CORRELATION BETWEEN SERUM ALBUMIN LEVELS AND NEONATAL SEPSIS IN PRETERM INFANTS

By

Mahmoud AbdelaallbrahimAbdelaal*,AtefElsayedDonia*, Abdelsattar Abdullah Kamel Elsayeh*,Mohamed Saeed Al shorbagy* *
Pediatric *& Clinical Pathology**Depts. Al-Azhar University-Faculty of Medicine

ABSTRACT

Background*: Neonatal sepsis(NS) defined as life threatening organ dysfunction caused by a dysregulated host response to infection, the presence of systemic inflammatory response syndrome (SIRS) accompanied by an infection in the presence of one or more vital organ dysfunction.*

Objective*s: We aimed to evaluate the clinical value of serum albumin levels for severity, morbidity and mortality of preterm infants with sepsis.*

Patients & Methods: *This prospective, comparative study included 50 neonates with documented sepsis. Cases are selected from neonatal intensive care unit (NICU) at AL Hussein University hospital. During the period from July 2017 to April 2018. Complete clinical examination, history taking and laboratory investigation including albumin was done.*

Results: *The Results showed that sepsis in male (52%) was higher than in female (48%) , Gestational age in studied group range from 28 weeks up to 36 weeks, birth weight in studied group range from 0.90 kg up to 2.60 kg, the most common blood group was (A+) representing (46 %), (92 %) of them delivered by cesarean section (CS) and(88 %) of them were single birth , the serum albumin levels in 1^{st} day range from 2.50 – 4.20 gm./dl and it is low in 35 patients representing (70%) of the studied groups with neonatal sepsis in Comparison to patients with normal serum albumin levels which occurs in 15 cases representing (30%) of the studied groups with neonatal sepsis .The serum albumin levels in 7^{th} day range from 1.80 – 4.30 gm./dl and it is low in 37 patients representing (74%) of the studied groups with neonatal sepsis in Comparison to patients with normal serum albumin levels which occurs in 13 cases representing (26%) of the studied groups with neonatal sepsis .The study show that sepsis among patients with low serum albumin levels was higher than in patients with normal serum albumin levels in 1^{st} day and 7^{th} day.*

Conclusion: *Hypoalbuminemia was frequent among neonates with sepsis. Lower albumin levels might be associated with a poorer prognosis. Albumin levels could be appropriate for the diagnosis and prognosis of preterm neonates with sepsis. Hypoalbuminemia was associated with severe adverse outcomes.*

Key words: *Intensive Care Units, neonatal sepsis, preterm, serum albumin.*

INTRODUCTION

Neonatal sepsis(NS) defined as life threatening organ dysfunction caused by a dysregulated host response to infection, the presence of systemic inflammatory response syndrome (SIRS) accompanied by an infection in the presence of one or more vital organ dysfunction **(Singer M and Deutschman CS, Seymour CW, et al.,2016).**

Neonatal sepsis remains one of the main causes of mortality and morbidity despite the progress in hygiene. introduction of new potent antimicrobial agents for treatment and advanced measures for diagnosis **(Brzychczy-Wloch M , Borszewska-Kornacka M, Gulczynska E and Wojkowska-Mach J, et al.,2013).**

Surviving infants may have serious sequel as a consequence of central nervous system involvement septic shock or hypoxia resulting from severe parenchymal lung disease **(Hornik CP, Fort P, Clark RH, Watt K, Benjamin DK Jr, Smith PB, Manzoni P, Jacqz-Aigrain E, Kaguelidou F and Cohen-WolkowiezM,et al .,2012).**

World Health Organization (WHO) estimates that 1 million deaths per year (10% of all under-five mortality) are due to NS and that 42% of these deaths occur in the 1st week of life **(OzaS, E Lawn J, Hogan DR, Mathers C and Cousens NC et al., 2014).**

Low serum albumin levels in critically ill patients are associated with the inflammatory response intensity to infections **(Al-Subaie N, Reynolds Tand Myers A et al., 2010).**

Low serum albumin levels are very common in critically ill patients, with reported incidences as high as 40 – 50% **(Ulldemolins M, Roberts JA and Rello J et al., 2011).**

AIM OF THE WORK

Evaluating the clinical value of serum albumin levels for severity, morbidity and mortality of preterm infants with sepsis.

PATIENT AND METHODS

This prospective, comparative study included 50 neonates with documented sepsis. Cases are selected from neonatal intensive care unit (NICU) at AL Hussein University hospital .During the period from July 2017 to April

2018. Complete clinical examination, history taking and laboratory investigation including s. albumin was done.

Inclusion criteria:

1. Preterm infants (< 37weeks).
2. Early onset sepsis.

Exclusion criteria:

1. Full term ≥ 37weeks.
2. Neonate with no sepsis.
3. Hypoxic Ischemic Encephalopathy.
4. Suspected inborn error of metabolism.
5. Patients received blood or blood products before the blood sampling

Financial disclosure /funding:

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Ethical consideration:

1. A written informed consent was obtained from patients or their legal guardians.
2. Informed consent was obtained from neonatal intensive care unit (NICU) at AL Hussein University hospital.
3. An approval by the local ethical committee was obtained before the study.
4. The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.
5. All the data of the patients and results of the study are confidential and the patients have the right to keep it.

At the start of study, an explanation of the study was provided, as well as details of participation, to ensure the potential participant had adequate information to provide informed consent.

Plan of study:

All patients were subjected to all the following:

- Obstetric history: - type of delivery, gestationalage, any association medical problems with the pregnancy.
- Route of feeding and the type of milk.
- Growth assessment of the neonate.
- Current medication.
- Complete clinical examination with emphasis on presence of the sign and symptoms of the Neonatal sepsis which include the following:

  1. General:

Lethargy - Cyanosis - Refusal to suckle - Poor cry - comatose - Fever - Seizures - Hypothermia Blank look - Poor perfusion - High pitched cry – Sclerema - Excessive crying/irritability - Poor weight gain - Shock - Bleeding-Renal failure.

2. Local:

Tachypnea - Chest retractions - Apnea/gasping - Grunting - Abdominal distension – Diarrhea - Vomiting - Neck retraction - Bulging fontanel.

- Follow up of the patients until discharge and assessment of morbidity and mortality.

Investigations:

Laboratory investigations:

1. Complete blood count (CBC): HB concentration, red cell count, white cell count and platelets were done automatically by Sysmex (Kx-21N) automated hematological counter.
2. Blood cultureby The BacT/ALERT® 3D 60 automated blood culture systems (BioMérieux, France) was used to process all samples.
3. Serum Albumin Levels byautomated cobas c311 analyzer - Roche.
4. Serial C-reactive protein by manual latex omega is a rapid latex agglutination test kit for the detection of C - reactive protein (CRP) in human serum.
5. Serum electrolytes by automatedcobas c311 analyzer - Roche.
6. Arterial blood gases: GEM Premier 3000 to determination of pH, PCO2, BE, HCO3, PO2, and O2saturation.
7. Liver enzymes (ALT-AST) by automatedcobas c311 analyzer - Roche.
8. Renal function (Urea-Creatinine) by automatedcobas c311 analyzer - Roche.

Statistical analysis:

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. **(Armonk, NY: IBM Corp)Kirkpatrick LA and Feeney BC et al., 2013)** Qualitative data were described using number and percent.The Kolmogorov-Smirnov test was used to verify the normality of distribution Quantitative data were described using range (minimum and maximum), mean, standard

deviation and median. Significance of the obtained results was judged at the 5% level **(Kotz S, Balakrishnan N and Read CB et al., 2006).**

The used tests were: **Chi-square test** for categorical variables, to compare between different groups. **Fisher's Exact or Monte Carlo correction** for chi-square when more than 20% of the cells have expected count less than 5. **McNemar** Used to analyze the significance between the different stages. **Paired t-test** for normally distributed quantitative variables, to compare between two periods. **Mann Whitney** test for abnormally distributed quantitative variables, to compare between two studied groups. **Wilcoxon signed ranks test** for abnormally distributed quantitative variables, to compare between two periods.

RESULTS

Table (1): Demographic Characteristic of Studied Group (n= 50)

Items	No.	%
Sex		
Male	26	52
Female	24	48
Gestational age (weeks)		
Range	28 – 36	
Mean ± SD.	33.62 ± 1.94	
Median	34	
Birth weight (kg)		
Range	0.90 – 2.60	
Mean ± SD.	1.76 ± 0.42	
Median	1.81	
Blood group		
A+	23	46
A-	2	4
B+	6	12
B-	2	4

AB+	8	16
O+	8	16
O-	1	2
Mode of delivery		
NVD	4	8
CS	46	92
Number of birth		
Single	44	88
TWINS	6	12
Age at admission		
< 24 hrs.	50	100
Stay in hospital (weeks)		
Less than 1 weeks	12	24
2 weeks -	24	48
3 weeks -	8	16
4 weeks	6	12
Range	7 – 24	
Mean ± SD.	12.66 ± 5.09	
Median	12	

This table shows the following characteristic for the studied patient : Fifty two percent were male and were 48% female , their gestational age ranged from 28 to 36 weeks , their birth weight ranged from (0.90 – 2.60) kg , the most common blood group was (A+) 46 %, 92 %of them delivered by cesarean section (CS) ,88 % of them were single birth.

Table (2): Distribution of the Studied Cases According to Risk Factor for Sepsis (n= 50)

Risk factor for sepsis	No.	%
PROM (>18 hrs.)	31	62
Maternal fever (>38°C)	4	8
Maternal UTI	22	44
Maternal HTN	6	12
Maternal HGE	2	4

This table shows that the most frequent risk factor for sepsis in our studied group was premature rupture of membranes (PROM)>18 hours representing 62% followed by maternal urinary tract infection (UTI)representing 44%.

Table (3): Serum Albumin Levels in Studied Group at 1st day and 7th day (n = 50)

Serum albumin level (gm./dl)	1st day	7th day	t	p
Range	2.50 – 4.20	1.80 – 4.30	1.248	0.218
Mean ± SD.	3.03 ± 0.36	2.99 ± 0.39		
Median	2.93	3.0		

This table shows that there was No significant difference between Serum albumin levels at 1st and 7th postnatal day in Studied Group.

Table (4): Types of Neonatal Sepsis in Studied Group (n = 50)

Types of sepsis	No.	%
Early onset sepsis	46	92
Late onset sepsis	4	8

This table shows that early onset sepsis represented 92% while late onset sepsis represented 8%.

Table (5): Distribution of the Studied Cases According to Blood Culture in the Studied Group (n= 50)

Blood culture	No.	%
Negative	1	2
Positive	49	98
E.coli	17	34.7
enterococc	5	10.2
GBS	13	26.5
Klebsiella	4	8.2
Pseudomon	5	10.2
Staph aureus	5	10.2

This table shows that only one patient had –ve blood culture and the other were +ve blood culture. The most frequent organism was

Escherichia coli (E. coli) representing 34.7% followed by Group B Streptococcus (GBS) representing 26.5%.

Table (6): Correlation between Serum Albumin with Stay in Hospital in the Studied Group (n = 50)

Stay in hospital(weeks)	Serum albumin				[illegible]	MCp
	Normal level		Low level			
	No.	%	No.	%		
1st day	**(n = 15)**		**(n = 35)**			
Less than 1 week	6	40.0	6	17.1	5.103	0.147
2 week	6	40.0	18	51.4		
3 week	3	20.0	5	14.3		
4 week	0	0.0	6	17.1		
7th day	**(n = 13)**		**(n = 37)**			
Less than 1 week	5	38.5	7	18.9	4.284	0.228
2 week	5	38.5	19	51.4		
3 week	3	23.1	5	13.5		
4 week	0	0.0	6	16.2		

This table shows that there was no significant difference between serum albumin level and duration of stay in hospital.

Table (7): Comparison Between 1st day and 7th day regarding to Laboratory Findings in the Studied Group (n= 50)

	1st day		7th day		Test of Sig.	p
	No.	%	No.	%		
CRP (mg/L)						
Negative (<6)mg/L	4	8.0	31	62.0	McN	<0.001*
Positive (>6)mg/L	46	92.0	19	38.0		
Range	12.0 – 48.0		12.0 – 48.0		Z =1.508	0.132
Mean ± SD.	17.74 ± 7.48		19.58 ± 9.13			
Median	12.0		24.0			
WBCs(×10³/cmm)						
Range	3.90 – 29.0		5.30 – 29.60		Z =0.222	0.824
Mean ± SD.	10.74 ± 3.65		11.75 ± 5.77			
Median	10.60		10.40			

Plat(×10³/cmm)				
Range	50.0 – 348.0	55.0 – 463.0	Z=2.964*	0.003*
Mean ± SD.	214.7 ± 61.92	174.5 ± 87.37		
Median	197.0	187.5		
Hb (gm/dl)				
Range	11.90 – 19.0	9.30 – 17.0	t = 10.008*	<0.001*
Mean ± SD.	15.92 ± 1.44	12.91 ± 2.17		
Median	16.0	13.0		

P: P value for comparing between 1st day and 7th day.

*: Statistically significant at p ≤ 0.05.

This table shows that there was significant difference between the results of CRP in the 1st and 7th postnatal days being more positive in the 1st day and also the difference was significant regarding platelet count being lower in the 7th day result. While no significant difference between 1st and 7th day laboratory results regarding WBCs count and hemoglobin level.

Table (8): Relation between Serum Albumin Level and CRP Level and WBCs count at 1st& 7th day in the Studied Group (n = 50)

	Serum albumin 1st day				Test of sig.	p	Serum albumin 7thday				Test of sig.	p
	Normal level S.albumin (n= 15)		Low level S.albumin (n=35)				Normal level S.albumin (n= 13)		Low level S.albumin (n= 37)			
	No.	%	No.	%			No.	%	No.	%		
CRP mg/l												
Negative (<6) mg/l	0	0	4	11.4	χ^2= 1.863	FEp= 0.302	9	69.2	22	59.5	χ^2= 0.390	FE p= 0.742
Positive (>6) mg/l	15	100	31	88.6			4	30.8	15	40.5		
Range	12.0 – 48.0		12.0 – 24.0		U= 227.50	0.892	12.0 – 24.0		12.0 – 48.0		U= 28.0	0.822
Mean ± SD.	18.40 ± 10.01		17.42 ± 6.07				18. 0 ± 6.93		20.0 ± 9.80			
Median	12.0		12.0				18.0		24.0			
WBCs(× 10³/cm)												
Range	5.10 – 14.90		3.90 – 29.0		U= 246.50	0.735	7.20 – 18.0		5.30 – 29.60			
Mean ± SD.	10.73 ± 2.99		10.74 ± 3.94				11.04 ±3.0		12.01 ±6.49		U= 221.50	0.674
Median	10.70		10.50				11.0		10.40			

2: Chi square test, FE: Fisher Exact, U: Mann Whitney test, P: P value for comparing between Normal level and Low level.

This table shows that there was No significant difference between Serum albumin level and CRP level at 1st& 7th day.

Table (9): Correlation between Serum Albumin and Morbidity in the Studied Group (n = 50)

	Serum albumin				[illegible]	p
	Normal level (n = 15)		Low level (n = 35)			
	No.	%	No.	%		
Thrombocytopenia (<150000)						
1st day	3	20.0	18	51.4	4.258*	0.039*
7th day	5	38.5	16	43.2	0.090	0.764
Anemia (<12 gm./dl)						
1st day	2	13.3	7	20.0	0.316	FEp=0.705
7th day	1	7.7	8	21.6	1.265	FEp=0.414
DIC						
1st day	0	0.0	2	5.7	0.893	FEp=1.000
7th day	0	0.0	2	5.4	0.732	FEp=1.000
Shock						
1st day	1	6.7	8	22.9	1.865	FEp=0.247
7th day	0	0.0	9	24.3	3.856	FEp=0.089

This table shows that there was significant +ve correlation between platelet count and S. albumin level in studied group.

Table (10): Correlation between Serum Albumin Level and Mortality in the Studied Group (n = 50)

Mortality	Serum albumin				[illegible]	FEp
	Normal level		Low level			
	No.	%	No.	%		
1st day	**(n = 15)**		**(n = 35)**			
Died	0	0.0	6	17.1	2.922	0.160
Alive	15	100.0	29	82.9		
7th day	**(n = 13)**		**(n = 37)**			
Died	0	0.0	6	16.2	2.396	0.319
Alive	13	100.0	31	83.8		

p: p value for comparing between Normal level and Low level.

This table shows that the number of died cases were higher in cases with low serum albumin level in 1st and 7th day of admission.

DISCUSSION

This study was done on preterm infants with neonatal sepsis to measuring serum albumin levels during the period from July 2017 to April 2018.

The aim of this study was to evaluate the clinical value of serum albumin levels for severity, morbidity and mortality of preterm infants with sepsis.

The study showed that sepsis among the male (52%) was higher than in female (48%), Gestational age in studied group ranged from 28weeks up to 36weeks, birth weight in studied group ranged from 0.90 kg up to 2.60 kg, the most common blood group was (A+) representing (46 %), (92 %) of them delivered by cesarean section (CS) and (88 %) of them were single birth as shown in table (1).

While a previous study by **(YangY, 2016)** showed that male infants had a higher incidence of neonatal sepsis than female infants, in male it representing 59.1% ,birth weight of them range from 1.65 kg up to 2.65 kg,60.3% of them delivered by cesarean section (CS), 92.6 % of them were single birth.

Another study by (Edwards MS, 2011) showed that male infants had a higher incidence of neonatal sepsis than female

infants. Possibly this is related to X-linked immune-regulatory genes.

But a study by **(Cetinkaya M, Cekmez F and Buyukkale G, et al., 2015)** showed that Preterm low birth weight infants have a 3–10 times higher incidence of infection than full-term normal birth weight infants.

In a previous study by **(Shane A L and Sánchez P J et al., 2017)** showed that the most important neonatal factor predisposing to infection that could result in sepsis is prematurity or low birth weight.

Our study showed that the stay in hospital in patent with low serum albumin level was longer than in patent with normal serum albumin level. Stay in hospital for 2 week representing 40% of patients with normal serum albumin levels comparison to patients with low serum albumin levels representing 51.4 %, but stay in hospital for 4 week representing 0% of patients with normal serum albumin levels comparison to patients with low serum albumin levels representing 17.1% as shown in table (6).

Our study showed that the most frequent risk factor for sepsis in our studied group was premature rupture of membranes (PROM)>18 hours occurring in 31 cases representing 62% followed by maternal urinary tract infection (UTI) in 22 cases representing 44%. followed by maternal hypertension (HTN) in 6 cases representing 12%followed by maternal fever (≥ 38°C) occurs in 4 cases representing 8% followed by maternal hemorrhage (HGE) in 2 cases representing 4% as shown in table (2).

While a previous study by **(Wortham JM, Hansen NI and Schrag SJ, et al., 2016)** showed that once the membranes have been ruptured for >18 hours the risk of sepsis in the neonate increases approximately 10 fold over baseline to a rate of 1% for proven and 2% for suspected sepsis.

In concordant with our study (Ruangkit C, Satpute A, Vogt BA, Hoyen C and Viswanathan S et al., 2016) showed that UTI of any cause raises the risk of NS due to raising the risk of prematurity and chorioamnionitis.

While a study by **(Shane A L and Sánchez P J et al., 2017)** showed that rates of neonatal sepsis increase substantially in low birth weight infants in the presence of maternal chorioamnionitis.

A previous study by **(Kristof K, Kocsis E and Nagy K, 2009)**

showed that low birth weight and premature birth, maternal bacterial infection, chorioamnionitis, premature rupture of membranes, maternal GBS carriers, checking the vagina over three times, prolonged labor, severe pre-eclampsia, gestational diabetes and Apgar score <4 were risk factors for adverse outcomes of sepsis.

The Results in our study showed that there were 46 patients with early onset sepsis representing (92 %) while 4 patients with late onset sepsis representing (8 %).Only one patient had –ve blood culture and the other were +ve blood culture. The most frequent organism was Escherichia coli (E. coli) representing (34.7%) followed by Group B Streptococcus (GBS) representing (26.5%) as shown in tables (4, 5).

A previous study by **(Verani JR, McGee L and SchragSJ,et al., 2010)** showed that the most common organisms associated with early-onset neonatal sepsis (EOS) are group B Streptococcus (GBS). Infection rates increased with decreasing birth weight. Case fatality rate overall was 16% but it was inversely related to gestational age.

Our study show that the serum albumin levels in 1st day range from 2.50 – 4.20 gm./dl and it low in 35 patients representing (70%) of the studied groups with neonatal sepsis in Comparison to patients with normal serum albumin levels which occurs in 15 cases representing 30% of the studied groups with neonatal sepsis .The serum albumin levels in 7th day range from 1.80 – 4.30 gm./dl and it is low in 37 patients representing (74%) of the studied groups with neonatal sepsis in Comparison to patients with normal serum albumin levels which occurs in 13 cases representing 26% of the studied groups with neonatal sepsis .The study show that sepsis among patients with low serum albumin levels higher than patients with normal serum albumin levels in 1st day and 7th day as shown in tables (3,8).

A previous study by **(Galinier A, Periquet B, Lambert W, et al., 2005)** showed that the plasma albumin concentration is a routinely measured in the neonatal intensive care unit (NICU) and is often found to be low in ill premature infants.

Other study by **(YangY, 2016)** showed that the albumin levels were low in ill premature infantsit representing 86 %.

Our results are concordant with **(Al-SubaieN, Reynolds Tand**

Myers A et al., 2010) showed that serum albumin levels are decreased in the acute phase of infections. Therefore low serum albumin levels in critically ill patients are associated with the inflammatory response intensity to infections and (Yerlikaya FH, Kurban S and Mehmetoglu I et al., 2014) showed that Low serum albumin levels are very common in critically ill patients with reported incidences as high as 40–50%.

In the present study a multivariate analysis revealed that there is an association between hypoalbuminemia and adverse outcomes. Serum albumin levels are decreased in the acute phase of infections. Low serum albumin levels in critically ill patients are associated with the inflammatory response intensity to infections. According to 1st day laboratory finding serum albumin level was normal in 15/50 cases s +ve CRP in these case and WBC_S range from(5.10 – 14.90) ($\times 10^3$/cmm).while serum albumin level was low in 35cases +ve CRP in 31cases and –ve in 4cases and WBC_S range from(3.90 – 29.0) ($\times 10^3$/cmm). So there no significant difference between CRP in two groups but WBC_S increase in group of low Serum albumin level up to 29.0×10^3/cmm .While the 7th day laboratory finding Serum albumin level was normal in 13/50 cases with +ve CRP in 4cases and –ve in 9cases and WBC_S range from(7.20 – 18.0) ($\times 10^3$/cmm). Serum albumin level was low in 31/50 cases and show +ve CRP in 15cases and –ve in 22cases with WBC_S range from (5.30 – 29.60) ($\times 10^3$/cmm). So there is significant difference between CRP in two groups it is +ve in case with low Serum albumin level more than cases with normal Serum albumin level as shown in tables (8).

The study show that the Results among the 50 patients showed that there was statistically difference significant between the results of CRP in the 1st and 7th postnatal days being more positive in the 1st day and also the difference was significant regarding platelet count being lower in the 7th day result. While no significant difference between 1st and 7th day laboratory results regarding WBCs count and hemoglobin level as shown in table (7).

Our study showed that there was significant difference between platelet count in the study groups as Thrombocytopenia in patients with normal serum albumin level occur in 3/15 of cases representing 20% in comparison to low Serum

albumin level which occur in 18/35 of cases representing 51.4% as shown in table (9).

While a study by **(Wai H L, ReyinL, Yhu-Chering Het al., 2012)** showed that in VLBW infants with sepsis is frequently associated with thrombocytopenia.

In This study Anemia occurred in patient with low Serum albumin level in 7/35 of cases representing 20% in comparison to patients with normal serum albumin level which occur in 2/15 of cases representing 13% as shown in table (9).

In the same time Disseminated intravascular coagulation (DIC) was present in patient with low Serum albumin level in 2/35 of cases representing 5.7% and not present in patient with normal Serum albumin level (0/15) cases representing 0% as shown in table (9).

Our study was agree with **(Ryan A and Lindy F, 2017)** who showed that bleeding from disseminated intravascular coagulopathy is highly with low Serum albumin level.

Our results showed that shock occurred in patient with low Serum albumin level in 8/35 cases represent 22.9% in comparison to patient with normal Serum albumin level (1/15) cases represent 6.7% as shown in table (9).

The study show that the complications as thrombocytopenia, Anemia, Disseminated intravascular coagulation (DIC) and shock among the patients with low Serum albumin level were higher than patients with normal Serum albumin level with significant difference.

Other study by **(Iacobelli S, Bonsante F and Lacoutiere C et al., 2012)** showed that Low early blood protein levels may impair adequate in-travascular volume and blood flow to vital organs in preterm infants leading to organs dysfunction.

While a study by **(YangY, 2016)** showed that Hypoalbuminemia may induce serious damage to the structure and function of many organs as lung, heart and liver.

Also study by **(Zaragoza R, Sancho S, Camarena JJ et al., 2009)** showed that there was close relation between hypoproteinemia and disease severity and prognosis.

The study show that the mortality rate incidence increase in patients with low serum albumin comparison to patients with normal serum albumin as the

cases with normal serum albumin level (15/50) show 0% mortality rate. The cases with low Serum albumin level (35/50) show 16.2% mortality rate as shown in table (10).

Our study agree with study by **(YangY, 2016)** showed that albumin levels of the patients who survived were higher than those of the patients who died.

CONCLUSION

1. Hypoalbuminemia was frequent among neonates with sepsis.
2. Lower serum albumin levels were associated with a poor prognosis.
3. Serum albumin levels could be appropriate for the prognosis of preterm neonates with infections.
4. Measuring serum albumin levels is easy and the results can be obtained very fast allowing the physician to adjust in treatment approach in a timely manner.
5. In the low albumin group the number of critical cases, the frequency of multiple organs injuries and Mortality rate were higher than in the patients with normal serum albumin levels.
6. Hypoalbuminemia was associated with severe adverse outcomes.

RECOMMENDATIONS

1. Measuring serum albumin levels should be done in all preterm infants it allowing the physician to adjust in treatment approach in a timely manner.
2. The sample size was relatively small and was from a single center.
3. Further studies including more patients from multiple centers are necessary to establish better treatments in neonates with low albumin levels.
4. Data suggest that preterm infants need more examination to clarify the treatment of hypoalbuminemia together with infection.
5. Additional studies including more patients from multiple centers should be carried out to reach firmer conclusions.

Limitation of the study

1. Difficulty of sampling.
2. Difficulty of follow up after discharge.
3. The sample size was relatively small and was from a single center.

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ارتباط مستويات مصل الزلال والانتان الوليدي في الاطفال المبتسرين

محمود عبدالعال ابراهيم عبدالعال - بكالوريوس الطب والجراحة - جامعة الأزهر
عاطف السيد دنيا - أستاذ طب الأطفال كلية الطب - جامعة الأزهر
عبدالستار عبدالله كامل السايح - مدرس طب الأطفال كلية الطب - جامعة الأزهر
محمد سعيد الشوربجى - أستاذ الباثولوجيا الإكلينيكية كلية الطب - جامعة الأزهر

الهدف من البحث: نحن نهدف إلى تقييم القيمة السريرية لمستويات مصل الزلال في الاطفال المبتسرين المصابين بالإنتان الوليدي من حيث شدة الإصابة وحدوث المضاعفات وعدد الوفيات.

منهج البحث: ستشمل هذه الدراسة المقارنة المتوقعة 50 وليدًا مصابًا بالإنتان. ستقاس مستويات الزلال المصلية في جميع الحالات في (24 ساعة) من الحياة و (7 يوم) من العمر. يتم اختيار الحالات من وحدة العناية المركزة للأطفالحديثيالولادة في مستشفى الحسين الجامعي. سيتم إجراء الاختبارات المعملية والدراسات الإشعاعية في المستشفيات السابقة.

النتائج: أظهرت النتائج أن حدوث الإنتان الوليدي في الذكور كان بنسبة 52٪ وهوأعلى من الإناث 48٪ ، ويتراوح العمر الحملي في المجموعة المدروسة من 28 أسبوعًا إلى 36 أسبوعًا ، ووزن المواليد في المجموعة المدروسة يتراوح من 0.90 كيلوغرام إلى 2.60 كجم ، وكانت فصيلة الدم الأكثر شيوعًا هي (A +) تمثل 46 ٪ ، 92 ٪ من الحالات تمت عملية الوضع عن طريق العملية القيصرية (CS) و 88 ٪ منها كانت ولادة فرديه ، ومستويات مصل الزلال في اليوم الأول تتراوح من 2.50 - 4.20 جم / ديسيلتر ، وكانت النسبة قليله في 35 مريضا يمثلون 70 ٪ من المجموعات المدروسة بالمقارنة مع المرضى الذين الذين لديهم مستويات مصل الزلال طبيعيه وعددهم 15 حالة يمثلون 30 ٪ من المجموعات المدروسة مع الإنتان الوليدي. مستويات الزلال في المصل في اليوم السابع تتراوح من 1.80 - 4.30 جم / ديسيلتر ، وكانت النسبة قليله في 37 مريضا يمثلون 74 ٪ من المجموعات المدروسة بالمقارنة مع المرضى الذين لديهم مستويات مصل الزلال طبيعيه وعددهم 13 حالة تمثل 26 ٪ من المجموعات المدروسة

مع الإنتان الوليدي. أظهرت الدراسة أن حدوث الإنتان الوليدفى المرضى الذين يعانون من انخفاض مستويات مصل الزلال عن النسبة الطبيعيه أعلى من المرضى الذين لديهم مستويات مصل الزلال في النسبة الطبيعية وذلك في اليوم الأول واليوم السابع.

الإستنتاجات:

1- كان نقص مستويات مصل الزلال بالدم متكرر بين الاطفال المبتسرين المصابين بالانتانالوليدى.

2- قد يرتبط انخفاض مستويات الزلال بحدوث المضاعفات وزياده عدد الوفيات .

3- مستويات الزلال يمكن أن تكون مناسبة لتشخيص والتنبؤ بالانتانالوليدى فى الاطفال المبتسرين.

التوصيات: ينبغي أن يتم:

1- قياس مستويات مصل الزلال في الاطفال المبتسرين حيث أنه يمكن الطبيب من ضبط نهج العلاج في الوقت المناسب.

2- حجم العينة كان صغيرا نسبيا وكان من مركز واحد.

3- إجراء المزيد من الدراسات بما في ذلك المزيد من المرضى من المراكز متعددة ضرورية للوصول لأفضل النتائج.

4- تشير البيانات إلى أن الاطفال المبتسرين يحتاجون إلى مزيد من الفحص لتوضيح علاج نقص مصل الزلال بالدم مع وجود العدوى.