Results

This study included 10 apparently healthy neonates as a control group and 70 neonates as a septic group.

The results of this study are listed in tables (5-23) and figures (4-14).

TABLE (5): comparison between septic and control groups as regards demographic characters (gest age- birth wt – sex – maturity- delivery – APGAR1 – APGAR5).

		Septic group (n=70)		Control group (n=10)		**Test of significance**	p
		No.	%	No.	%		
Sex	Female	٣٦	٥١.٤	٦	٦٠.٠	0.3	>0.05
	Male	٣٤	٤٨.٦	٤	٤٠.٠		
Maturity	FT	٤٢	٦٠.٠	٦	٦٠.٠	---	---
	PT	٢٨	٤٠.٠	٤	٤٠.٠		
Delivery	C.S	٤٢	٦٠.٠	٦	٦٠.٠	---	---
	V.D	٢٨	٤٠.٠	٤	٤٠.٠		
		Mean	SD	Mean	SD		
gest age (weeks) (Range)		٣٦.٨٩	٢.٦١٨	٣٨.٠٠	١.٨٢٦	1.7	>0.05
		(32-40)		(36-40)			
birth wt (KG) (Range)		٢.٥٥١٤	0.٤٤٧٩٦	٢.٧١٤٠	0.٣٨٧٣٠	1.1	>0.05
		(1.82-3.24)		(2.20-3.20)			
APGAR1(min) (Range)		٤.٩٧	0.٩٤٧	٦.٦٠	0.٥١٦	5.3	<0.001
		(3-6)		(6-7)			
APGAR5(min) (Range)		٧.٩٠	١.٠٠٩	٩.٥٠	0.٥٢٧	4.9	<0.001
		(6-9)		(9-10)			

- Gestational age was higher in control than septic group.
- No significant difference between different groups as regards sex, maturity and mode of delivery.
- No significant difference between different groups as regards birth wt.
-APGAR 1& 5 were significantly higher in control than septic group.
- Normal birth weight was significantly more frequent in control than septic group.

Figure (4)

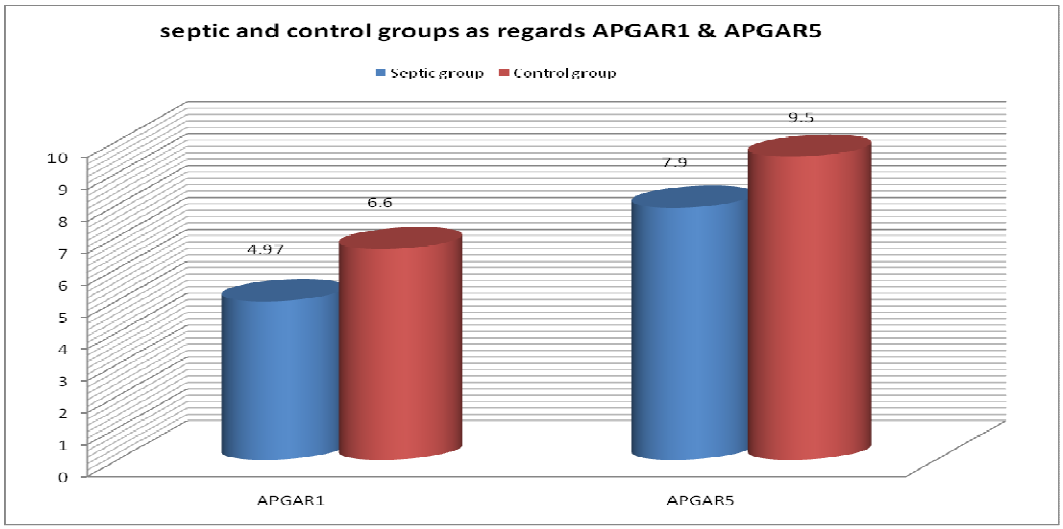


TABLE (6): comparison between septic and control groups as regards risk factors for infection (PROM – UTI – chorioamnionitisnitis).

		Septic group (n=70)		Control group (n=10)		**Test of significance**	p
		No.	%	No.	%		
PROM	No	٥٠	٧١.٤	١٠	١٠٠.٠	3.8	>0.05
	Yes	٢٠	٢٨.٦	٠	٠.		
UTI	NO	٥٤	٧٧.١	١٠	١٠٠.٠	1.6	>0.05
	YES	١٦	٢٢.٩	٠	٠.		
Chorio-amnionitisnitis	No	٦٢	٨٨.٦	١٠	١٠٠.٠	0.3	>0.05
	Yes	٨	١١.٤	٠	٠.		

-According to this table there is no PROM or UTI or Chorioamnionitisnitis in the control group. but in the septic group there is 20 cases of PROM, 16 cases of UTI, and 8 cases of chorioamnionitisnitis.

TABLE (7): comparison between septic and control groups as regards laboratory findings.

	Septic group (n=70)		Control group (n=10)		**Test of significance**	
	Mean	SD	Mean	SD		
Platelets **(x10³/L)** (Range)	٢١٧.٦١ (87-386)	٧٦.٢٢	٢٤٥.٩٠ (182-323)	٤٧.٣٤	1.1	>0.05
HB **(g/dL)** (Range)	١٣.٤٧ (8.9-18.1)	٢.٢٠	١٥.٦٣٠ (14.3-17.2)	0.٩٢	5.5	<0.001
TLC **(x10³/L)** (Range)	٢٠.٤١ (15.3-26.1)	٢.٢٠	١٠.٦٦٠ (7.8-14.1)	٢.٢٦	13.1	<0.001
I/T ratio (Range)	0.٢٥٩ (0.145-1.032)	0.١٥٨	0.٠٦٨ (.020-.120)	0.٠٣٢	3.8	<0.001
CRP (mg/dl) (Range)	48.0 (22 - 96)	4.26	0.0 (0.0 - 0.0)	0.0		<0.001

- TLC was significantly higher in septic group than control group.
- No significance difference between septic and control groups as regards platelet count.
- CRP was significantly higher in septic than control group.
- Low platelet count was more frequent in septic than control group.
- Anemia was more frequent in septic than control group.
- Significant difference between different groups as regards I/T ratio.

Figure (5)

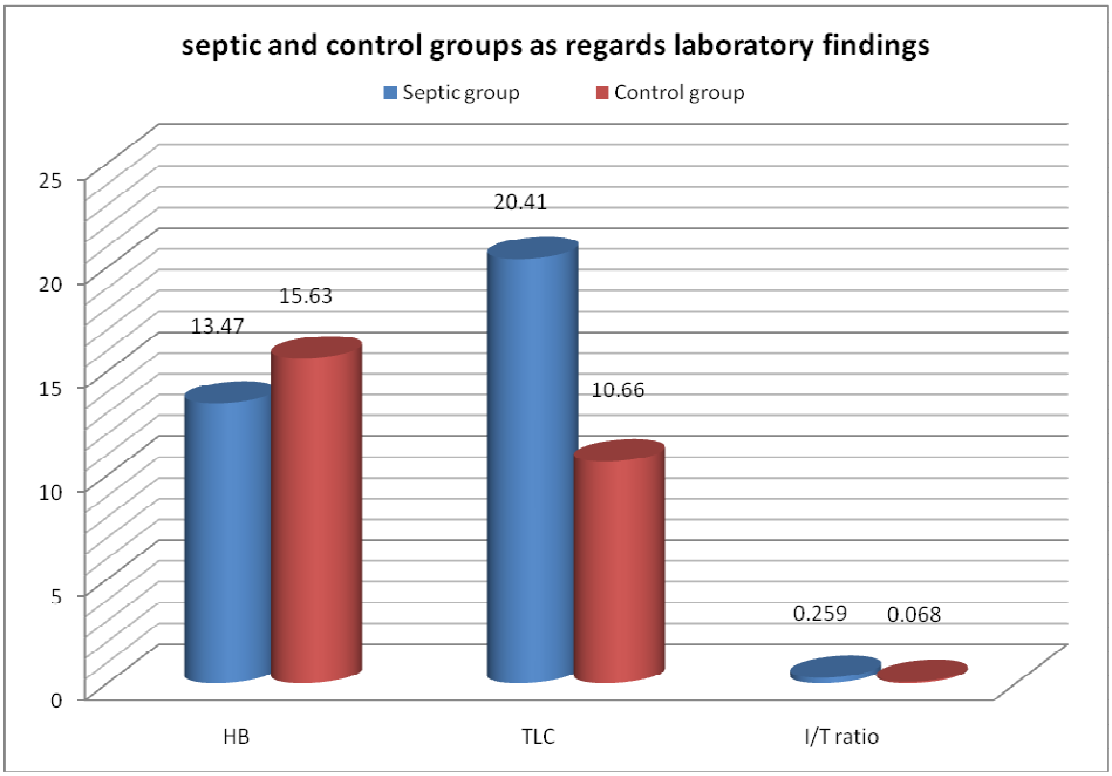

septic and control groups as regards laboratory findings
Septic group
Control group
25
20
15
10
5
0
13.47
15.63
20.41
10.66
0.259
0.068
HB
TLC
I/T ratio

TABLE (8): comparison between septic and control groups as regards HNL.

	Septic group (n=70)		Control group (n=10)		**Test of significance**	
	Mean	SD	Mean	SD		
HNL **(ng/mL)** (Range)	٢١٧.٨٤ (96-335)	٥٤.٣٤٣	٣٠.٣٠ (17-49)	١١.٦٩١	10.8	<0.001

-Serum HNL levels were highly significantly increased in septic group than control group.

Figure (6)

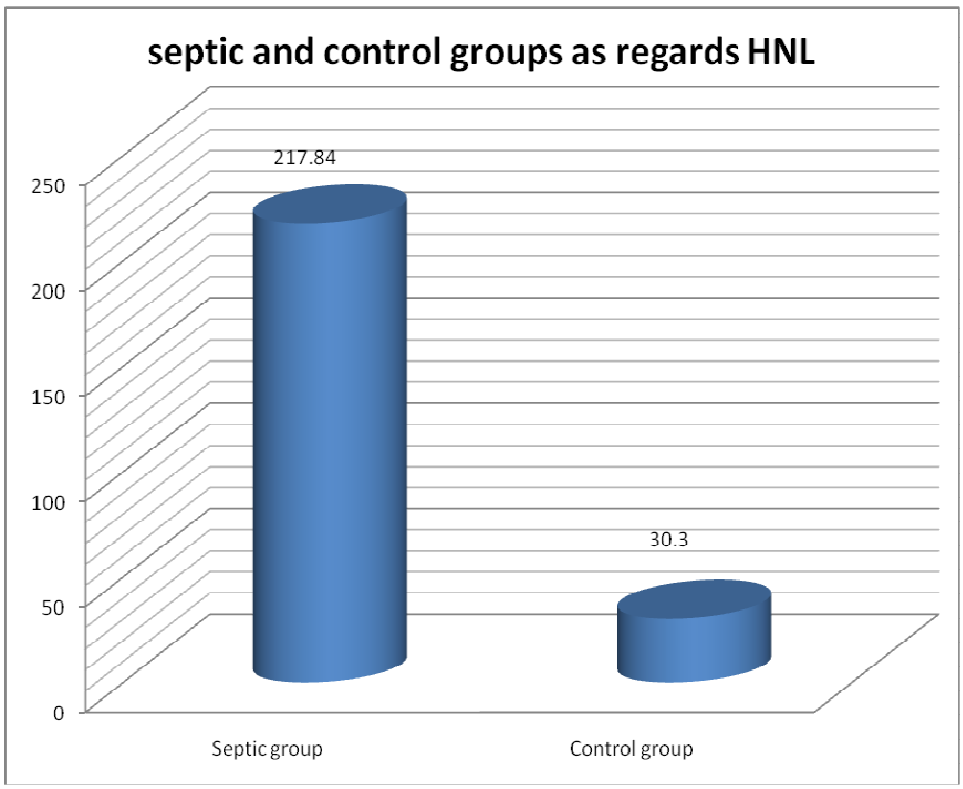


TABLE (9): comparison between preterm and full term septic cases as regards demographic characters (gest age- birth wt – sex – mode of delivery – APGAR1 – APGAR5).

		PT (n=28)		FT (n=42)		**Test of significance**	p
		No.	%	No.	%		
Sex	Female	١٥	٥٣.٦	٢١	٥٠.٠	0.1	>0.05
	Male	١٣	٤٦.٤	٢١	٥٠.٠		
Delivery	C.S	٢٣	٨٢.١	١٩	٤٥.٢	8.1	<0.05
	V.D	٥	١٧.٩	٢٣	٥٤.٨		
		Mean	SD	Mean	SD		
gest age (weeks) (Range)		٣٣.٩٣ (32 - 36)	١.٠١٦	٣٨.٨٦ (37 - 40)	0.٩٥٢	20.6	<0.001
birth wt (KG) (Range)		٢.٠٦٧٩ (1.82 - 2.45)	0. ١٨٠٨١	٢.٨٧٣٨ (2.43 - 3.24)	0. ٢٢٣٦٦	15.9	<0.001
APGAR1(min) (Range)		٤.٥٠ (3-7)	0.٩٢٣	٥.٢٩ (3-7)	0.٨٣٥	3.6	<0.05
APGAR5(min) (Range)		٧.٤٣ (6-9)	١.٠٦٩	٨.٢١ (6-10)	.0.٨٤٢	3.4	<0.05

In Septic cases:

- Gestational age was significantly decreased in preterm than full term neonates.
- Weight was significantly decreased in preterm than full term neonates.
- No significant difference between preterm and full term neonates as regards sex, mode of delivery.
- Significant difference between preterm than full term neonates as regards to APGAR 1& 5 minutes.

TABLE (10): comparison between preterm and full term septic cases as regards laboratory findings.

	PT (n=28)		FT (n=42)		**Test of significance**	
	Mean	SD	Mean	SD		
Platelets **(x10³/L)** (Range)	٢٠٤.٩٦ (87 - 386)	٩٠.٠٨٥	٢٢٦.٠٥ (89 - 331)	٦٥.٢٠٥	1.1	>0.05
HB **(g/dL)** (Range)	١٣.٠٣٩ (9.3 - 16.7)	٢.٣٢٣٧	١٣.٧٥٢ (8.9 - 18.1)	٢.٠٩٥٩	1.3	>0.05
TLC **(x10³/L)** (Range)	١٩.٩٩٦ (7.8 - 25.3)	٢.٤٦٨٤	٢٠.٦٩٨ (7.9 - 26.1)	١.٩٨٤١	1.3	>0.05
I/T ratio (Range)	0.٢٥٩٢٥ (.030 -1.032)	0.١٧٤٠١٠	0.٢٥٩٣٣ (.020 -1.010)	0.١٤٩٠٢٣	0.1	>0.05
CRP (mg/dl) (Range)	48.0 (22 - 94)	4.23	48.0 (22 - 96)	4.26	1.0	>0.05

In Septic cases:

- No significant difference between preterm and full term neonates as regards to TLC, I/T ratio, Platelets, HB and CRP.

TABLE (11): Comparison between preterm and full term in different study groups as regards HNL(ng/mL).

	PT		FT		**Test of significance**	
	Mean	SD	Mean	SD		
septic cases (Range)	٢١٦.٠٠ (112 - 284)	٤٤.٤٠٩	٢١٩.٠٧ (195 - 335)	٦٠.٥٥٩	0.2	>0.05
Control (Range)	٢٩.٠٠ (22 - 42)	٩.٠١٨	٣١.١٧ (17 - 49)	١٣.٩٦٣	0.3	>0.05

In control group:

- No significant difference between full term and preterm neonates as regards to HNL.

In Septic cases:

- No significant difference between full term and preterm neonates as regards to HNL.

Figure (7)

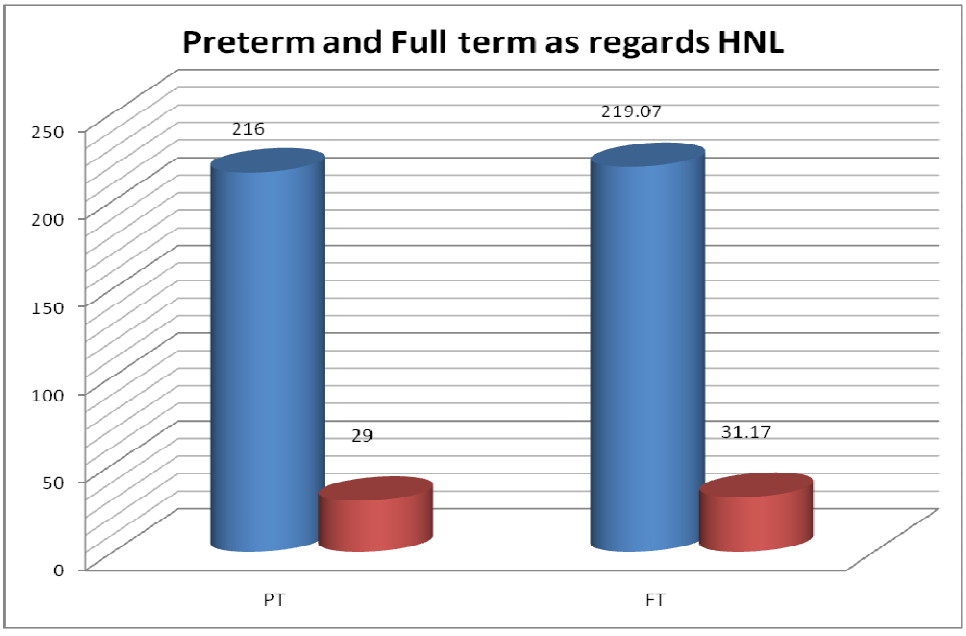


TABLE (12): Comparison between neonates born by V.D and those delivered by C.S as regards HNL (ng/ml).

	C.S		VD		**Test of significance**	
	Mean	SD	Mean	SD		
Cases (Range)	٢١٨.٢١ (100 - 320)	٥١.٣٠٨	٢١٧.٢٩ (96 - 335)	٥٩.٥٧٢	0.1	>0.05
Control (Range)	٣٢.٦٧ (22 - 46)	٩.٧٧١	٢٦.٧٥ (17 - 49)	١٤.٩٣٠	0.7	>0.05

-Mode of delivery showed that it has no affect on HNL in septic group or control group.

Figure (8)

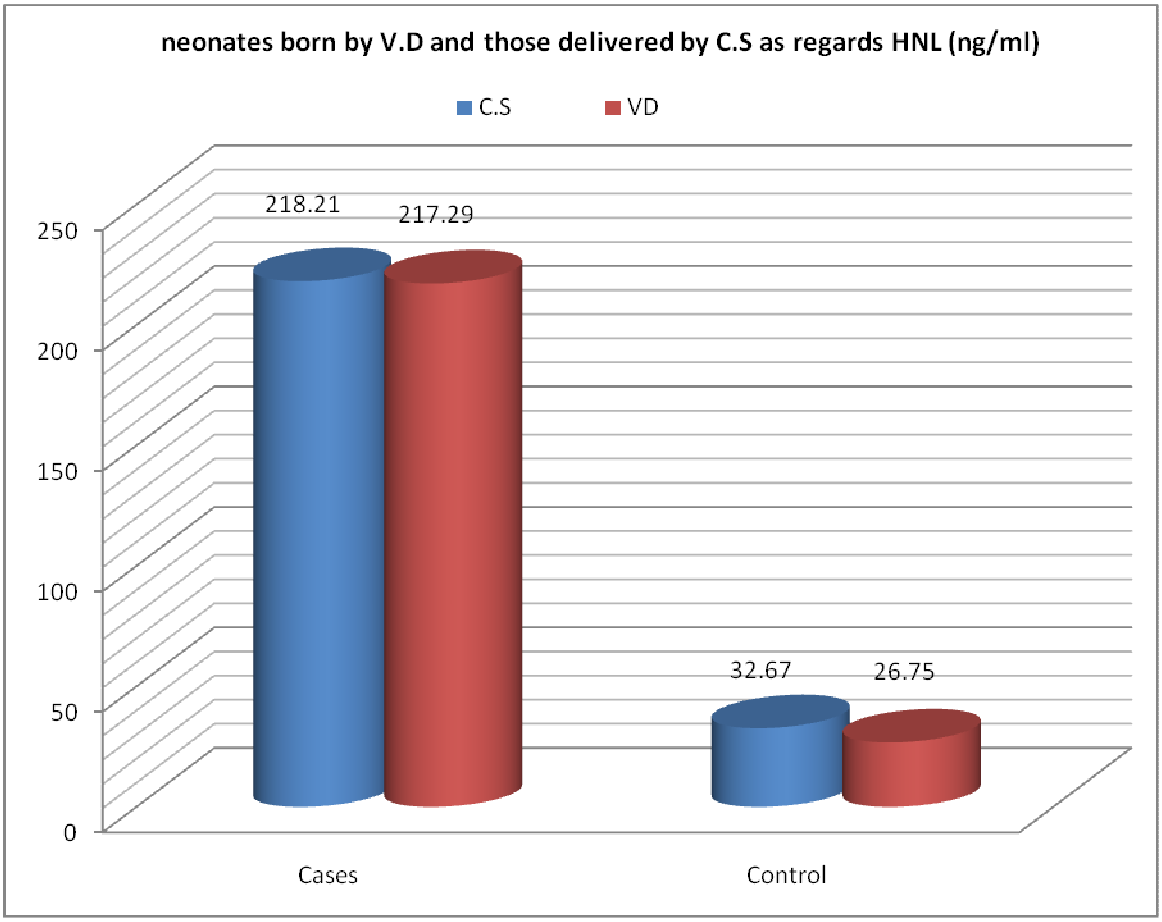


TABLE (13): comparison between males and females as regards HNL (ng/ml) in different studied neonates.

	Male		Female		**Test of significance**	
	Mean	SD	Mean	SD		
Cases	٢١٦.٤٧	٥١.١٥٥	٢١٩.١٤	٥٧.٨٨٩	0.2	>0.05
(Range)	(100 - 320)		(96 - 335)			
Control	٣١.٧٥	١٤.٣٨٥	٢٩.٣٣	١٠.٩١٢	0.3	>0.05
(Range)	(17 - 46)		(20 - 49)			

- No significant difference between males and females in different studied groups as regards HNL.

Figure (9)

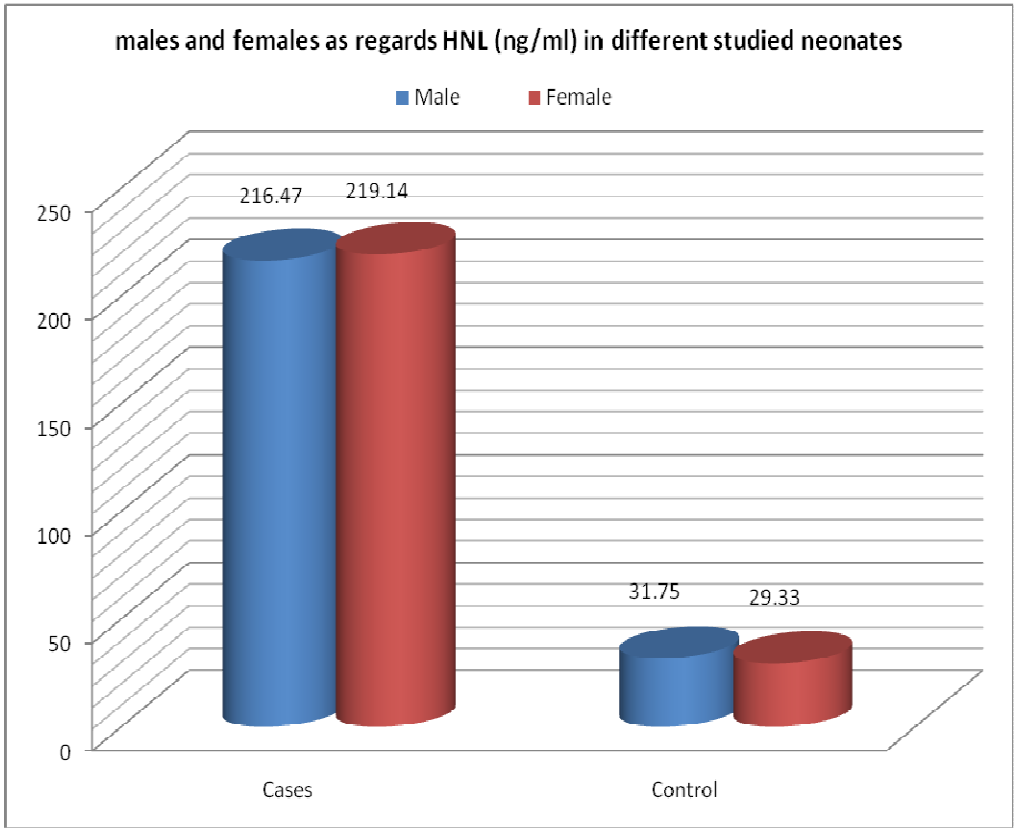


TABLE (14): Comparison between positive blood culture and negative blood culture in septic cases as regards laboratory findings.

	Positive blood culture (n=46)		Negative blood culture (n=24)		**Test of significance**	
	Mean	SD	Mean	SD		
Platelets (x10³/L) (Range)	٢٢٣.٩٢ (87 - 342)	٨٩.٠٢	٢٤٥.٠١٤ (95 - 386)	٦٢.٢٠٣	1.09	>0.05
HB (g/dL) (Range)	١٣.٠٤٢ (8.9 - 16.7)	٢.٣٢٣٩	١٣.٨٤٢ (9.6 - 18.1)	٢.٠٩٦٨	1.06	>0.05
TLC (x10³/L) (Range)	٢٢.٩٨٤ (9.2 - 26.1)	٣.٠٦٨٤	١٧.٤٩٨ (7.8 - 20.4)	١.٩٨٤١	1.3	>0.05
I/T ratio (Range)	0.٢٥٩٢٢ (0.145- 1.032)	0.١٧٤٠١٠	0.٢٥٩٣٥ (0.153 - 1.010)	0.١٤٩٠٢٣	0.1	>0.05
CRP (mg/dl) (Range)	48.0 (22 - 94)	4.23	36.0 (24 - 62)	2.81	1.3	>0.05

- NO significance difference between positive blood culture and negative blood culture in septic cases as regards laboratory findings.

TABLE (15): Comparison between neonates with positive versus those with negative blood culture as regards septic score.

	Positive blood culture (n=46)		Negative blood culture (n=24)		**Test of significance**	
	Mean	SD	Mean	SD		
Septic score (Range)	13 (8 - 17)	2.12	11 (7 - 15)	1.84	1.18	>0.05

- NO significance difference between positive blood culture and negative blood culture in septic cases as regards septic score.

TABLE (16): comparison between neonates with positive versus those with negative blood culture as regards HNL in septic group.

	Positive blood culture (n=46)		Negative blood culture (n=24)		**Test of significance**	
	Mean	SD	Mean	SD		
HNL(ng/mL)	٢٤١.٨٥	٤٤.٦٧٨	١٧١.٨٣	٣٩.٩٠٧	6.4	<0.001
(Range)	(190 - 335)		(96 - 256)			

-Neonates with negative blood culture had a significantly decreased HNL concentration than those with positive blood culture.

Figure (10)

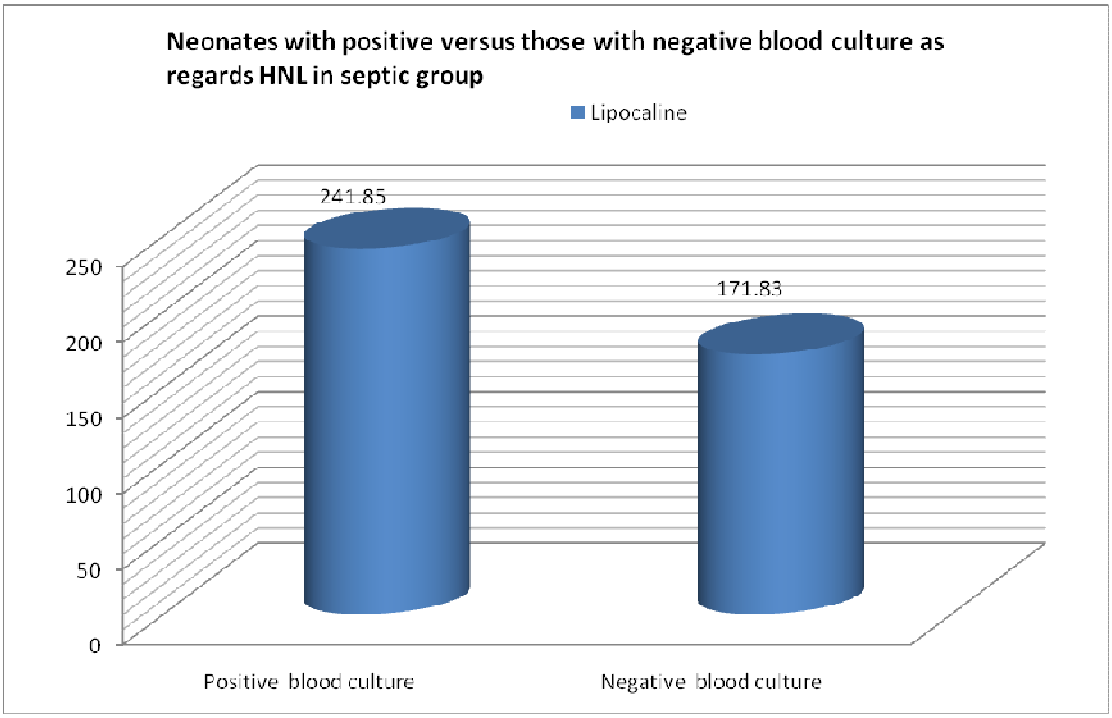


TABLE (17): Comparison between positive blood culture and control as regards laboratory findings.

	Positive blood culture (n=46)		Control (n=10)		**Test of significance**	
	Mean	SD	Mean	SD		
Platelets **(x10³/L)** (Range)	٢٢٣.٩٢ (87 - 342)	٨٩.٠٢	٢٤٥.٩٠ (182 - 323)	٤٧.٣٤	1.09	>0.05
HB **(g/dL)** (Range)	١٣.٠٤٢ (8.9 - 16.7)	٢.٣٢٣٩	١٥.٦٣٠ (14.3 - 17.2)	0.٩٢	1.19	<0.001
TLC **(x10³/L)** (Range)	٢٢.٩٨٤ (9.2 - 26.1)	٣.٠٦٨٤	١٠.٦٦٠ (7.8 - 14.1)	٢.٢٦	2.1	<0.001
I/T ratio (Range)	0.٢٥٩٢٢ (0.145- 1.032)	0.١٧٤٠١٠	0.٠٦٨ (0.020 - 0.120)	0.٠٣٢	3.8	<0.001
CRP (mg/dl) (Range)	48.0 (22 - 94)	4.23	0.0 (0.0 - 0.0)	0.0		<0.001

- TLC was significantly higher in positive blood culture group than control group.
- No significance difference between positive blood culture and control groups as regards platelet count.
- CRP was significantly higher in positive blood culture group than control group.
- Low platelet count was more frequent in positive blood culture group than control group.
- Anemia was more frequent in positive blood culture group than control group.
- Significant difference between different groups as regards I/T ratio.

TABLE (18): Comparison between positive blood culture in septic group and control as regards HNL.

	Control (n=10)		Positive blood culture (n=46)		**Test of significance**	
	Mean	SD	Mean	SD		
HNL**(ng/mL)**	٣٠.٣٠	١١.٦٩١	٢٤١.٨٥	٤٤.٦٧٨	7.9	<0.001
(Range)	(17-49)		(190 - 335)			

-Neonates in control group had a highly significantly decreased HNL concentration than those with positive blood culture in septic group.

Figure (11)

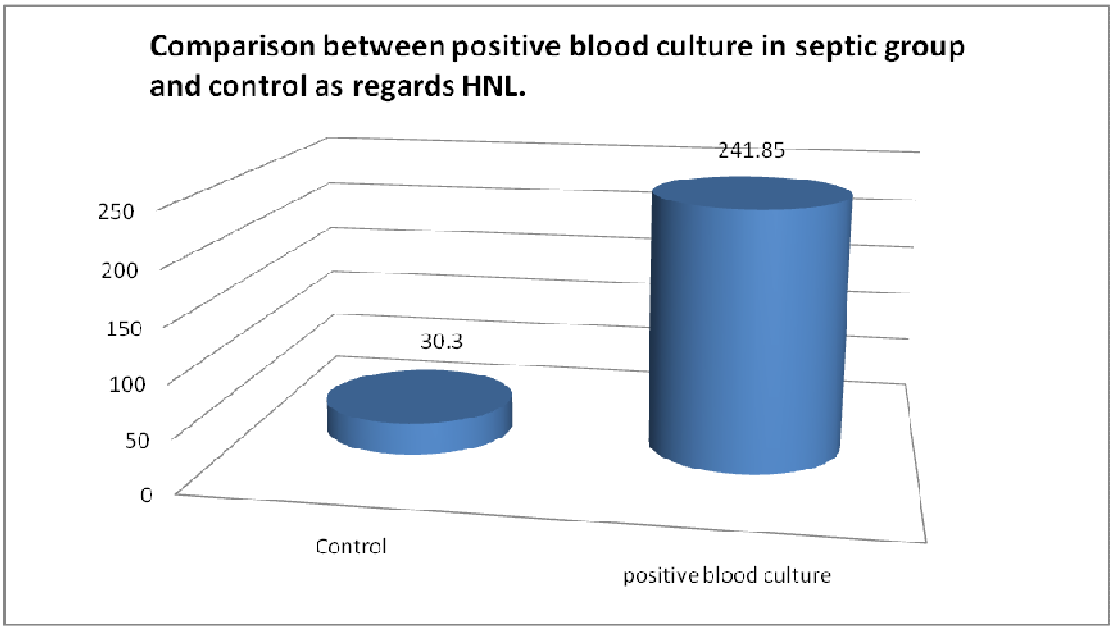


TABLE (19): Comparison between negative blood culture and control as regards laboratory findings.

	Negative blood culture (n=24)		Control (n=10)		**Test of significance**	
	Mean	SD	Mean	SD		
Platelets **(x10³/L)** (Range)	٢٤٥.٠١٤ (95 - 386)	٦٢.٢٠٣	٢٤٥.٩٠ (182 - 323)	٤٧.٣٤	1.0	>0.05
HB **(g/dL)** (Range)	١٣.٨٤٢ (9.6 - 18.1)	٢.٠٩٦٨	١٥.٦٣٠ (14.3 - 17.2)	0.٩٢	1.12	<0.001
TLC **(x10³/L)** (Range)	١٧.٤٩٨ (7.8 - 20.4)	١.٩٨٤١	١٠.٦٦٠ (7.8 - 14.1)	٢.٢٦	1.6	<0.001
I/T ratio (Range)	0.٢٥٩٣٥ (0.153 - 1.010)	0.١٤٩٠٢٣	0.٠٦٨ (0.020 - 0.120)	0.٠٣٢	3.8	<0.001
CRP (mg/dl) (Range)	36.0 (24 - 62)	2.81	0.0 (0.0 - 0.0)	0.0		<0.001

- TLC was significantly higher in negative blood culture group than control group.
- No significance difference between negative blood culture and control groups as regards platelet count.
- CRP was significantly higher in negative blood culture group than control group.
- Low platelet count was more frequent in negative blood culture group than control group.
- Anemia was more frequent in negative blood culture group than control group.
- Significant difference between different groups as regards I/T ratio.

TABLE (20): Comparison between negative blood culture in septic group and control as regards HNL.

	Control (n=10)		Negative blood culture (n=24)		**Test of significance**	
	Mean	SD	Mean	SD		
HNL(ng/mL) (Range)	٣٠.٣٠ (17-49)	١١.٦٩١	١٧١.٨٣ (96 - 256)	٣٩.٩٠٧	5.6	<0.001

-Neonates in control group had a significantly decreased HNL concentration than those with negative blood culture in septic group.

Figure (12)

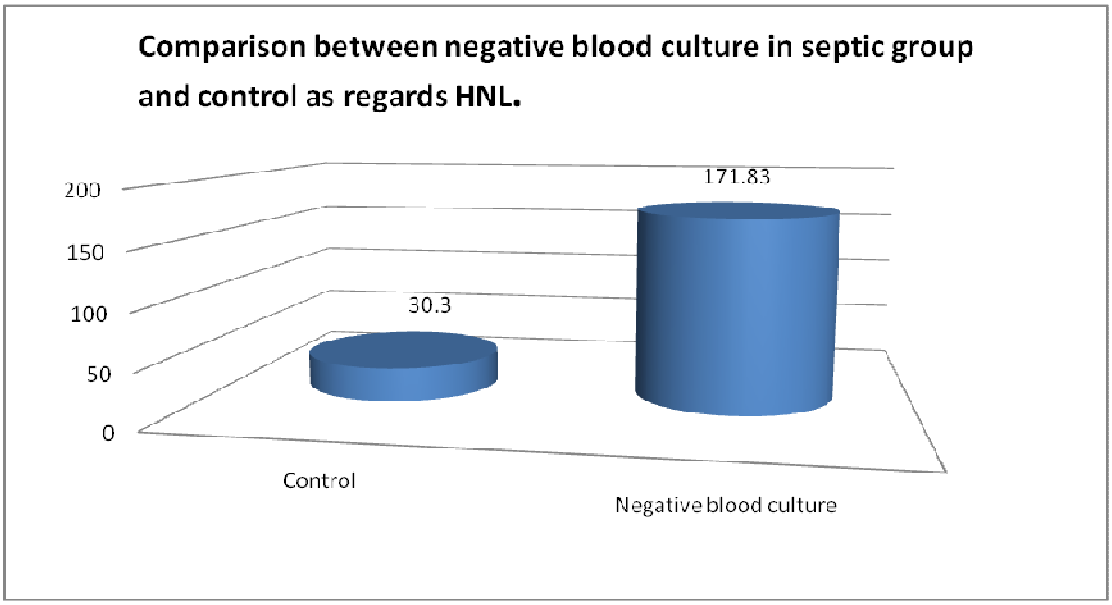


TABLE (21): comparison between neonates with bacterial versus those with fungal blood culture as regards HNL in septic group.

	bacterial blood culture (n=39)		Fungal blood culture (n=7)		**Test of significance**	
	Mean	SD	Mean	SD		
HNL (ng/mL). (Range)	٢٤٤.٠٠ (136 - 335)	٤٥.٣٩٦	٢٢٩.٨٦ (185 - 308)	٤١.٤٨٧	0.8	>0.05

-No significant difference between neonates with bacterial than those with fungal blood culture statuses as regards HNL concentration in septic group.

Figure (13)

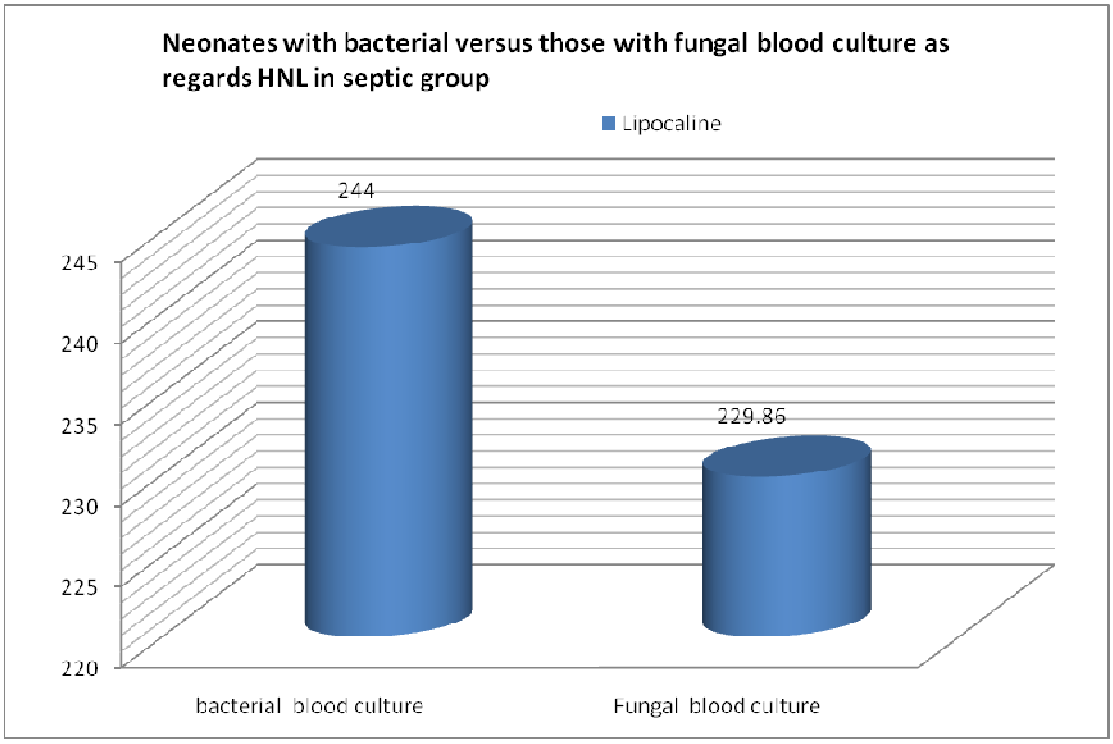
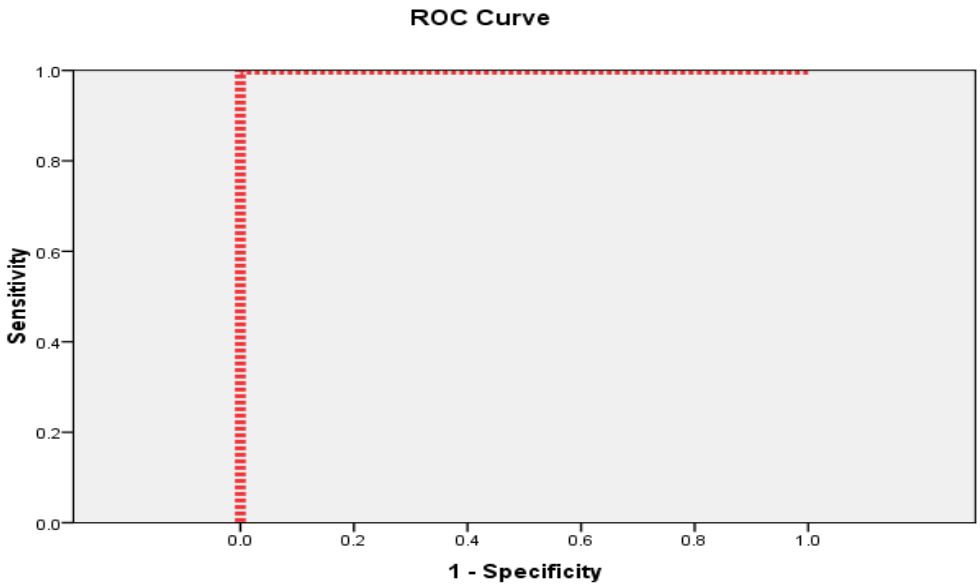


TABLE (22): Distribution of organisms obtained from blood cultures in septic groups.

	Septic (N=70)
Blood culture (n, %)	
• Negative	24 (34.28%)
• Staph methecillin sensitive	15 (21.42%)
• Candida	7 (10.0%)
• Klebsiella	10 (14.28%)
• B-heamolytic streptococci	9 (12.85%)
• E Coli	5 (7.14%)

Figure (14)-ROC curve of HNL at cutoff point:



Our present study shows a sensitivity of 100% and specificity of 96.7% for HNL in diagnosing neonatal sepsis at a cut-off value of 128.5 ng/mL

TABLE (23): correlation between HNL and some clinical characteristics in septic neonates.

	R	P
I/T ratio	0.017	>0.05
TLC	0.021	>0.05
Hb	-0.177	>0.05
platelets	-0.454	<0.001
APGAR 1m	-0.328	<0.01
APGAR 5m	-0.265	<0.05
Gest.Age	0.024	>0.05
Birth Wt (kg)	0.040	>0.05

In septic group:-

-No significant correlation between HNL and I/T ratio, TLC, HB, Gest.age and birth Wt.

-There is negative significant correlation between HNL and platelet count, APGAR 1m and APGAR 5m.