SERUM LEVEL OF ENDOCAN IN SEPTIC NEONATES

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ABSTRACT

Background: *Neonatal sepsis is an important cause of neonatal morbidity and mortality in the neonatal intensive care unit. Endocan is constitutively expressed by endothelial cells and high levels of endocan can be used as agood marker for neonatal sepsis.*

Aims: *the aim of this work was to evaluate the role of serum level of Endocan in diagnosis of late onset sepsis in both preterm and fullterm neonates.*

Patients and Methods: *This study had been carried out in neonatal intensive care unit (NICU) at AL Hussein University hospital during the period from January 2019 to May 2019. The study was conducted on 48 neonates who selected by simple random method and classified into four groups: 2 preterm groups (septic (as a case) and non-septic (as a control)) and 2 full-term groups (septic (as a case) and non-septic (as a control)): with post natal age > 3 days for all groups. Blood was collected from a peripheral vein of all septic newborns and healthy newborns at the time of initial laboratory evaluation before any treatment, and from septic groups within 48-72 hours after initiation of treatment. Serum endocan was measured by enzyme-linked immunosorbent assay (ELISA).*

Results: *Serum Endocan level were significantly higher in septic neonates at the time of admission in preterm cases which it was (231.77±99.46 ng/l) and in full-term cases it was (183.28±75.86 ng/l) in comparison with no septic neonates which the endocan level was (71.26±19.54ng/l) in preterm control group and it was (70.15±17.36 ng/l) in full term control group and Endocan were significantly decrease within 48-72 hours after initiation of treatment it was (142.99±67.41 ng/l) in preterm group and it was (100.86±52.27 ng/l) in full term group. In our study cutoff point of endocan level in preterm and full term neonates 97.428ng/l. with sensitivity 94% specificity 100%, positive predictive value 92.31% and negative predictive value 100%.*

Conclusions: *Serum level of Endocan were significantly higher in septic neonates(preterm and full-term) than no septic neonates (preterm and full-term), Serum level of endocan was higher at the time of initial laboratory evaluation then decreased after 48 – 72 hours after treatment in septic neonates so Serum Endocan can be used for diagnosis of late onset neonatal sepsis.*

INTRODUCTION

Neonatal sepsis remains one of the leading causes of morbidity and mortality both among term and preterm infants **(Camacho-Gonzalez et al., 2013)**. Late-onset sepsis is generally defined as the onset of symptoms at ≥7 days of age. Similar to early onset sepsis, there is variability in the definition, ranging from an onset at >72 hours of life to ≥7 days of age **(Kimberlin et al., 2015)**. Early recognition and diagnosis of neonatal sepsis are problematic. Positive predictive value and reproducibility of putative diagnostic testing is suboptimal, which leads to a very low clinical suspicion index and high rates of empiric antimicrobial treatment **(Wynn, 2016)**. Endocan (also known as endothelial cell-specific molecule) is a 50-kDa proteoglycan comprising a polypeptide of 165amino acids covalently attached via serine 137 to a single derma tan sulfate molecule. It is expressed in endothelial cells of the lung, kidney, skin, liver, gastrointestinal tract, brain, and heart, and the levels can be measured in both serum and tissues **(Kali, Shetty., 2014**, **Chang et al., 2015)**. Endocan is mainly, but not entirely, expressed by renal and pulmonary endothelium. Endocan expression is up regulated by cytokines, namely tumor necrosis factor-α (TNF-α), interleukin (IL)-1 and microbial lipopolysaccharide, as well as by proangiogenic factors such as vascular endothelial growth factor (VEGF). An increase in tissue expression or serum level of endocan reflects endothelial activation and neovascularization which are prominent pathophysiological changes associated with inflammation and tumor progression **(Sarrazin et al., 2010**, **kali and Shetty, 2014** and **Yang m et al., 2015)**. A few studies of sepsis conducted in adults and one in neonates have shown that endocan levels are significantly elevated in sepsis and thus are an effective marker of sepsis **(Recchia et al., 2010** and **Saldir et al., 2015)**.

AIM OF THE STUDY

The main aim of this study is to evaluate the role of serum level of endocan in early diagnosis of late onset sepsis in preterm and full-term neonates.

PATIENTS AND MATERIALS

Patients:

This prospective and comparative study was carried out in neonatal intensive care unit (NICU) at AL Hussein University hospital from January 2019 to

May 2019. It was conducted on 48 neonates who were divided into four groups:

Group 1 (cases): included 18 preterm newborn (<33 – <37 wks) with proven sepsis (positive blood or cerebrospinal fluid CSF cultures for microorganisms and probable infection negative cultures but clinical and laboratory evidence of sepsis: C-reactive protein (CRP) > 5 mg/dL or sepsis related clinical signs.

Group 2(control): included 6 preterm newborn (<33 – <37 wks) without clinical or laboratory evidence of neonatal sepsis.

Group 3 (cases): included 18 full term newborn (<37 – < 42 wks) with proven sepsis (positive blood or cerebrospinal fluid CSF cultures for microorganisms and probable infection with negative cultures but clinical and laboratory evidence of sepsis: C-reactive protein (CRP) > 5 mg/dL or sepsis related clinical signs).

Group 4 (control): included 6 full-term newborn (<37 – < 42 wks) without clinical or laboratory evidence of sepsis.

Inclusion criteria:

1. Neonates between 4 day and 28 day.
2. Neonates with suspected sepsis (poor activity, poor suckling, feeding intolerance, dehydration,.....).
3. Neonates with positive sepsis workup (CBC, CRP, Blood culture,....).
4. Neonates without any congenital anomalies.

Exclusion criteria:

1. Neonates with sepsis in first 72 hours (EOS).
2. Neonates received blood or blood products before the blood sampling.
3. Infants with multiple congenital anomalies.
4. Newborn with Risk factors for perinatal infection e.g.: PROM, Maternal UTI and Genital herpis.

Ethical consideration:

1. Approval from the ethical committees of pediatric department and Faculty of Medicine Al-Azhar University.
2. Written consent for the study was obtained from the parents of these neonates.
3. The data of the patients and the results of the study are confidential and the care giver has the right to keep them.
4. The authors received no financial support for the study or the publication.

5. The authors declared that there is no conflict of interest regarding the study and publication.

Methods:

All the neonates at this study were subjected to:

1. Complete history taking:

A. Obstetric history (previous sibling death, previous admission to NICU, previous premature labor or low birth weight, etc).

B. Prenatal history with stress on risk factors of neonatal sepis e.g: diabetes mellitus, maternal fever >38 C°, maternal antibiotics, maternal urinary tract infection (UTI).

C. Natal history with stress on risk factors of neonatal sepis e.g: premature rupture of membrane (PROM), maternal fever, prolonged second stage of labor, etc.

D. Postnatal History with stress on risk factors of neonatal sepis e.g.: low Apgar score at 1 and 5 min, aggressive resuscitation, respiratory distress , fever, jaundice.

E. Current history: includes most common symptoms of sepsis in the neonates e.g poor suckling, hypothermia, hypo activity, etc.

2. Thorough clinical examination including assessment of gestational age through analysis of maternal dates and Ballard scores, birth weight and length measurement, skull circumference. Detection of clinical signs of sepsis such as: temperature instability (<37 or >38.5 _C), respiratory distress, apnea, circulatory dysfunction (shock, prolonged capillary refill), GIT dysfunction (abdominal distension, feeding intolerance, hepatomegaly, jaundice), neurological dysfunction (irritability, hypotonia, lethargy).

Laboratory investigations including:

1. Serum Endocan Levels:

Serum level of endocan was measured at the time of admission for all septic (cases) and non-septic (control) neonates and after 48-72 hours for septic neonates only. Analysis of serum endocan level was performed by using a double antibody sandwich enzyme linked immunosorbent assay (ECSM1 ELISA KIT).

2. Complet blood count:

Complete blood counts with differential leucocytic count and platelet counts was measured at the time of admission for all septic (cases) and non-septic (control) neonates and after 48-72 hours for septic neonates only. The sample was 1 ml of fresh venous blood which collected from peripheral veins of neonates by sterile venipuncture and put in a sterile vacutainer containing K2 EDTA as anticoagulant, complete blood counts were performed electronically.

3. C- reactive protein:

C- reactive protein was measured at the time of admission for all septic (cases) and non-septic (control) neonates and after 48-72 hours for septic neonates only. CRP is estimated by latex agglutination assay using the AVITEX CRP commercial kit.

4. Blood culture:

By The BacT/ALERT® 3D 60 automated blood culture system (BioMérieux, France) was used to process all samples.

5. Some liver function tests:

Aspartate aminotransferase (AST) and alanine aminotransferase (ALT).

6. Serum electrolytes and Arterial blood gases.

Statistical analysis:

Data was revised, coded and fed to statistical software IBM SPSS version 21. The Probability (P-Value) statistical analyses were done at level of significance of $P \leq 0.05$. Quantitative data were expressed as mean ± standard deviation. Qualitative data were expressed as frequency and percentage.

Mean (average): the central value of a discrete set of numbers, specifically the sum of values divided by the number of values.

Standard deviation (SD): is to measure of dispersion of a set of values. A low SD indicates that the values tend to be close to the mean of the set, while a high SD indicate that the values are spread out over a wider range.

RESULTS

Table (1): Demographic and Personal data of the Preterm groups:

Variable	Preterm cases No=18		Preterm control No=6		Test of significance	P value
	No	%	No	%		
Sex						
Male	9	50.0	2	33.3	FX= 0.503	0.649
Female	9	50.0	4	66.7		
Weight(kg)						
Mean ± SD	1.91±0.245		2.08±0.232		T=1.541	0.138
Median	1.85		2.05			
I.Q.R	1.7-2.05		1.88-2.33			
Gestational. Age (weeks)						
Mean ± SD	33.28±1.227		34.17±0.753		T=1.658	0.111
Median	33		34			
I.Q.R	32-34		33.75-35			

This table shows that there is no statistically significant difference between preterm cases and control as regards sex, weight and gestational age.

Table (2): Demographic and Personal data of the Full term groups

Variable	Full term cases No=18		Full term control No=6		Test of significance	P value
Sex						
Male	9	50.0	3	50.0	FX= 0.00	1.00
Female	9	50.0	3	50.0		
Weight(kg)						
Mean ± SD	2.98±0.39		3.07±0.22		T= -0.652	0.524
Median	3		3.05			
I.Q.R	2.6-3.32		2.88-3.25			
Gestational. Age (weeks)						
Mean ± SD	38.17±0.924		37.67±0.816		U= 37.50	0.280
Median	38		37.67			
I.Q.R	37.75-39		37-38.25			

This table shows that there is no statistically significant difference between full term cases and control as regards sex, weight and gestational age.

Table (3): Comparison between the preterm groups as aregard complete blood count and CRP

Variable	Preterm cases No=18	Preterm control No=6	Test of significance	P value
WBCs ($\times 10^3$/cmm)				
Mean ± SD	21.02±5.09	11.2±1.85		
Median	20.6	10.9	T= 6.927	0.0001*
I.Q.R	18.5-23.05	9.65-12.6		
I/T.RATIO				
Mean ± SD	0.21±0.03	0.133±0.012		
Median	0.22	0.135	T= 6.508	0.001*
I.Q.R	0.18-0.23	0.12-0.14		
RBCS (x 10^6/µL)				
Mean ± SD	3.54±0.305	4.92±0.30		
Median	3.5	4.93	T =9.56	0.0001*
I.Q.R	3.48-3.83	4.73-5.16		
Hb (g/dl)				
Mean ± SD	11.52±0.981	15.42±1.01		
Median	11.5	15.7	T =8.37	0.0001*
I.Q.R	11-11.58	14.73-16.1		
PLATELET (x 10^3/µL)				
Mean ± SD	203.56±69.48	269.33±55.13		
Median	189.5	279.5	U= 19.00	0.018*
I.Q.R	173.75-222.75	208.5-314.25		
CRP (mg/l)				
Mean ± SD	30.89±14.92	3±0		
Median	26	3	T =7.929	0.0001*
I.Q.R	19.5-39	3-3		

This table shows that there is statistically significant difference between preterm cases and control as regards WBCS, I.T /ratio, RBCs, Hb, CRP and platelet count.

Table (4): Comparison between the Full term groups as a regard complete blood count and CRP

Variable	Full term cases No=18	Full term control No=6	Test of significance	P value
WBCS (x 10^3/µL)				
Mean ± SD	17.89±6.79	12.22±1.95		
Median	19.15	12.05	T= 3.175	0.004*
I.Q.R	13.78-21.65	10.6-13.9		
I/T.RATIO				
Mean ± SD	0.326±0.57	0.135±0.104		
Median	0.19	0.135	U =0	0.0001*
I.Q.R	0.18-0.21	0.13-0.14		
RBCS (x 10^6/µL)				
Mean ± SD	3.56±0.228	4.92±0.301		
Median	3.5	4.93	T =11.66	0.0001*
I.Q.R	3.5-3.65	4.73-5.16		
Hb (g/dl)				
Mean ± SD	12.46±0.64	15.42±1.01		
Median	12.5	15.7	T= 8.5	0.0001*
I.Q.R	12.2-13	14.73-16.1		
PLATELET (x 10^3/µL)				
Mean ± SD	183.28±79.52	260.83±71.77		
Median	183	249	U= -2.230	0.051
I.Q.R	123.5-224	193.25-327.5		
CRP (mg/l)				
Mean ± SD	38.4±57.05	3±0		
Median	24	3	U =0	0.0001*
I.Q.R	16-33	3-3		

This table shows that there is statistically significant difference between fulterm cases and control as regards WBCS, I.T /ratio, RBCs, Hb, CRP and platelet count.

Table (5): Resulte of blood culture in study groups

Bood culture result	In preterm cases	In full term cases	P.value
Klebsiella	33.30 %	27.80%	< 0.005
E.coli	22.20%	22.20%	>0.005
Staphylococcus aureus	11.10%	11.10%	>0.005
GBS	11.10%	11.10%	>0.005
Pseudomonas	5.60%	5.60%	>0.005
No growth	16.70%	22.20%	<0.005

This table show that most common organism according blood culture in preterm cases group was klebsiella (33.30%) followed by E.coli (22.20%) while no growth was (16.70%) but the blood culture in full term cases group show the most common organism was klebsiella (27.80%) followed by E.coli (22.20%) while no growth was (22.20%) and this table show that there is significant difference between full term and preterm as regard klebsiella and negative growth. while there is no significant difference between full term and preterm as regard E.coli, Staphylococcus aureus, GBS. and Pseudomonas.

Table (6): Serum level of endocan in cases groups (before and after treatment in cases groups)

Endocan level(ng/l)	Preterm case	Full term cases	P value
Before treatment			
Mean ± SD	231.77±99.46	183.28±75.86	
Median	229.89	175.49	0.118*
I.Q.R	136.77-300.07	122.28-218.37	
After treatment (48-72 hours)			
Mean ± SD	142.99±67.41	100.86±52.27	0.051*
Median	113.59	90.17	
I.Q.R	91.71-203.48	71.92-103.97	
P value	0.001*	0.001*	

This table shows that there is statistically significant difference between serum level of endocan before treatment and after 48-72 hours from treatment in both preterm and full term cases groups while there is no either before treatment or after 48-72 hours from treatment.

Table (7): Serum level of endocan in control groups at the time of admission

Variable	preterm control	Full term control	P value
S. endocan			
Mean ± SD	71.26±19.54	70.15±17.36	
Median	73.04	70.67	0.575*
I.Q.R	54.94-85.38	51.57-88.39	

This table show there is no statistically significant difference between preterm and full term control groups according to serum level of endocan at the time of admission.

Table (8): Correlation between serum endocan level and other parameters at the time of initial laboratory evaluation in cases groups

Variables	S. Endocan level (preterm cases)		S. Endocan level (full term cases)	
	Spearman correlation	P. value	Spearman correlation	P. value
Gestational age	-0.579	0.012*	-0.053	0.833
Weight	-0.574	0.013*	-0.175	0.488
WBCSs	0.895	0.0001*	0.527	0.025*
I : T ratio	0.590	0.010*	0.579	0.012*
CRP	0.878	0.0001*	0.788	0.000*
Blood culture	0.443	0.065	0.097	0.702
Platelet	0.011	0.964	-0.212	0.399

This table shows that there is a statistically significant positive correlation between each pair of (endocan and I.T ratio), (Endocan and CRP) (endocan and WBCS There is a statisticall significant negative correlation between endocan level and weight and gestational age in preterm cases). There is a statistically significant positive correlation between endocan level and CRP, while there is no statistically significant correlation between all other laboratory tests.

Table (9): Correlation between serum endocan level and other parameters at 48-72 hours after treatment initiation in the cases groups

Variables	S. Endocan level (preterm cases)		S .Endocan level (full term cases)	
	Spearman correlation	P value	Spearman correlation	P value
Gestational age	**-0.505**	**0.033***	**-0.046**	**0.857**
Weight	**-0.500**	**0.035***	**-0.198**	**0.430**
WBCs	**0.549**	**0.018***	**0.382**	**0.118**
I:T ratio	**0.761**	**0.0001***	**0.724**	**0.001***
CRP	**0.849**	**0.0001***	**0.837**	**0.0001***
Blood culture	**0.375**	**0.125**	**0.447**	**0.063**
Platelet	**-0.022**	**0.932**	**-0.380**	**0.119**

This table shows that there is a statistically significant positive correlation between each pair of (endocan and I.T ratio), (Endocan and CRP). There is a statistically significant negative correlation between endocan level and weight and gestational age in preterm cases). There is a statistically significant positive correlation between endocan level and WBCs and CRP, while there is no statistically significant correlation between all other laboratory tests.

Table (10): ROC Curve for serum endocan showing cutoff point of endocan level in the studied groups

Best cut off point	AUC	Sensitivity	specificity	PPV	NPV
97.428	**0.793**	**94%**	**100%**	**92.31%**	**100%**

This table shows that best cutoff point of endocan level in preterm and full term neonates 97.428 ng/l. with sensitivity 94% specificity 100%, positive predictive value 92.31% and negative predictive value 100%.

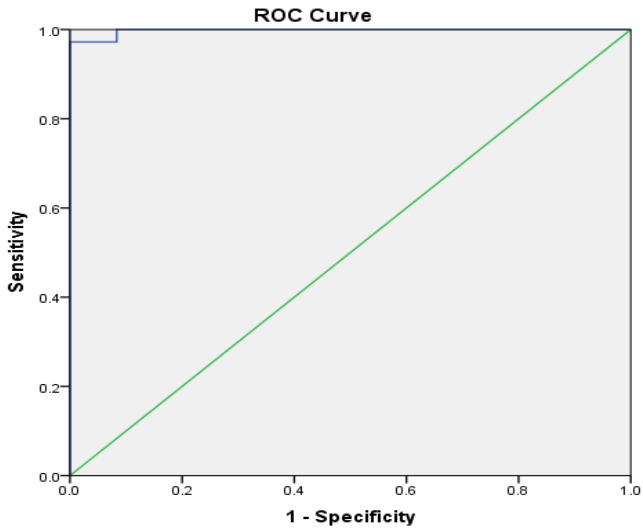

Figure (2): ROC Curve for serum endocan showing cutoff point of endocan level in the studied groups

DISCUSSION

Neonatal sepsis is a major cause of neonatal morbiditiy and mortality; timely diagnosis of neonatal infections can significantly contribute to their treatment. Neonatal sepsis is a serious condition associated with a high mortality rate, and it is considered a major challenge for pediatricians due to its non-specific symptoms and the absence of a definitive diagnostic test *(Boskabadia, Zakerihamidi., 2016).*

In our study we found that immature to total neutrophil ratio (I: T ratio) in the septic groups was significantly higher than that of control groups. These results came in agreement with study of **(Mondal, et al., 2012)**. In our study we found that CRP levels were higher in septic neonates groups than in control groups, This came in agreement with the results of the study of **(Shyamala et al., 2010)**. In our study the results of Blood cultures showed that culture-proven sepsis in preterm septic cases was occurred in 15 cases (83.3%) while culture-proven sepsis in full term septic cases was occurred in 14 cases (77.7%) in which the most common organism isolated is Gram-negative klebsiella representing 6 cases (33.3%) in preterm septic cases and 5 cases (27.8%) in full term septic cases, followed by Gram-negative E.coli representing 4 cases (22.2%) in both preterm and full term septic cases, followed by gram positive staphylococcus aureusm representing 2 cases (11.1%) in both preterm and full term septic cases followed by grame positive GBS representing 2 cases (11.1%) in both preterm and fullterm septic cases and one case (5.6%) gram negative bacilli pseudomonas in both preterm and full term septic cases while no growth represent 3 cases (16.7%)in preterm septic cases and representing 4 cases (22.2%) in full term septic cases. This came in agreement with blood culture results of study of several studies **(Dzwonek et al., 2008, Sharma, et al., 2016** and **Vaniya et al., 2016)** who documented blood culture positive cases to be 69.2%.

In the present study results showed that Endocan levels were significantly higher at the time of initial laboratory evaluation in preterm septic group (231.77±99.46 ng/l) than in preterm control group (71.26±19.54ng/l) and significantly higher in full term septic group (183.28±75.86ng /l) than in full term control group (70.15±17.36 ng /l). This came in

agreement with study done by **(Saldir et al., 2015)** in late onset sepsis on neonates found that the serum endocan level was higher in patients with sepsis compared to the control groups, and our result came in agreement with the other studies of **(Saldir et al., 2015** and **Zonda, et al., 2019)** which found serum Endocan level was higher in neonates with sepsis compared to non-septic group. In the current study we found that Endocan level was significantly decreased within 48 -72 hours after treatment initiation in preterm septic group (142.99±67.41 ng/l) than the time of initial laboratory evaluation (231.77±99.46 ng/l) also was significantly decreased within 48 - 72 hours after treatment initiation in full term septic group (100.86±52.27 ng/l) than the time of 1st admission (183.28±75.86 ng/l). This came in agreement with other studies of **(Saldir, et al., 2015** and **Zonda, et al., 2019)** which found the same results. In the present study we found that there is significant correlation of Endocan level with CRP in septic groups (preterm and full term). and these came in disagree with other previous studies **(Scherpereel et al., 2006)** who found that serum level of endocan was not correlated with that of CRP. In our study we found that there is statistically significant positive correlation between endocan with I:T ratio in both septic groups (preterm and full term). This came in agreement with study of **(Saldir, et al., 2015)** which found the same result. In the current study, results showed that there is a significant correlation between endocan and platelets count and white blood cell count in septic group. This came in agreement with the study of **(Pauly D, et al., 2015)** which found that there was significant correlation between endocan with platelets count and WBCs count in septic group. While our data showed non-significant correlation between serum endocan level with gestational age, body weight.

The ROC analysis of our data showed that best cutoff point of endocan level in preterm and full term neonates 97.428 ng/l at the cut off value: sensitivity 94% specificity 100%, PPV 92.31%, NPV 100%.

In the study of **Zonda GI et al (2019)**. The authors found that cutoff value of endocan 162 ng/ L corresponds to a sensitivity of (88%) and a specificity of (50%).

Limitation of the study: Small number of samples and Difficulty of follow up after discharge.

CONCLUSION

Serum level of Endocan is higher in septic neonates (preterm and full term) than control neonates (preterm and full term), with high sensitivity and specificity. Serum level of Endocan was higher at the time of initial laboratory evaluation then decreased after 48 – 72 hours after treatment initiation, No significant difference of Endocan level between preterm and full term neonates, Serum endocan can be used for diagnosis of late onset neonatal sepsis.

RECOMMENDATION

Serum endocan can be used as indicator for diagnosis and follow up of late onset neonatal sepsis, but this need wide range study and large number of neonates with late onset sepsis.

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مستوي الاندوكان فى الرضع المصابين بالإنتان الوليدى

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الإنتان الوليدي هو متلازمة سريرية تتكون من غير أعراض محددة وعلامات العدوى المصحوبة بتجرثم الدم في الأيام الـ 28 الأولى من الحياة. يشمل الإنتان الوليدي العديد من الالتهابات الجهازية لحديثي الولادة، مثل تسمم الدم والتهاب السحايا والالتهاب الرئوي والتهاب المفاصل والتهاب العظم والنقي وما إلى ذلك. الإنتان هو السبب الرئيسي السادس للوفاة بين حديثي الولادة والسبب الثامن لوفاة الرضع خلال السنة الأولى من الحياة.

من الصعب تحديد تشخيص الإنتان الوليدي ولا يزال يمثل تحديًا لمقدمي الرعاية الصحية للولدان. وبناءً على مزيج من العرض السريري؛ استخدام علامات غير محددة، بما في ذلك البروتين التفاعلي C وثقافات الدم واستخدام الطرق الجزيئية مثل السيتوكينات، يتم فحصهما بشكل متزايد لاستخدامهما كإجراءات فحص غير محددة للإنتان الوليدي.

الاندوكان- جزيء خاص بالخلايا البطانية 1- هو سلفات بروتوغليكان سائلة 50 كيلو دالتون متداولة يتم التعبير عنها بواسطة الخلايا البطانية ويمكن اكتشافها في مجرى الدم.

أظهرت بعض الدراسات أنه يمكن التعرف على الاندوكان كعلامة جيدة على الخلل البطاني وخلل وظيفي متعدد الأعضاء في الإنتان، ويمكن قبوله كعلامة جيدة لتنبؤ البقاء على قيد الحياة في الإنتان.

والهدف من البحث هو تقييم دور مستوى الاندوكان في المصل في تشخيص الإنتان المتأخر في كل من الخدج والرضع كاملي النمو.

أجريت هذه الدراسة في وحدة العناية المركزة لحديثي الولادة في مستشفى الحسين الجامعي في الفتره من شهر يناير الي شهر مايو 2019، وقد تضمنت الدراسة 48 وليداً تم تقسيمهم إلى أربع مجموعات على النحو التالي:

المجموعة 1: بما في ذلك 18 خدج حديثي الولادة مصاب بداء الإنتان الوليدي.

المجموعة 2: بما في ذلك 6 خدج حديثي الولادة غير مصاب بالانتان الوليدي.

المجموعة 3: بما في ذلك 18مولود كامل المدة مصاب بداء الانتان الوليدي.

المجموعة 4: بما في ذلك 6 مولود كامل المدة غير مصاب بالانتان الوليدي.

تعرض جميع الرضع الملتحقين بهذه الدراسة لما يلي:

1. أخذ التاريخ الكامل بما في ذلك: تاريخ العائلة، تاريخ ما قبل الولادة، تاريخ الولادة وما بعد الولادة.
2. الفحص السريري الكامل بما في ذلك: الخصائص الديموغرافية، وقياسات الجسم البشري (الوزن، الطول، محيط الرأس) والفحص السريري الكامل للكشف عن العلامات السريرية للإنتان.

تم عمل التحاليل الآتية:

1. عدد الدم الكامل، اختبارات وظائف الكلى والكبد, بروتين سي التفاعلي و مزرعة دم.
2. مستوى مصل الاندوكان بواسطة تقنيه الاليزا.

وكانت نتائج الدراسة ما يلي:

1. فيما يتعلق بمعايير عدد الدم الكامل، كان هناك انخفاض في مستويات الهيموجلوبين بين مجموعات المرضى، وانخفاض كبير في عدد الصفائح الدموية بين مجموعات المرضى، وزيادة كبيرة للغاية في إجمالي عدد كريات الدم البيضاء بين مجموعات المرضى وزيادة كبيرة للغاية في نسبة الخلايا غير الناضجه الي الخلايا الكليه بين مجموعات المرضى.
2. في هذه الدراسة، كان مستوى بروتين سي التفاعلي أعلى بشكل ملحوظ في مجموعات المرضى من المجموعات الضابطة.
3. كان مستوى مصل الاندوكان أعلى بكثير في مجموعة المرضى من المجموعة الضابطة.
4. كان مستوى الإندوكان في الدم أعلى في وقت الإدخال الأول ثم انخفض بعد 48-72 ساعة بعد بدء العلاج.
5. لا يوجد اختلاف مهم في مستوى الأندوكان بين الخدج والولدان الناضجين.

كما اظهرت نتائج دراستنا ان افضل قيمه لمصل الاندوكان لتشخيص الانتان الوليدي 98.428 نانو جرام /لتر بحساسيه 94% وخصوصيه 100%.

6. في هذه الدراسة، أظهر الارتباط بين مستوى الاندوكان في المصل مع معلمات مختلفة في مجموعة المرضى وجود ارتباط طردي كبير بين مستوى الاندوكان في المصل مع (اجمالي عدد كرات الدم البيضاء، بروتين سي التفاعلي و نسبه الخلايا غير الناضجه الي الخلايا الكليه) وارتباط عكسي كبير بين مستوى الاندوكان في المصل مع (الصفائح الدمويه). في حين أن العلاقة بين مستوى إندوكان في المصل مع (عمر الحمل، وزن الجسم) كان إحصائيًا غير مهم.

التوصيات:

يمكن استخدام الإندوكان في تشخيص الإنتان عند الولدان الخدج والكاملين الذين يعانون من الإنتان الوليدي المتاخر لانه يمتلك حساسيه عاليه 94% وخصوصيه عاليه 100%.