , refusal to eat and had a fever the neonate who was determined to have kernicterus shown side effects of a fever (9). Another impact of kernicterus is seizures .The neonatal Unit at Allied Hospital Faisalabad thinks about 200 neonatal of either sex who exhibited seizures amid their doctor's facility from April 2003 to June 2004 .The seizures were assessed and one reason for the seizures was kernicterus 4.5% or 9% neonatal, showed seizures caused by kernicterus (10).

Extreme neonatal jaundice may demonstrate the nearness of different conditions adding to the hoisted bilirubin levels of which there are a vast assortment of conceivable outcomes , These ought to be identified or rejected as a major aspect of the differential finding to keep the advancement of intricacy (11).

CMV is the most common cause of congenital infection, and 60% to 80% of symptomatic children can have hepatosplenomegaly and jaundice (30). Other TORCH infections (Toxoplasmosis, Other infections, Rubella, Cytomegalovirus infection and Herpes simplex) may have hepatosplenomegaly

and jaundice as part of the congenital infection(20). Hepatotropic viruses (hepatitis A, B and C) rarely cause neonatal jaundice. Hepatitis B and C are vertically transmitted and are usually subclinical, although hepatitis B may cause a neonatal hepatitis(30).Conjugated hyperbilirubinemia may occur with bacterial sepsis, especially urinary tract infection and this must be ruled out with the initial investigations(15).

The objective of this study to detect the effect of TORCH infection (Toxoplasms, Rubella, Cytomegalovirus and Herpes virus)in the prolongation of neonatal jaundice, to studythe relation between weight and age of infant studied or age of mother and the level of TSB,HB,and PCV of newborn infants,and to signify the relation between maternal blood group and Rh+ve type of their infants with jaundice.

Materials and Methods

1- Collection of samples

A total of 180 infant blood samples were collected from Special Nursing Home and Bent AL-Huda Hospital at Nasiriya city during a period of October 2016 to March 2017 ,90 newborn infants in the first week of life compliant a severe hyperbilirubinemia , other 90 was normal infants as control group . A questionnaire sheet was filled out for each infant studied which included, age of moth, Age gestation, weight of baby, blood group of both mother and her infant, area of residence and medical history.

2- Total serum bilirubin (TSB) was a calorimetrically measured in samples of infant according to Shmidt procedure (12).

3-Estimationof HB Cynomethemoglobinmethod (The Photometricmethod): Bythe Ranganathan(13).

3-Antibodies were detected by the Enzyme Linked Immune Sorbent Assay (ELISA)IgGkit (Foresight, Acon Laboratories, San Diego, USA) for TORCH infection (Toxoplasma, Rubella, Cytomegalovirus and Herpes virus) .

Statistical analysis

Chi- Square test was used for statistical analysis of the data. Also, standard deviation was calculated for ELISA test (SPSS Version 15).

Results

Table(1) and figure (1) show the distribution of jaundice in infants by weight ,it wasnoticed increases in the incidence of jaundice which infant who weigh less was than 2Kg , the prevalence was 64.44% ,35.65% at $P<0.05$ using Fischer exact probability test.

Table1: Distribution of Juandice among infant by weight.

Infant weight	No.	%
Weight less than 2Kg	58	64.44a
Weight more than 2Kg	32	35.56b

a, b: there was in significant difference between similar litter at P<0.05 using Fischer exact probability test

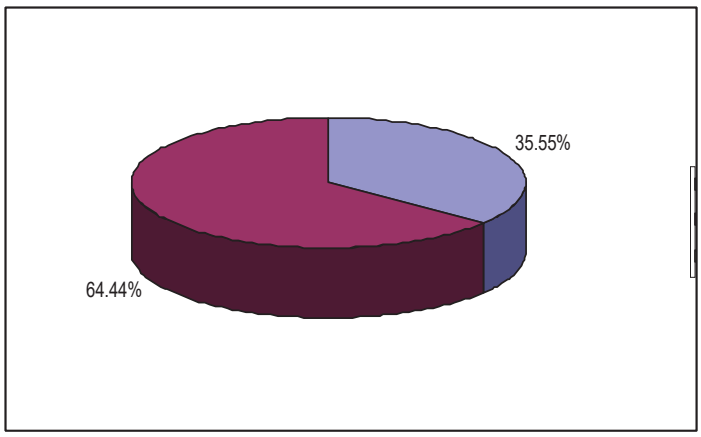

Figure 1 Distribution of Juandice in infant by weight

Table (4) shows significant correlation between the mean average of infant weight , age of mother ,gestational age which risk of icterus by using and ANOVA test (_Mean S.D0.7, 2.67,6.89).

Significant differences were documented between urban and residences of mother which jaundice infant as appear table (2) and figure (2) there was significantly highest percentage in urban and infant who was less than 2Kg weight (65.56%)followed by rural less than 2Kg (34.44%) then urban more than 2Kg weight (38.89%) and lastly rural which less than 2Kg infant weight percentage (25.56%) at P<0.05 using Fischer exact probability test.

Table 2: percentage of jaundice infants studied in content to resident area

Type of Residence	No.less Than2Kg Baby weight	(%)	NO.	%	No.more Than2K Baby weight	(%)
Urban	59	65.56	35	38.89a	24	26.67b
Rual	31	34.44*	23	25.56b	8	8.89 c
Total	90	100	58	64.44	32	35.65

* significant difference. A , b , c , there are insignificant difference between similar litter at P<0.05 using Fischer exact probability test.

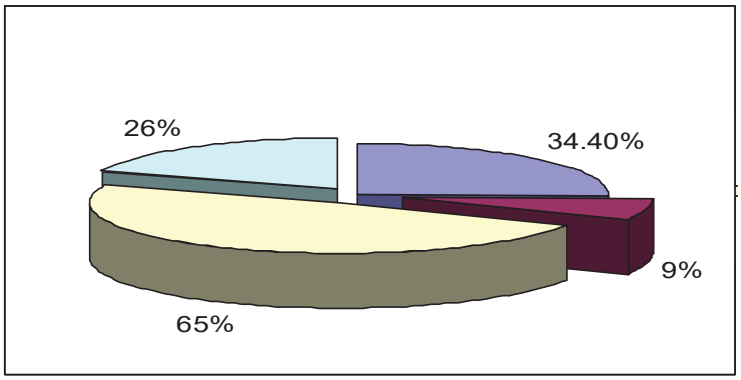

Figure2 : percentage of infant weight in contrast to resident area

Table(3) shows the correlation between weight and age of infant or age of mother which some abnormal level of some blood test of infant included in this study . As appeared from this table it was noted elevation in the level of TSB among jaundiced infant, significant correlation between weight and age of infant studied or age of mother and the level of TSB ,HB and PCV of studied infant.

Table 3: correlation between weight and age of infant or age of mother whith someblood test include in this study.(Mean±SD).

Infant weight	TSB	PCV	Hb	Time of domi
Correlation whith	0.195645	0.076483	0.006344	0.17484−
Correlation whith baby age	0.174756	0.042904	0.00602−	0.13045−
Correlation whithmother age	0.010582	0.21073	0.139976	0.062122

Table 4: Correlation between risk of jaundice and infant weight, Age of gestation and mother.(Mean±SD)

Mean	Infant weight (2Kg)	Age of gestation (week)	Age of mother (years)	Time of domi (days)
Average	2.36	31.87	26.58	5.74
Minimum	1	22	15	0
Maximum	4.3	35	46	20
Standard Deviation	0.74	2.67	6.89	4.13

Table(5) and figure(3) shows relation between mother and similar infant blood group which the incidence of jaundice in all sample studied it was appeared that there was significant relation between infant and mother blood group with jaundice where it increase which O blood group specially Rh + ve(55.56%) at P<0.05 using Fischer exact probability test.

Blood Group System	Infant blood group		Mother blood group		Similar infant and mother blood group	
	No.	%	No.	%	No.	%
A+	21	23.33b	19	21.11b	5	27.78 b
B+	20	22.22b	5	5.56 c	1	5.56 c
AB +	7	7.78c	4	4.44 c	0	0
O+	34	37.78a	41	45.56a	10	55.56a
A-	0	0	2	2.22c	0	0
B-	0	0	8	8.89 c	0	0
AB-	0	0	0	0	0	0
O-	8	8.89	11	12.22	2	11.11
Total	90	100	100	100	18	100

Table 5: Relation between infant and mother and similar infant and mother blood group whith the incidence of jaundice in all sample studied

a , b ,c , there are insignificant difference between similar litter at P<0.05 using Fischer exact probability test.

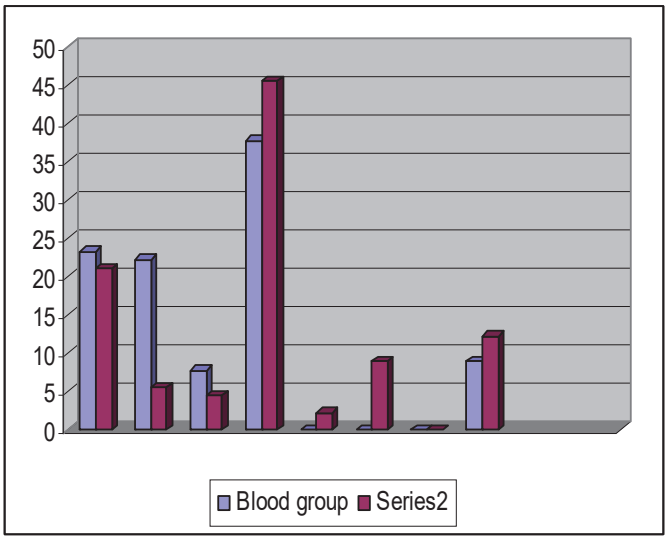

Figure3 Relation between baby and mother blood group and incidence of jaundice in all sample studiedPlasma bilirubin (TB) level greater than 1 mg/dl

In table 6 we show the effect of infections on prolong of neonatal jaundice , which the prolong incidence of jaundice in some sample studied there were positive with ELISA against IgG of (TORCH) infections .

Table6:Relation between Duration of Prolong neonatal infant (Staying in hospital) with infection.

No. of Prolong neonatal infant	Result	Duration
6	Cytomegalovirus +	14-21 days>
5	Toxoplasma +	
3	Rubella +	
0	Herpes +	

Discussion

Jaundice is an important problem in the first week of life. It is a cause of concern for the physician and a source of anxiety for the parents(14). CNS developing may be toxicby level of Bilirubinand may lead to of impairment of neurological impairment even in term newborns, Nearly 60% of term newborn becomes visibly jaundiced in the first week of life(15).

The present study documented increases in the risk of citrus with infants with low weight (less than 2kg), and with less 35 weeks period of gestation , the result was agree withMadlon-Kay and

Blackmonwho documented that lower gestational age babies are at higher risk of developing hyperbilirubinemia (16), (17).

A very low birth weight infants run the higher risk of Kernicterus and brain injury due to hyperbilirubinemia. they need therefore a quicker therapeutic approach, though the treatment of physiologic hyperbilirubinemia must always be planned on the basis of gestational age(17) .

The current study also recorded elevation in the level of TSB among jaundiced infants . the liver of a newborn may be too immature to keep up with bilirubin removal(18) , causing bilirubin to build up in the blood, this build-up turns skin and, sometimes, the white part of eyes yellow. Premature babies have especially immature livers, making jaundice more likely (17).

Normally, the liver removes bilirubin from the blood and changes it into a form that can be passed from the body in bowel movements. In the newborn period, more red blood cells can break down than at most other times, creating more bilirubin to handle, almost all newborn infants develop a total serum.It produces neonatal jaundice ,the yellowish discoloration of the skin and /or sclera caused by bilirubin deposition (19).

The present study document a significant relation between maternal bloodgroup and jaundice where it increase which O blood group specially Rh +ve , this result was agreement which (15) but was not agree which VinaySatish (20).

Rh hemolytic disease may relate which severe anemia hydrops and PCV level at birth . the common causes of hemolytic jaundice include Rh hemolytic disease,ABO incompatibility ,G-6-PD deficiency and minor blood group incompatibility (21).

The evidence of congenital rubella was seen in 2% of children with suspected congenital infection, which is at par with the declining trend in the incidence of congenital rubella syndrome from 34.5% in 1988 to 0% in 2002 as observed by Gandhoke (4) and is much less than the earlier reports of 10-20%(5), (6). The observation was similar in recent studies ,wherein IgG positivity was observed only in 1% of pregnant women. However, 3-9% rubella IgG positivity has been shown in asymptomatic (8).pregnant women by other investigators(9). Recent studies have shown that the majority of pregnant women in the Indian population are immune to rubella thereby leaving only a few susceptible to contract acute rubella infection. In this study, the overall IgG positivity in women with obstetric complications was 3.4%(9). In this study, laboratory evidence of CMV infection in the form of IgG antibodies were found in 5% of suspected infants with congenital infection(4). Ganghokehave reported IgG positivity of 18.75% in infants and children, respectively with congenital infection. Presently, the overall incidence of CMV in women of child bearing age was 7.8%. No difference was observed in IgG positivity among asymptomatic pregnant women and those with obstetric

complications. Considering the fact that transmission to fetus occurs in about 40% of the cases with primary infection and results in the delivery of about 10-15% symptomatic and 85-90% asymptomatic congenitally-infected newborns(22), the authors do not feel the need for routine screening for CMV in all antenatal cases. The 7.8% IgG positivity in asymptomatic pregnant women seen in our study is similar to earlier Delhi-based studies(23) However, some studies from India(14), have observed a higher positivity of 13-20% in asymptomatic pregnant women. In our study, we observed significantly higher CMV positivity in infants presenting with jaundice, whereas significantly higher rubella positivity was seen in infants presenting with dysmorphism.

Conclusion

The incidence of jaundice was in increase with newborn infants who weigh less was than 2 kg and gestational age less than 35 weeks.Newborns detected to have yellow discoloration of the skin should have an urgent laboratory detected to have yellow discoloration of the skin should have an urgent laboratory confirmation for levels of TSB,HB and PCV in blood sample of new born babies .There wasrelation between weight, age of infants and age of their mothers with abnormal level of TSB, HB and PCV in blood sample of newborn. Significant correlation was noted between the risk of jaundice and infants weight, age of gestation and mothers. Blood group of and Rh blood typing of mother and her baby should be tested to facilitate early treatment of jaundice .There was relation between prolong of jaundice and TORCH infection.

References

[1] Lee, J.; Reyes, B. A.; McManus, D.D.; Mathias, O. and Chon, K.H. (2012). Atrial fibrillation detection using a smart phone. Annual International Conference of the IEEE Engineering in Medicine and Biology Society, 1177–80.

[2]Agu, E., Pedersen, P., Strong, D. (2013).The smartphone as a medical device: Assessing enablers, benefits and challenges. IEEE International Workshop of Internet-of- Things Networking and Control.76– 80.

[3] Akrman, I; Arika, C.; Bilgen, H; Kalaca, S. and Ozek, E. (2002). Transcutaneous measurement of Bilirubin by Ivterometer during phototherapy on Bilibed. Turkish J. Med. Sci. 32 :165-168.

[4] Lee, J., Reyes, B. a, McManus, D.D., Mathias, O., and Chon, K.H. (2013). Atrial fibrillation detection using an iPhone 4S. IEEE Transactions on Bio-Medical Engineering 60(1)203–6.

[5]Bhutani, V.; Johnson, L. and Sivieri, E. (1999). Predictive ability of a predischarge hour-specific serum bilirubin for subsequent significant hyperbilirubinemia in healthy term and near-term newborns. Pediatrics 103: 1.

[6] Bhutani, V.K.; Stark, A.R. and Lazzeroni, L.C., (2013). Predischarge Screening for Severe Neonatal Hyperbilirubinemia Identifies Infants Who Need Phototherapy. The Journal of pediatrics. 162(3) 477–482.

[7] Bland, J.M. and Altman, D.G. (1986). Statistical Methods for Assessing Agreement Between Two Methods ofClinical Measurement. The Lancet, 307–310.

[8] Boulanger, C.; Boulanger, A.; de Greef, L. (2013). Stroke rehabilitation with a sensing surface. ACM CHI Conference on Human Factors in Computing Systems.

[9] Bourouis, A.; Feham, M.; Hossain, M. a. and Zhang, L. (2014). An intelligent mobile based decision support system for retinal disease diagnosis. Decision Support Systems 59: 341–350.

[10]Breiman, L.E.O. (2001). Random Forests. Machine Learning 45(1):5–32.

[11] Brunori, P., Masi, P. and Faggiani, L. (2011). Evaluation of bilirubin concentration in hemolysed samples, is itreally impossible? The altitude-curve cartography approach to interfered assays. Clinicachimicaacta; international journal of clinical chemistry 412, 9(10): 774–7.

[12] Schmidt, H. G. (1993).Foundations of problem-based learning: some explanatory notes. Med. Edju. J. 27(5):422-432.

[13] Ranganathan, H. and Gunasekaran, N.(2006).Simple method for estimation of hemoglobin in human blood using color analysis.IEEE Trans. Inf. Technol. Biomed.10(4):657-62.

[14] Pedregosa,F.;Weiss,R.andBrucher,M. (2011).Machine Learning in Python. Journal of Machine Learning Research 12.2825–2830.

[15] Gomez M, Bielza C, Fernandez,D .;Pozo JA, Rios-Insua , S (2007).A graphical decision-theoretic model for neonatal jaundice . Med. Decis Making 27 (3): 250-65

[16] Madlon-Kay ,F and Diane, J.(1997). Recognition of the Presence and Severity of Newborn Jaundice by Parents.Nurses, Physicians, and Icterometer Pediatrics. 100: 3

[17] Blackmon, L.R. (2004). Research on Prevention of Bilirubin-Induced Brain Injury and Kernicterus.National Institute of Child Health and Human Development Conference Summary . Pediatrics,114: 229-233.

[18]Poland, R.L.; Schultz G.E and Gayatri , G.(1980).High milk lipase activity associated with breast milk jaundice.Pediatr. Res. 14: 1328-31 .

[19] Dennery, Pa.; Seidman , D,S and Stevason ,D.K. (2001) Neonatal jaundice . N. Englan. J. Med. 344-355

[20]VinaySatish, K.; Madhukar, S. D. and Costas D. M. (2007). Optimization based automated curation of metabolic reconstructions. Methd. Artic. J. 8(212): 1-16.

[21] Hold, S. (2004). Management of hyperbilirubinemia in the newborn infant 35 or more weeks of gestation. Pediatrics. J. 114 (1) : 297-316 ..

[22]Onorato IM, Morens DM, Martone WJ, Stansfield SK. Epidemiology of CMV infections: Recommendations for prevention and control. Rev. Infect. Dis. 1985;7:479-97.

[23] Revello MG, Gerna G.(2002). Diagnosis and management of human cytomegalovirus infection in the mother, fetus and new born infant. Clin.Microbiol. Rev.15:680-715.