Results

Table (8): *Clinical data of the studied groups :*

Group	Statistical data	Gest. Age/w	Wt/g	Apgar score at 1 min.	Apgar score at 5 min.	Downes score	ABG score	X-ray score
Preterms without RDS (10 cases)	Mean	34.9	1.95	7.2	9.3	0	0	0
	± SD	1.1005	.3109	.4216	.483	0	0	0
	Range	33-36	1.5-2.4	7-8	9-10	0	0	0
Preterms with RDS (40 cases)	Mean	32.975	1.6113	3.825	6.8	7.6	1.85	3.475
	± SD	2.7408	.4614	.813	.4641	1.1503	0.7696	1.1764
	Range	27-36	.8-2.4	3-5	6-8	4	2	4

Table (9): Descriptive data of both studied groups :

Group	***Preterm infants without RDS (10 cases)***			***Preterm infants with RDS (40 cases)***		
Sex	***M***	***5***	***50%***	***M***	***24***	***60%***
	F	***5***	***50%***	***F***	***16***	***40%***
Mode of delivery	***SVD***	***7***	***70%***	***SVD***	***14***	***35%***
	CS	***3***	***30%***	***CS***	***26***	***65%***
PROM	***Absent***	***6***	***60%***	***Absent***	***25***	***62.5%***
	Present	***4***	***40%***	***Present***	***15***	***37.5%***
Steroids	***Absent***	***2***	***20%***	***Absent***	***14***	***35%***
	Present	***8***	***80%***	***Present***	***26***	***65%***
Surfactant	***Used***	***0***	***0%***	***Used***	***19***	***47.5%***
	Not	***10***	***100%***	***Not***	***21***	***52.5%***
CPAP	***Used***	***0***	***0%***	***Used***	***11***	***27.5%***
	Not	***10***	***100%***	***Not***	***29***	***72.5%***
M.V	***Used***	***0***	***0%***	***Used***	***24***	***60%***
	Not	***10***	***100%***	***Not***	***16***	***40%***
Prognosis	***Cured***	***10***	***100%***	***Cured***	***32***	***80%***
	Died	***0***	***0%***	***Died***	***8***	***20%***

(RDS= respiratory distress syndrome; M= male; F= female; SVD= spontaneous vaginal delivery; CS= Caesarean section; M.V.=mechanical ventilation; PROM= premature rupture of membrane; CPAP= continous positive air pressure)

Table (10): Gestational age (in weeks) of the studied preterm infants :

	Gestational age			*P.value*
	Mean	*± SD*	*Range*	
Preterm infants without RDS. (Group I). ***(10 cases).***	***34.9***	***1.1***	***33-36***	***.001*****
Preterm infants with RDS. (Group II). ***(40 cases).***	***32.975***	***2.74***	***27-36***	

**High Statistically significant difference.

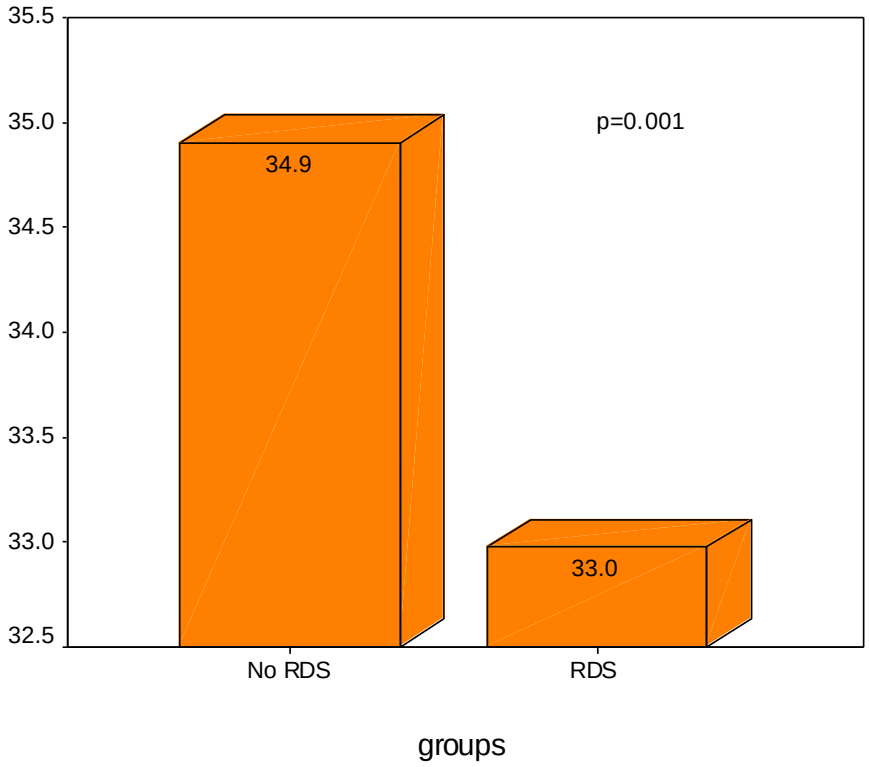
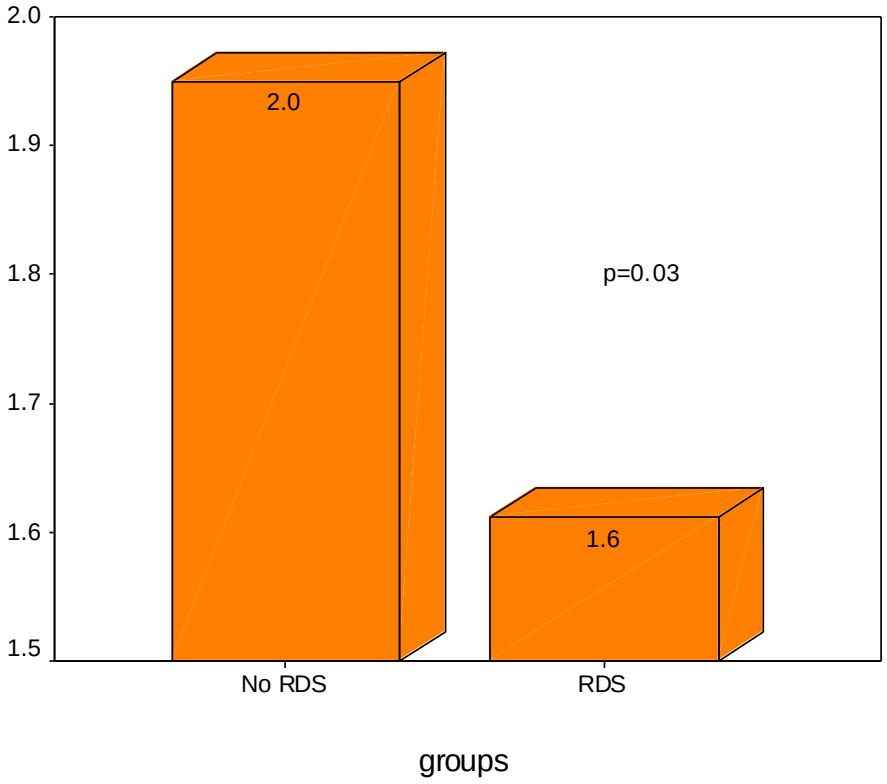


Figure (20): Gestational age (in weeks) of the studied preterm infants.

Table (11): Birth weight (in kg) of the studied preterm infants :

	Birth weight			***P.value***
	Mean	***± SD***	***Range***	
Preterm infants without RDS. (Group I). (10 cases).	***1.95***	***0.31***	***1.5-2.4***	***0.033****
Preterm infants with RDS. (Group II). (40 cases).	***1.675***	***0.461***	***0.8-2.4***	

* Statistically significant difference.



Figure(21): Birth weight (in kg) of the studied preterm infants.

Table (12): ***Gender effect on VEGF level in both studied groups :***

Group	Sex		VEGF (pg/ml)		P-value
			Median	Range	
Preterm infants without RDS. (Group I). (10 cases).	Male	5	232	75-800	.754
	Female	5	223	25-830	
Preterm infants with RDS. (Group II). (40 cases).	Male	24	24.45	17-78.3	.557
	Female	16	30.05	15-78	

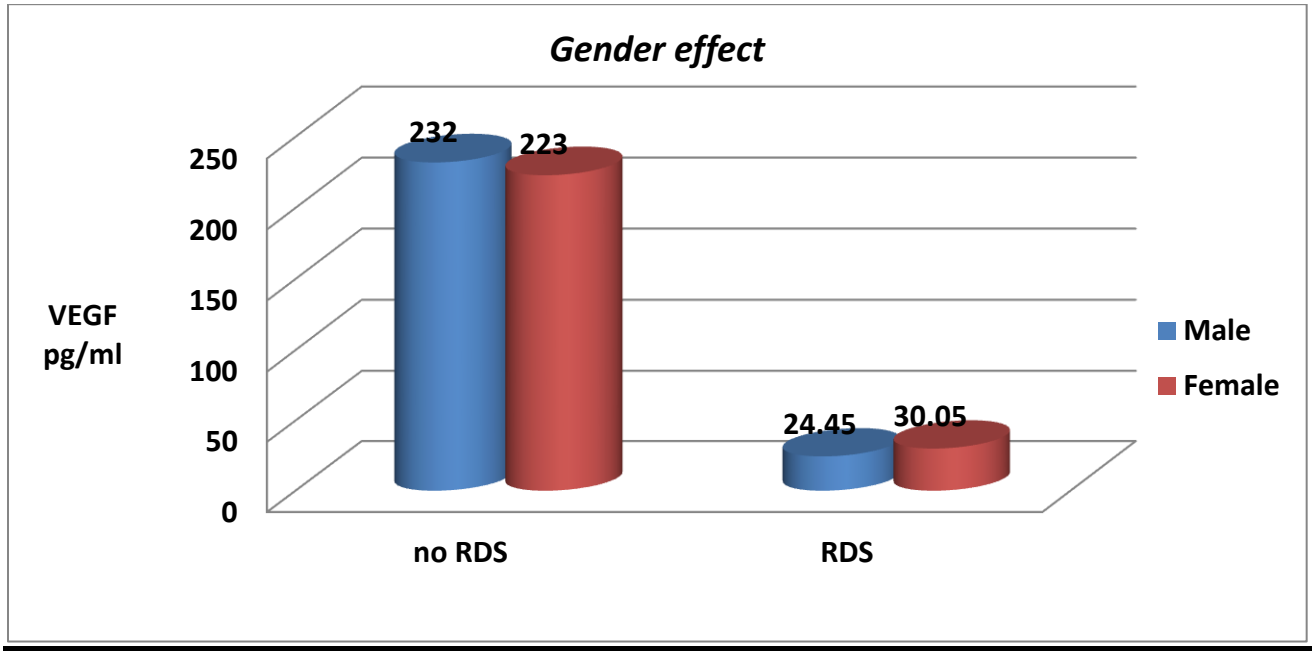
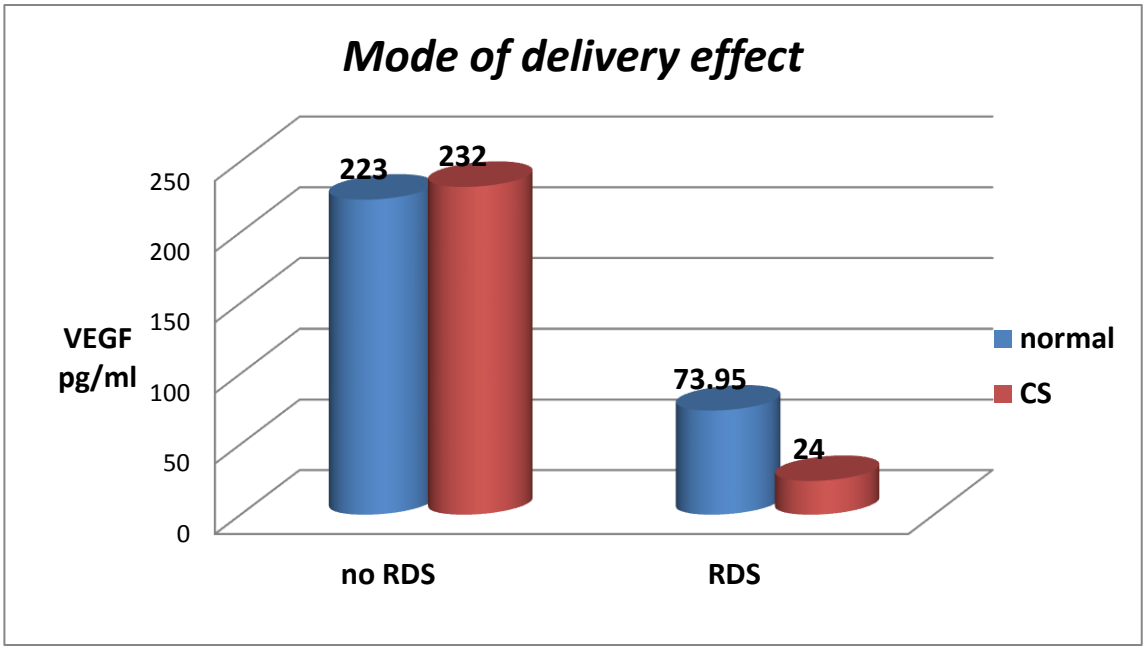


Figure (22): ***Gender effect on VEGF level in both studied groups .***

Table(15): Mode of delivery effect on VEGF level in both studied groups:

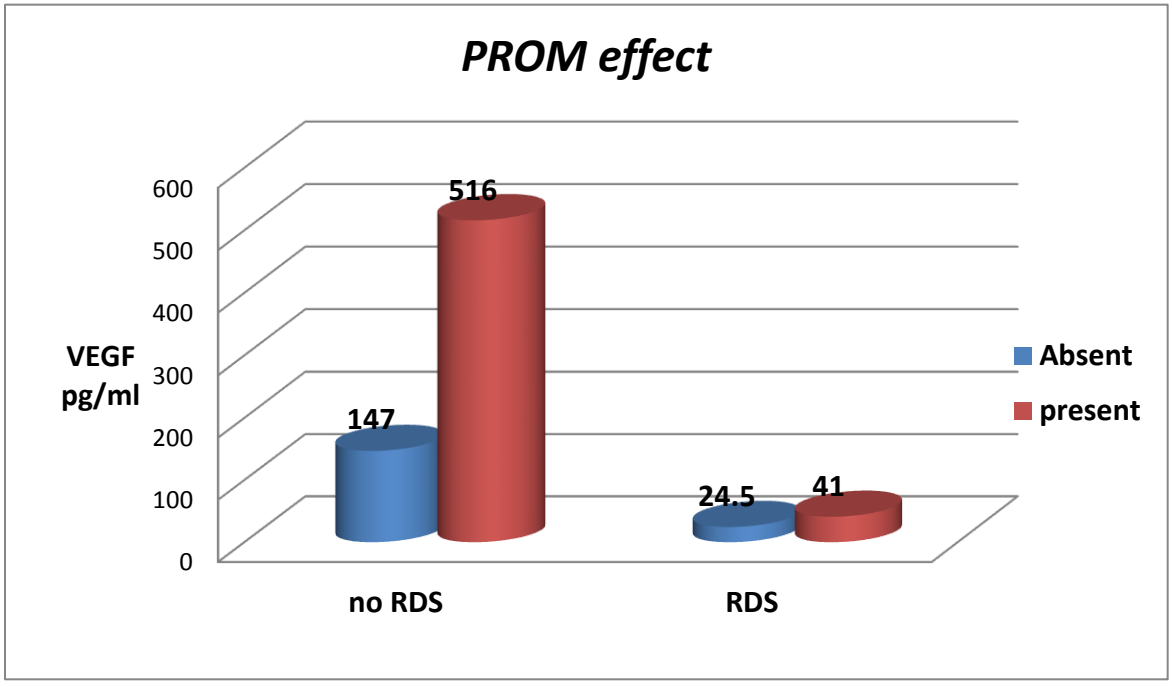
Group	Mode of delivery		VEGF (pg/ml) Median	VEGF (pg/ml) Range	P-value
Preterm infants without RDS. (Group I). (10 cases).	Normal	7	223	26-800	.909
	CS	3	232	25-830	
Preterm infants with RDS. (Group II). (40 cases).	Normal	14	73.95	20-78.3	.557
	CS	26	24	15-76.8	



Figure(24): *Mode of delivery effect on VEGF level in both studied groups .*

Table (14): ***PROM effect on VEGF level in both studied groups :***

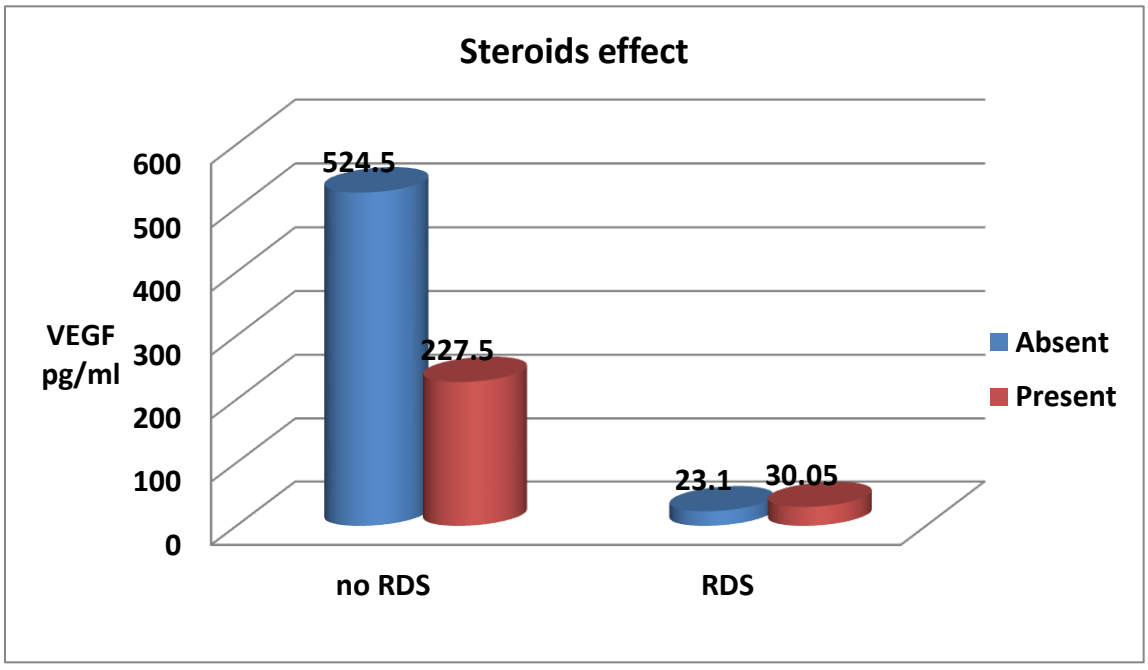
Group	PROM		VEGF (pg/ml)		P-value
			Median	Range	
Preterm infants without RDS. (Group I). (10 cases).	Absent	6	147	25-277	0.088
	Present	4	516	223-830	
Preterm infants with RDS. (Group II). (40 cases).	Absent	25	24.5	18-78.3	.89
	Present	15	41	15-78.3	



Figure(24): ***PROM effect on VEGF level in both studied groups .***

Table(15): Antenatal steroids effect on VEGF level in both studied groups:

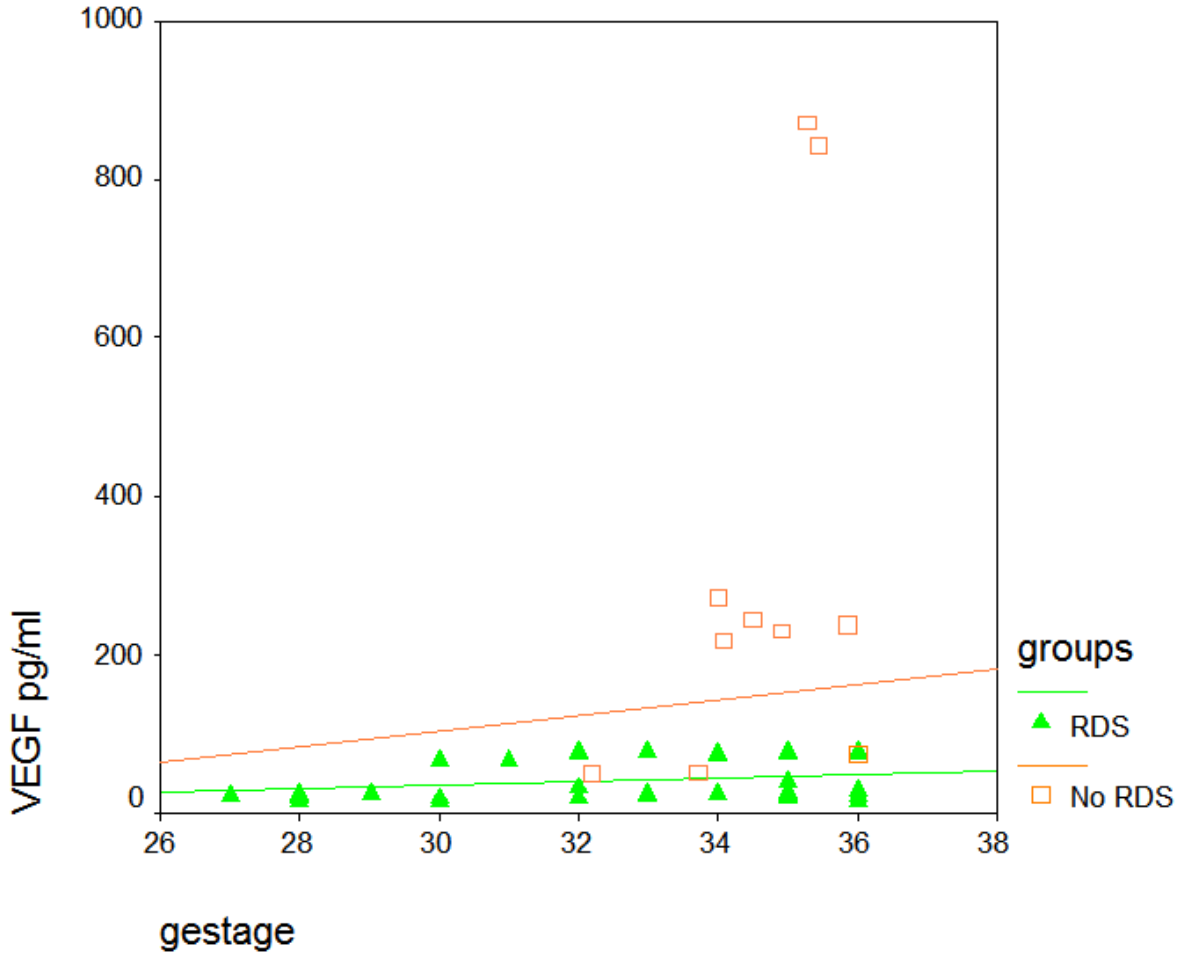
Group	Steroids		VEGF (pg/ml)		P-value
			Median	Range	
Preterm infants without RDS. (Group I). (10 cases).	Absent	2	524.5	219-830	0.433
	Present	8	227.5	25-800	
Preterm infants with RDS. (Group II). (40 cases).	Absent	14	23.1	15-76.8	0.21
	Present	26	30.05	17-78.3	



Figure(25): Antenatal steroids effect on VEGF level in both studied groups.

<u>Table (16):</u> Correlation coefficient between VEGF level and Gestational age for all studied infants:

Gestation (weeks)	*Spearman's coefficient*	*P-value*
Preterm infants without RDS.	***0.184***	***0.610***
Preterm infants with RDS.	***.22***	***0.172***



<u>Figure(26):</u> Showing the correlation between VEGF level and Gestational age for all studied infants.

<u>Table (17):</u> Correlation coefficient between VEGF level and Birth weight for all studied infants:

Birth weight (g)	*Spearman's coefficient*	*P-value*
Preterm infants without RDS.	*0.158*	*0.663*
Preterm infants with RDS.	*.173*	*0.285*

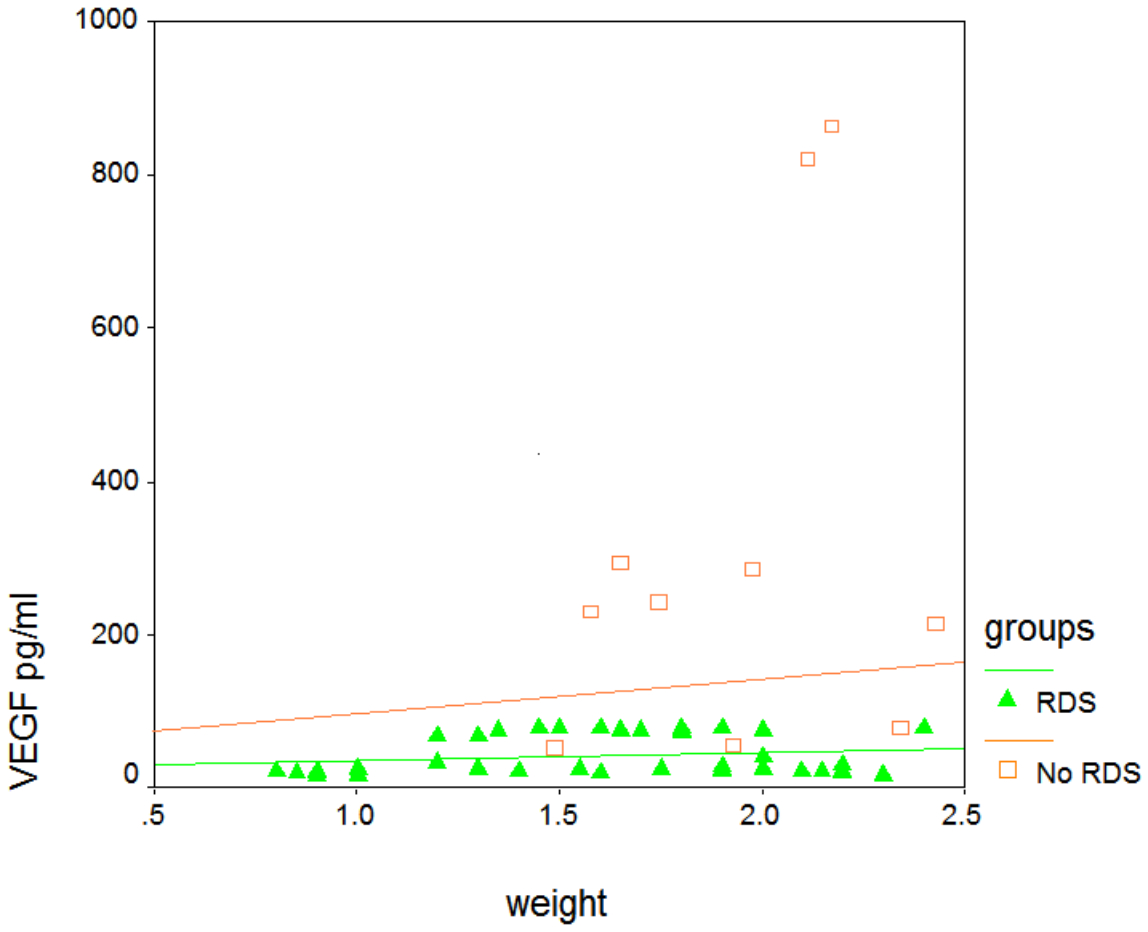


Figure (27):Showing the correlation between VEGF level and Birth weight for all studied infants.

Table (18): ***Comparison between Preterm infants without RDS and Preterm infants with RDS as regard to VEGF level :***

Group	*Statistical data*	*VEGF (pg/ml)*	*P-value*
Preterm infants without RDS. *(Group I). (10 cases).*	*Median* *Range*	*227.5* *25-830*	*.0001***
Preterm infants with RDS. *(Group II).(40 cases).*	*Median* *Range*	*24.9* *15-78.3*	

**High Statistically significant difference

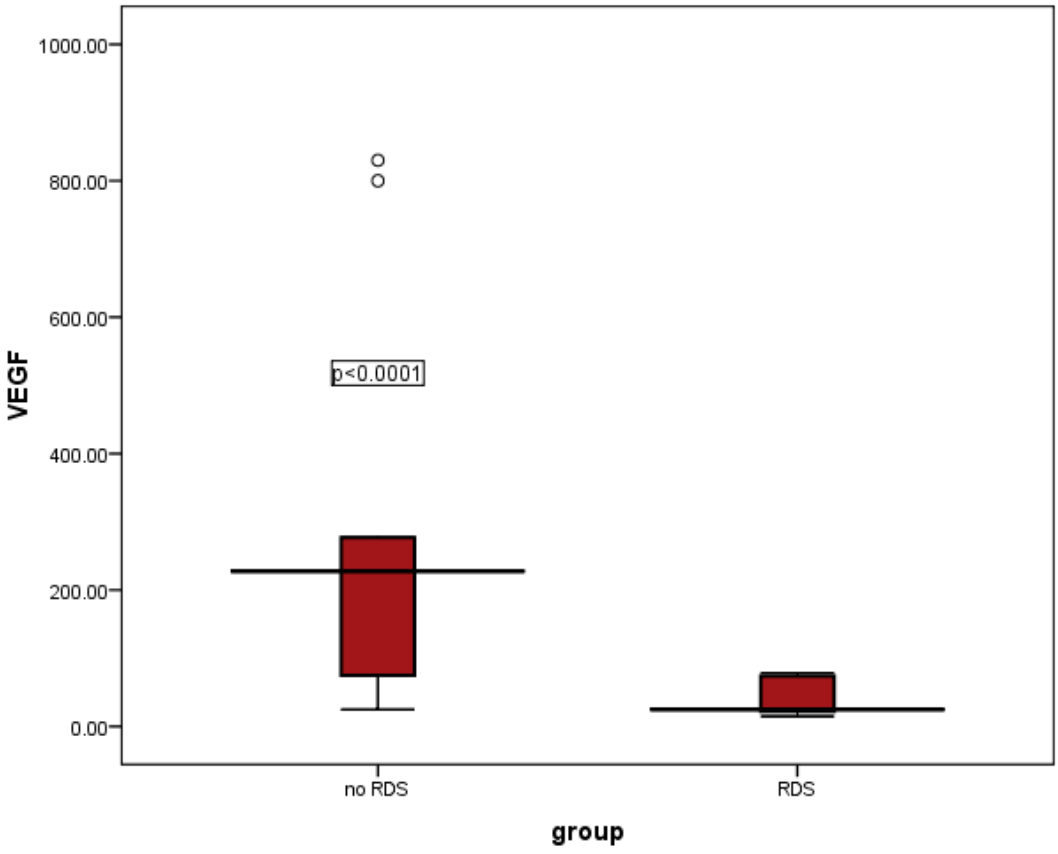


Figure (28): ***Shows high statistical significant correlation in VEGF level between Preterm infants without RDS and Preterm infants with RDS .***

Table (19): ***Correlation between the degree of RDS in Preterm infants with RDS (group II) according to VEGF level :***

Preterms with RDS.	*VEGF (pg/ml)*		*P-value*
	Median	*Range*	
Mild RDS	*74.4*	*73.5-78.3*	*.0001***
Moderate RDS	*74.6*	*41-78.3*	
Severe RDS	*22.1*	*15-33*	

******High Statistically significant difference

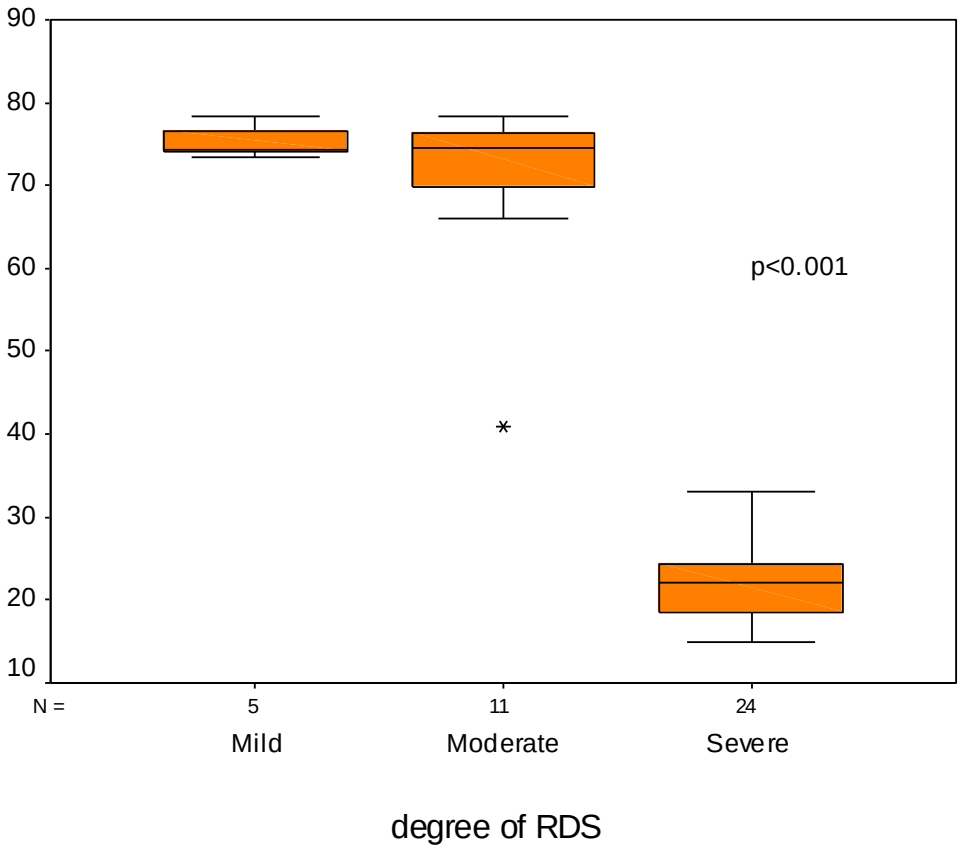


Figure (29): ***Shows high statistical significant correlation in VEGF level between Preterm infants according to the severity of RDS .***

Table (20): ***Correlation coefficient between VEGF level and various variables for all studied infants:***

Variable	*Spearman's coefficient*	*P-value*
Apgar 1	*0.774*	*0.0001***
Apgar 5	*0.619*	*0.0001***
Downes score	*-0.837*	*0.0001***
ABG score	*-0.852*	*0.0001***
X-ray score	*-0.862*	*0.0001***

** High Statistically significant difference

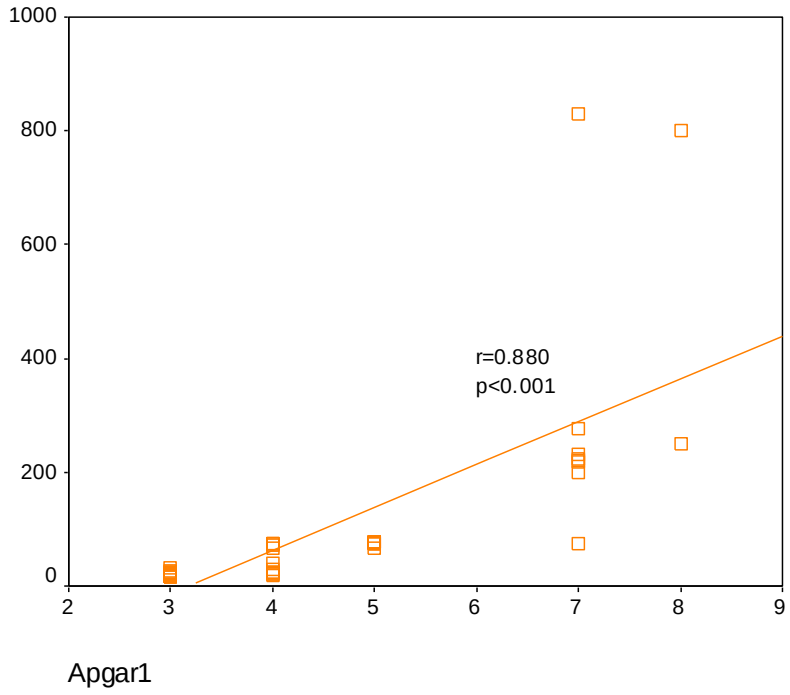
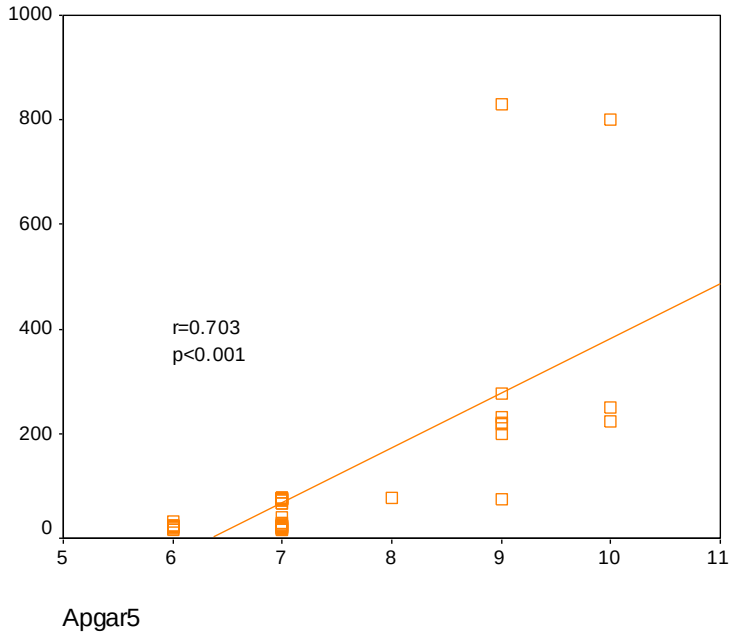
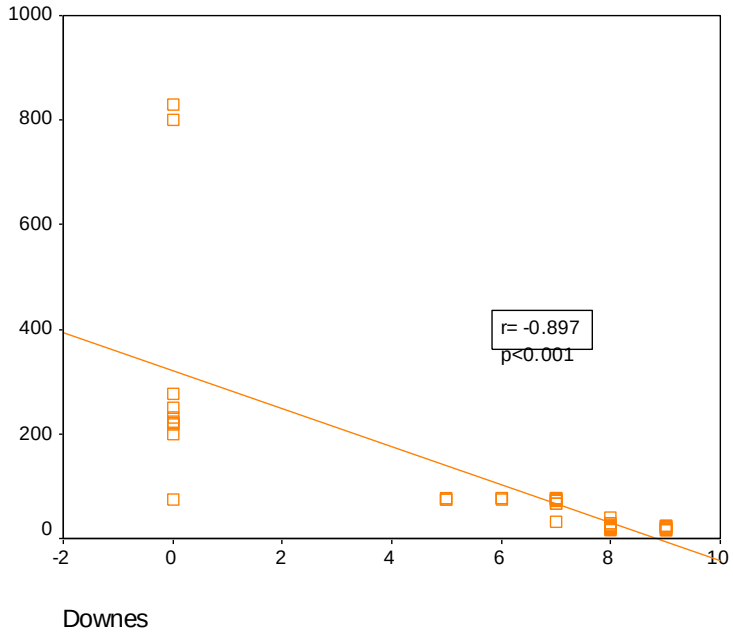


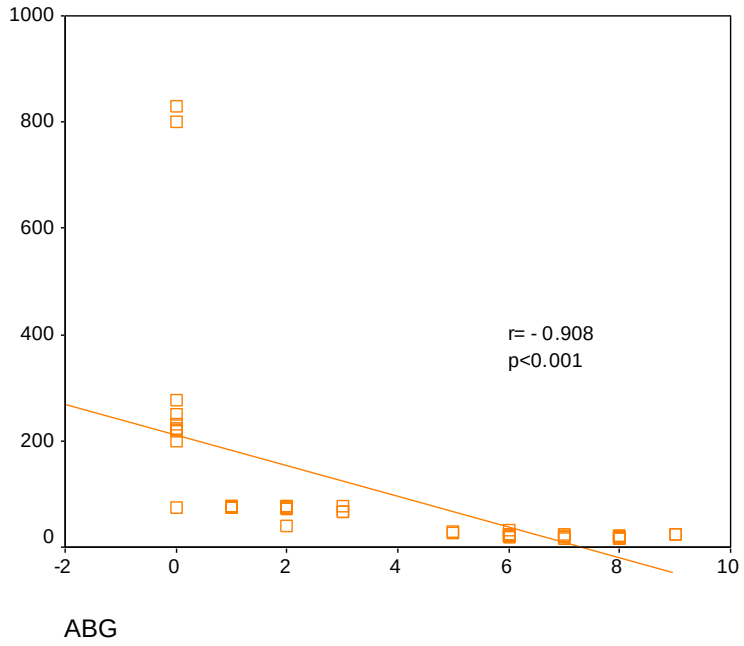
Figure (30): ***Correlation between VEGF level and Apgar score at 1 min for all studied infants.***



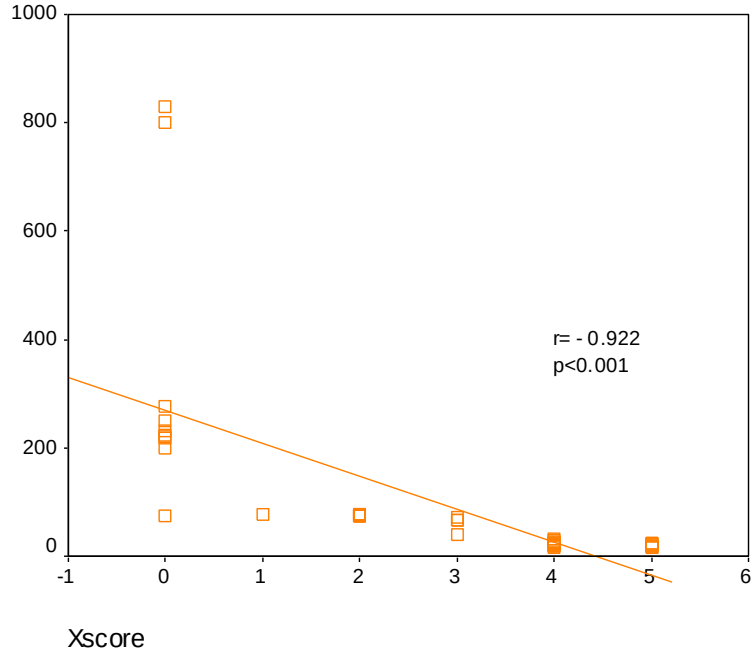
<u>Figure (31):</u> Correlation between VEGF level and Apgar score at 5 min for all studied infants.



<u>Figure (32):</u> Correlation between VEGF level and Downes score for all studied infants.



<u>Figure (33):</u> Correlation between VEGF level and ABG score for all studied infants.

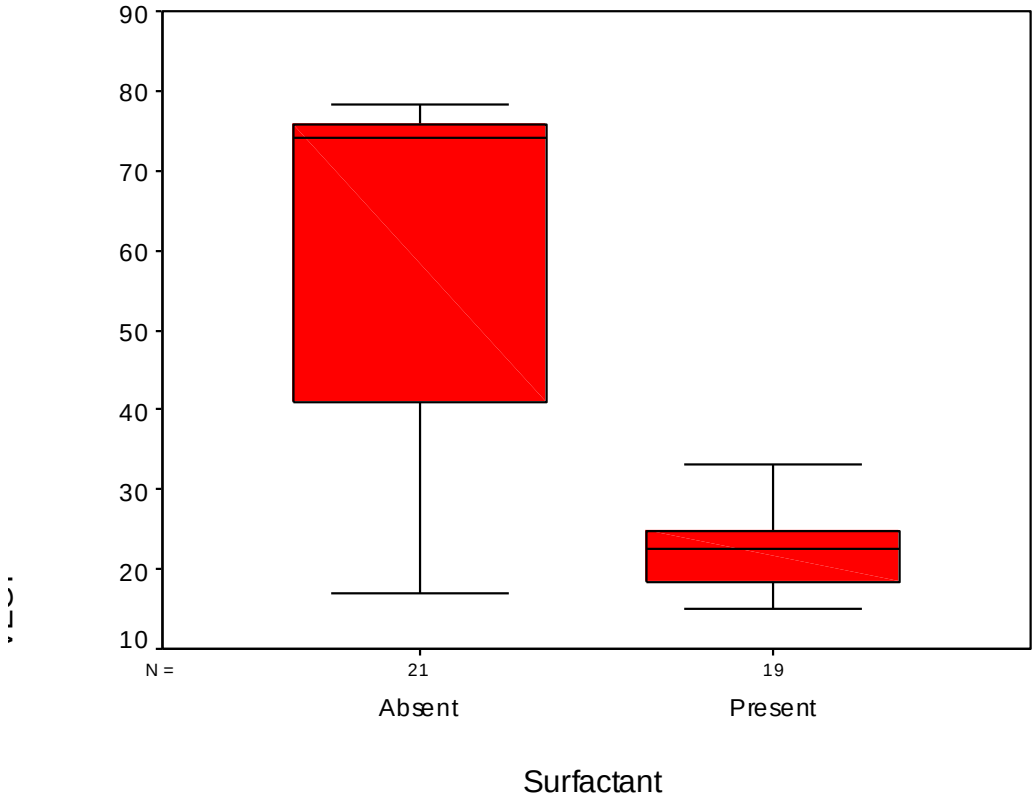


<u>Figure (34):</u> Correlation between VEGF level and X-ray score for all studied infants.

Table (21):Correlation between administration of rescue surfactant and VEGF level in preterm infants with RDS :

Group	*Surfactant*		*VEGF (pg/ml)*		*P-value*
			Median	*Range*	
Preterm infants with RDS. (Group II). ***(40 cases).***	***Absent***	***21***	***74***	***17-78.3***	***0.0001*****
	Present	***19***	***22.5***	***15-33***	

**High Statistically significant difference.

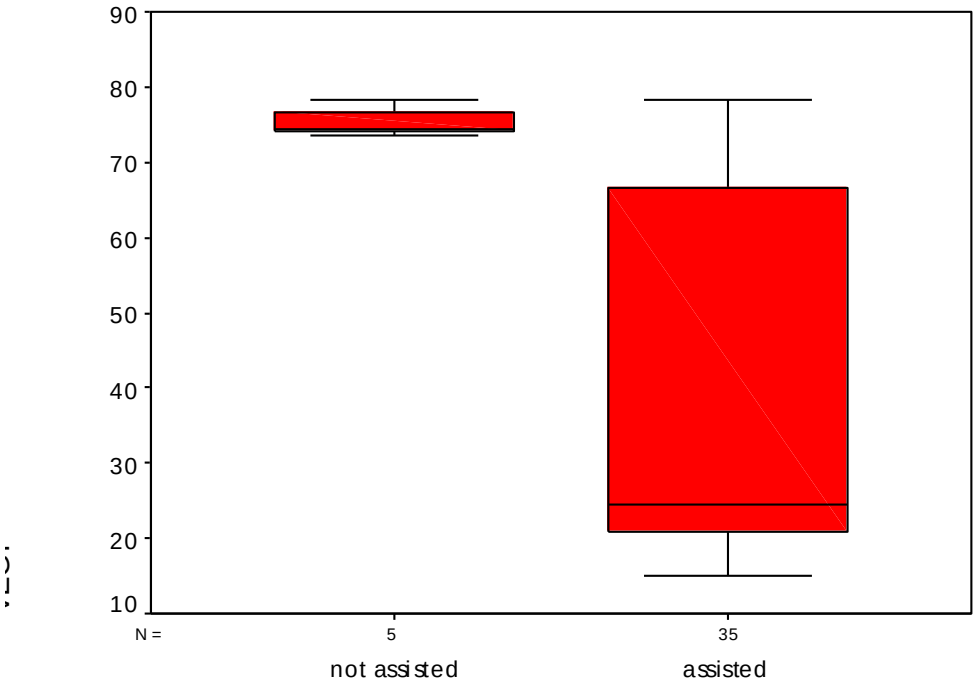


Figure(35):Showing the correlation between administration of rescue surfactant and VEGF level in preterm infants with RDS (group II).

Table (22): Correlation between the need of respiratory assist and VEGF level in preterm infants with RDS :

Group	*No*	*VEGF (pg/ml)*		*P-value*
		Median	*Range*	
Preterm infants who didn't need resp assist	***5***	***74.4***	***73.5-78.3***	***0.0001*****
Preterm infants who needed resp assist	***35***	***24.4***	***15-78.3***	

**High Statistically significant difference.

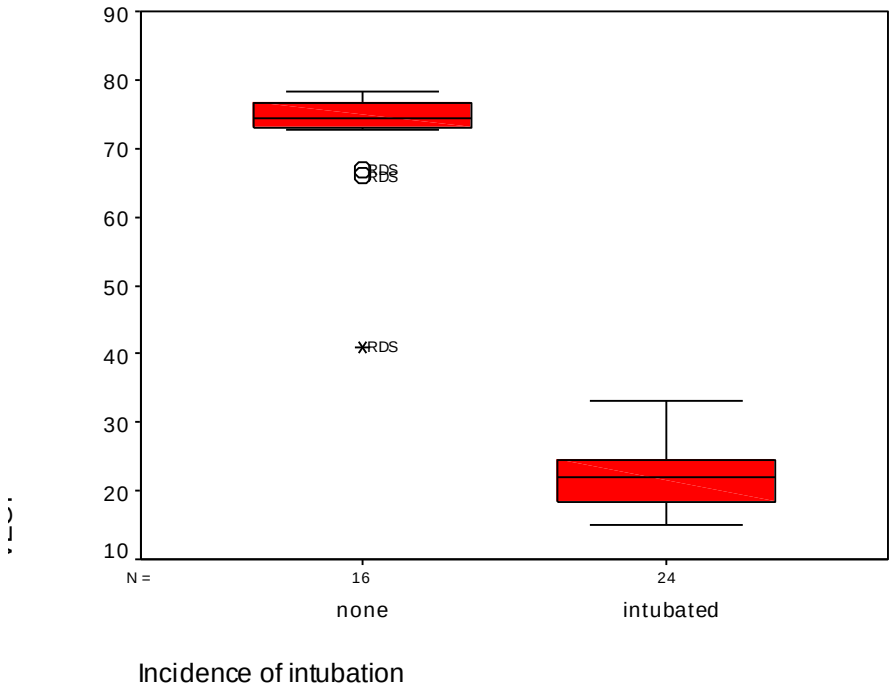


Figure(36): Showing the correlation between the need of respiratory assist and VEGF level in preterm infants with RDS.

Table (23): Correlation between the incidence of tracheal tube intubation and VEGF level in preterm infants with RDS :

Group	*No*	*VEGF (pg/ml)*		*P-value*
		Median	*Range*	
Non intubated preterm infants with RDS.	*16*	*74.5*	*41-78.3*	*0.0001***
Intubated preterm infants with RDS.	*24*	*22.1*	*15-33*	

**High Statistically significant difference.



Figure(37): Showing the correlation between the incidence of tracheal tube intubation and VEGF level in preterm infants with RDS.

Table (24): Correlation between VEGF level and outcome among infants with RDS :

Preterm infants with RDS.		*VEGF (pg/ml)*		*P-value*
		Median	*Range*	
Cured	*32*	*37*	*17-78.3*	*.0001***
Died	*8*	*19*	*15-25*	

******High Statistically significant difference

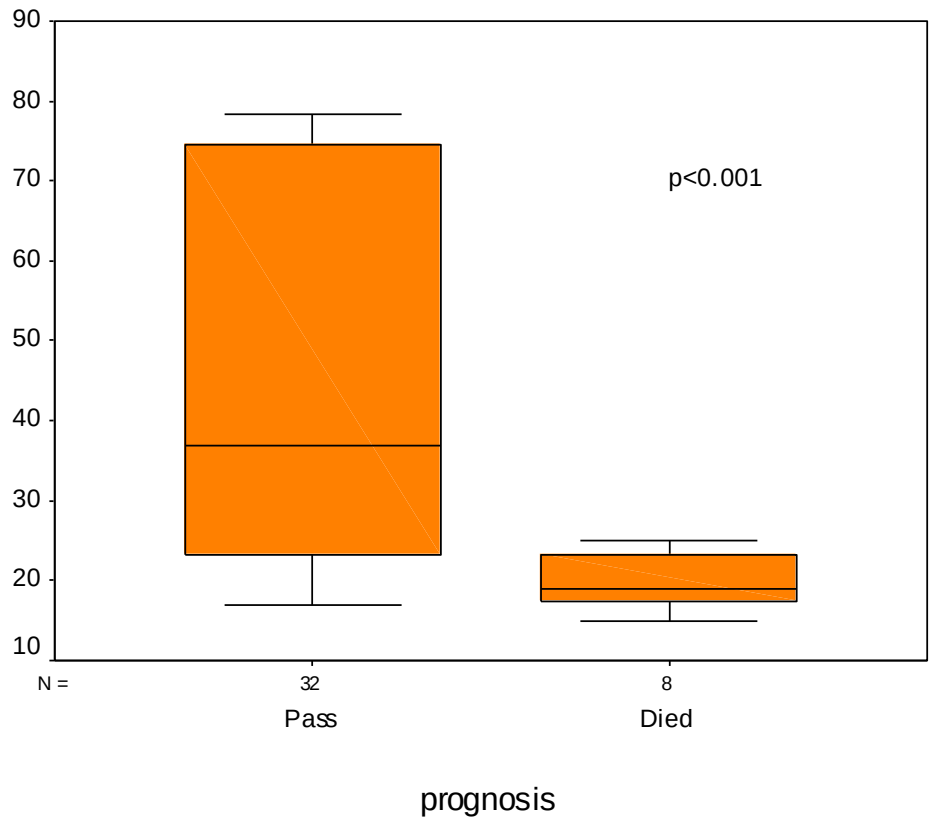


Figure (38): Shows statistical significant correlation between VEGF level and death among infants with RDS .

Table (25): ROC curve results for VEGF as a diagnostic tool for RDS:

Area	***0.888***
Significance	***0.0001***
Cut off value	***30.5***
Sensitivity	***57.5%***
Specificity	***80%***
Positive predictive value	***92%***
Negative predictive value	***42.5%***

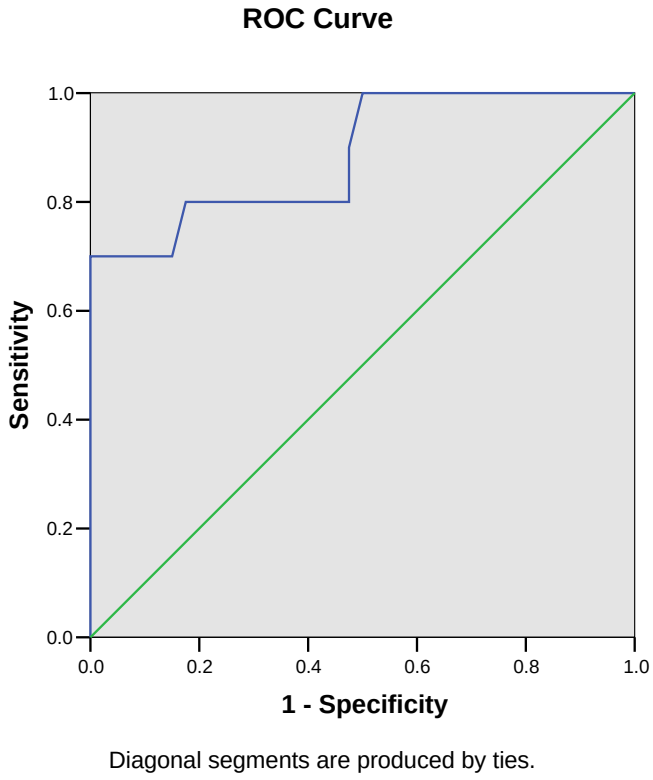


Figure (39): ROC Curve.

Analysis of the Results

The study included 50 preterm newborns consequently admitted to El-Mansoura general hospital and (NICU) of Mansoura University Children Hospital (MUCH) the period from March 2009 till December 2009.

All neonates were subjected to :

A. Complete history taking including:

1. Antenatal history of maternal diseases, maternal fever, maternal use of antenatal steroids with its type, dose and time of administration, ..etc.
2. Natal history of mode of delivery, premature rupture of membranes,..etc.

B. Complete clinical examination to assess:

gestational age by Ballad score, Apgar scores at 1&5 minutes, degree of respiratory distress syndrome using Downes score.

C. Chest X. ray .

D. Laboratory investigations included:

1. Arterial blood gases (ABG).
2. Cord blood VEGF level using (ELISA) method .

All babies were followed in the neonatal intensive care unit *(NICU)* for possibility of developing RDS .

Babies who did not develop respiratory distress syndrome (RDS) were classified into group I *(control group)* , they were 10 preterm infants.

While babies who developed RDS were classified into group II (40 preterm infants) .

The descriptive data in **Table(9)** shows that :

Male preterm infants represent 60% of the preterm infants with RDS cases, whereas half the number of preterm infants without RDS were males.

Higher incidence of preterm infants who did not develop RDS (70%) were born vaginally, whereas the incidence of cesarean section is high in those developing RDS (65%) .

PROM occurred in almost 40% of preterm infants in both groups.

Antenatal steroids were given in 80% of the preterm infants who didn't develop RDS, and in 60% of preterm infants who developed RDS.

65% of the preterm infants with RDS were given rescue surfactant after delivery.

CPAP was used in almost 28% of preterm infants who developed RDS, while assisted ventilation was used in 40% of the same group.

None of the preterm infants who did not develop RDS died , while death occurred in 20% in the preterm infants with RDS.

The mean gestational age in weeks (34.9 $\pm$1.1005) for preterm infants without RDS & the mean gestational age in weeks (32.975$\pm$ 2.7408) for preterm infants with RDS with high statistically significant difference between the two groups ($P < 0.05$), as shown in table No.10 and figure No.20.

The birth weight in kg (1.95 $\pm$0.31) for preterm infants without RDS & the mean birth weight in kg (1.675$\pm$ 0.461) for preterm infants with RDS with statistically significant difference between the weight of the two groups ($P < 0.05$), as shown in table No.11 and figure No.21.

No significant difference in concentrations of VEGF between male and female infants in both studied groups ($p > 0.05$) as shown in table No.12. and figure No.22.

No significant difference in concentrations of VEGF between infants whose mothers had PROM or not in both studied groups ($p > 0.05$) as shown in table No.14. and figure No.24.

No significant difference in concentrations of VEGF between infants whose mothers received antenatal steroids or not in both studied groups ($p > 0.05$) as shown in table No.15. and figure No.25.

No significant correlations between VEGF levels and gestational age for both studied groups ($p > 0.05$) as shown in table No.16. and figure No.26.

No significant correlations between VEGF levels and birth weight for all studied groups ($p > 0.05$) as shown in table No.17. and figure No.27.

Highly significant difference found in the concentrations of VEGF between the preterm infants without RDS 227.5(75-830) pg/ml & the preterm infants with RDS 24.9(15-78.3) pg/ml ($p < 0.001$), as shown in table No.18. and figure No.28.

Highly significant difference found in the concentrations of VEGF between the preterm infants with mild RDS 74.4(73.5-78.3) pg/ml , the preterm infants with moderate RDS 74.6(41-78.3) pg/ml & the preterm infants with severe RDS 22.1(15-33) pg/ml ($p < 0.001$), as shown in table No.19. and figure No. 29.

Table (9) represent clinical data measured and reported at time of delivery as gestational age, birth weight, apgar score at 1 min, apgar score at 5 min, ABG score, Downes score and X-ray score (reported at admission) .

High significant correlations between VEGF levels and various variables (apgar score at 1 min , apgar score at 5 min , Downes score , ABG score, X-ray score) for preterm infants with RDS ($p < 0.001$) as shown in tables No.20, and figures no.30,31,32,33,34.

There was a significant positive correlation between VEGF level and Apgar score at 1 min & 5 min ($p < 0.001$) among preterm infants with RDS as shown in table No.20 and figures No.30,32.

There was a significant negative correlation between VEGF level and Downes score, ABG score & X-ray score ($p < 0.001$) among preterm infants with RDS as shown in table No.20 and figure No.32,33,34.

Highly significant difference was found in the concentrations of VEGF between the preterm infants who didn't need respiratory support 74.4(73.5-78.3) pg/ml and preterm infants who needed respiratory support (either CPAP or M.V) 24.4(15-78.3) pg/ml ($p < 0.001$), as shown in table No.22. and figure No. 36.

Highly significant difference was found in the concentrations of VEGF in the group of preterm infants who developed RDS between infants given rescue surfactant 22.5(15-33) pg/ml and infants not given surfactant 74(15-78.3) pg/ml ($p < 0.001$), as shown in table No.21. and figure No. 35.

Significantly lower concentrations of VEGF found in preterm infants developing RDS with higher incidence of endotracheal tube intubation 22.1 (15-33) pg/ml compared with other preterm infants from the same group 74.5(41-78.3) pg/ml , ($p < 0.001$**)** as shown in table No.23 and figure No.37.

The preterm infants with RDS who died had significantly lower VEGF concentrations than the preterm infants with RDS who survived **[** 37 (17-78.3) *v* 19 (15-25)] pg/ml , ($p < 0.001$**)** as shown in table No.24 and figure No.38.

Cord blood VEGF elevation was significantly correlated with an absence of RDS as the specificity of cord blood VEGF above 30.5 pg/ml for predicting the absence of RDS was 80%, the sensitivity was 57.5% with area under curve 0.888 and significance of 0.0001 as shown table No.25 and figure No.39.