Result

Table (1): Comparison between maternal and gestational age among cases and control

		Maternal Age (years)	Gestational Age (weeks)
Cases	**Mean**	27.13	39.00
	SD	4.31	1.02
	Min	22	38
	Max	34	41
Control	**Mean**	26.20	39.33
	SD	3.93	1.18
	Min	20	38
	Max	32	41
P value		<u>**0.473**</u>	<u>**0.358**</u>

There was a non significant difference of maternal age among the studied cases when compared to those of the control group (P > 0.05)

There was also a non significant difference of gestational age among the studied cases when compared to those of the control group

(P > 0.05)

Table (2): Comparison between weight, length and head circumference among cases and control

		Weight (kg)	Length (cm)	Head circ (cm)
Cases	**Mean**	3.20	48.90	34.28
	SD	0.33	1.67	0.69
	Min	2.6	46	33
	Max	3.7	52	35
Control	**Mean**	2.98	49.47	34.33
	SD	0.42	1.19	0.79
	Min	2.2	47	33
	Max	3.6	51	35
P value		<u>0.097</u>	<u>0.198</u>	<u>0.837</u>

There was a non significant difference in the mean ± SD of the anthropometric measures of the cases when compared to the control group (P > 0.05)

Table (3): Distribution of maternal problems among cases and controls.

Maternal illness	Cases		Control	
	Number	%	Number	%
APH	3	10.00	0	0.00
Breach	3	10.00	0	0.00
MAS	4	13.33	0	0.00
Obstructed	3	10.00	1	6.67
PROM	9	30.00	2	13.33
No maternal problems	8	26.67	12	80.00
Total	30	100	15	100

As regard the maternal illness PROM was reported in 9 cases (30%) followed by MAS which was reported in 4 cases (13.33%). APH, obstructed labour and breach delivery were reported in 3 cases (10%) respectively. Mothers without any maternal problems were reported in 8 cases (26.67%). on the other hand, Obstructed delivery was present in 6.67%, PROM was present in 13.33% and 80% were without any history of maternal problems among the control group.
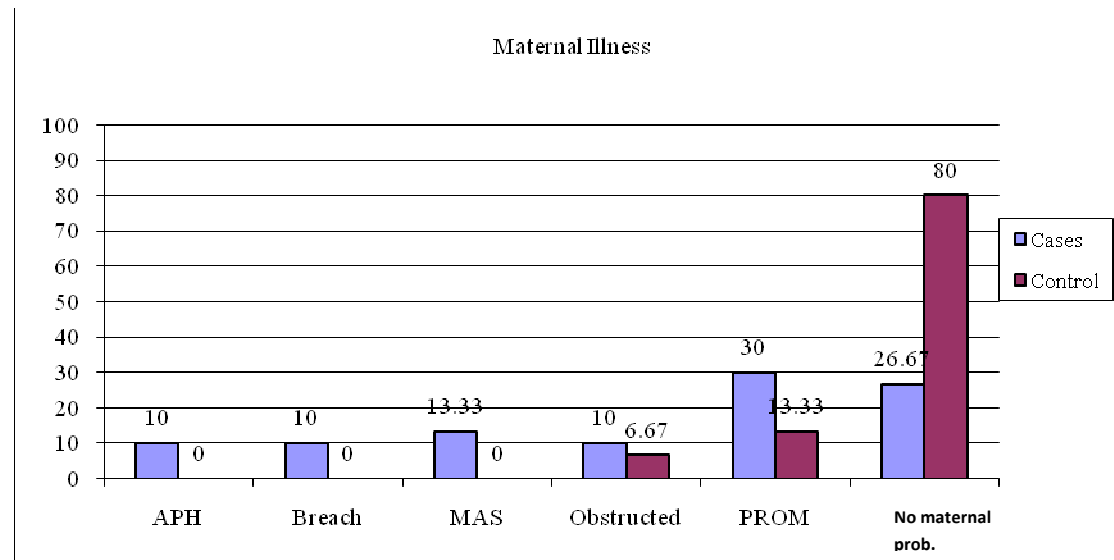
Fig (1) : Distribution of maternal problems among cases and controls

Table (4): Gender distribution among cases and controls.

Gender	Cases		Control	
	Number	%	Number	%
Males	23	76.67	6	40.00
Females	7	23.33	9	60.00
Total	30	100	15	100

As regard the gender distribution among the studied cases 76.67% were males and 23.33% were females while 40% were males and 60% were females among the control group.

Table (5): Mode of delivery among cases and controls.

Mode Of Delivery	Cases		Control	
	Number	%	Number	%
NVD	15	50.00	6	40.00
CS	15	50.00	9	60.00
Total	30	100	15	100

Fifty percent of the cases were delivered by CS while 60% were delivered by CS among the control group and 50% of the cases were delivered by NVD while 40% were delivered by NVD among the control group.

Table(6):Distribution of cases according to sarnat classification.

	Cases	
	Number	**%**
HIE 1	10	**33.33**
HIE 2	12	**40.00**
HIE 3	8	**26.67**
Total	**30**	**100**

The table shows that ten cases were HIE stage 1, twelve cases were HIE stage 2 and eight cases were HIE stage 3

Table(7):Distribution of seizures among cases and control

	Cases	
Seizures	**Number**	**%**
Peresent	16	**53.33**
Absent	14	**46.67**
Total	**30**	**100**

The table shows that seizures was present in 53.33% of the cases

Table (8): Comparison between blood gases among cases and control

		PH	PCO2 mmHg	PO2 mmHg	HCO3 Meq/L
Cases	**Mean**	7.08	55.95	75.43	39.90
	SD	0.09	6.49	10.09	5.99
	Min	6.9	48	50	30
	Max	7.2	70	91	53
Control	**Mean**	7.39	41.84	94.76	31.73
	SD	0.03	8.58	3.88	6.04
	Min	7.33	21.3	89	18.9
	Max	7.45	48	100	39.9
P value		<u>0.001</u>	<u>0.001</u>	<u>0.002</u>	<u>0.001</u>

There was a significant change in the mean ± SD of the blood gases parameters among cases when compared to those of the control group (P > 0.05)

Table (9): Comparison between studied parameters among cases and control

		Na mmol/L	K mmol/L	ALT U/L	AST U/L
Cases	**Mean**	138.53	3.86	34.17	37.10
	SD	3.61	0.40	26.16	2.98
	Min	134	3.4	12	32
	Max	145	4.8	88	42
Control	**Mean**	141.00	4.09	26.47	37.07
	SD	4.88	0.61	10.11	2.81
	Min	134	3.3	13	32
	Max	149	5.1	39	42
P value		0.097	0.201	0.201	0.971

There was a non significant difference in the mean ± SD of serum level of Na, K, ALT and AST levels between cases and controls (P > 0.05)

Table(10):Comparison between CBC,CRP and Apgar at 5 minutes among cases and control.

		Hb g/dl	RBCs X10^6/mm^3	WBCs X 10^3/mm^3	PLT X10^3/mm^3	CRP	Apgar 5min.
Cases	**Mean**	13.33	4.54	11.95	163.97	13.6	5.97
	SD	1.38	0.61	3.69	66.63	11.02	1.54
	Min	11	3.5	7.6	85	6	3
	Max	15.3	6.3	17.3	290	48	8
Control	**Mean**	14.2	4.73	12.62	236.6	6.8	10.00
	SD	2.11	0.45	2.86	70.74	2.11	0.00
	Min	12	4.1	7.8	150	6	10
	Max	18	5.3	17.2	360	12	10
P value		0.165	0.226	0.509	0.003	0.003	0.0001

There was a highly significant difference in Apgar at 5 minutes between cases and control (P < 0.01)

There was a highly significant difference in both CRP and PLT between cases and control (P < 0.01)

Table (11): Comparison between serum Catalase levels among cases and control

		Catalase (unit / nmol / min / ml)
Cases	**Mean**	10.74
	SD	1.65
	Min	6.825
	Max	13.925
Control	**Mean**	3.18
	SD	0.71
	Min	2.265
	Max	4.665
P value		**0.0001**

There was a highly significant difference in the mean $\pm$ SD of serum catalase levels among cases (10.74 $\pm$ 1.65unit/nmol/min/ml) when compared to the control group (3.18 $\pm$ 0.71unit/nmol/min/ml) (P < 0.01)
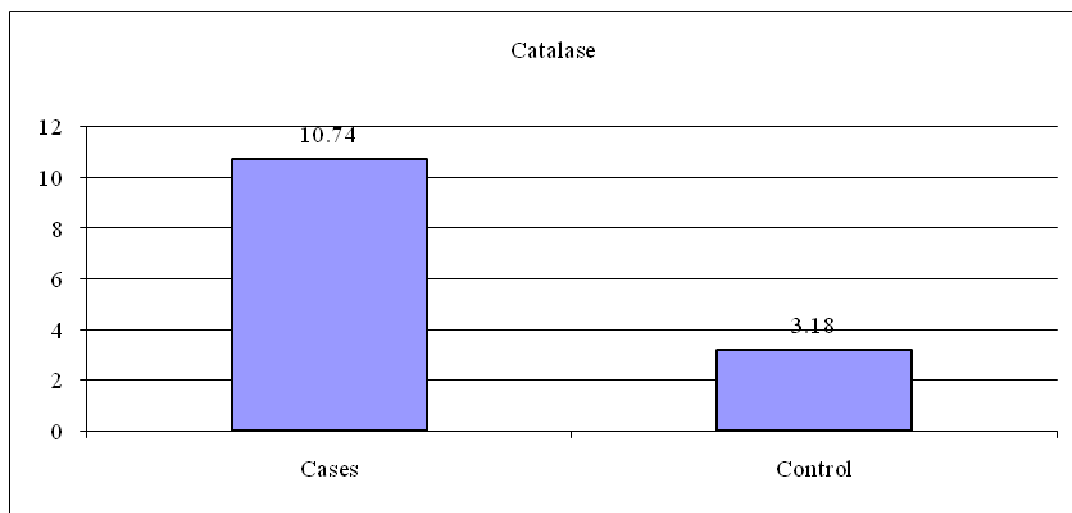
Fig(2) : Comparison between serum Catalase levels among cases and control

Table (12): Comparison between the serum catalase levels among the studied groups

		Catalase (unit/nmol/min/ml)	P value
HIE 1 (n = 10)	Mean	8.98	
	SD	1.17	
	Min	6.825	
	Max	10.345	
HIE 2 (n = 12)	Mean	10.90	
	SD	0.36	
	Min	10.45	
	Max	11.605	
			< 0.01
HIE 3 (n = 8)	Mean	12.68	
	SD	0.75	
	Min	11.725	
	Max	13.925	
Control (n = 15)	Mean	3.18	
	SD	0.71	
	Min	2.265	
	Max	4.665	

There was a highly significant difference in the mean ± SD of serum catalase levels among HIE 1 (8.98 ± 1.17unit/nmol/min/ml), HIE 2 (10.90 ± 0.36unit/nmol/min/ml), HIE 3 (12.68 ± 0.75unit/nmol/min/ml) and the control group (3.18 ± 0.71unit/nmol/min/ml) (P < 0.01)
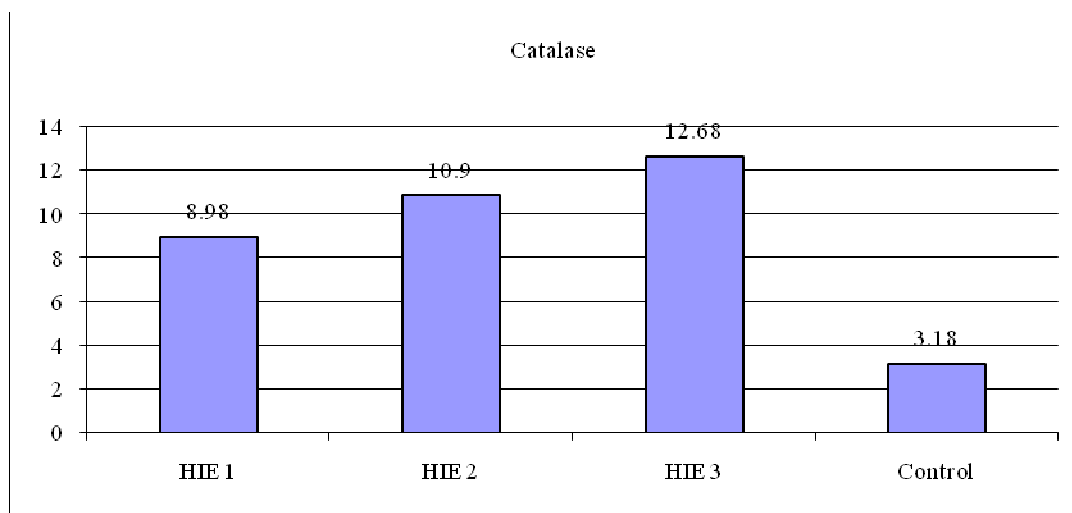
Catalase

Fig (3) : Comparison between the serum catalase levels among the studied groups

Table (13): Comparison between serum catalase levels among NVD versus CS

|		Catalase (unit/nmol/min/ml)
NVD cases	Mean	10.30
	SD	1.73
	Min	6.825
	Max	12.885
CS cases	Mean	11.17
	SD	1.50
	Min	8.6
	Max	13.925
P value		0.153

There was a non significant difference in the mean ± SD of catalase among cases delivered by CS (11.17 ± 1.50unit/nmol/min/ml) when compared to those delivered by NVD (10.30 ± 1.73unit/nmol/min/ml) (P > 0.05).

Table (14): Comparison between serum catalase levels among cases with and without seizures.

		Catalase (unit/nmol/min/ml)
With seizures no.(16)	**Mean**	11.41
	SD	1.22
	Min	9.72
	Max	13.925
Without seizures no.(14)	**Mean**	9.97
	SD	1.78
	Min	6.825
	Max	12.69
P value		**0.0184**

There was a highly significant difference of serum catalase levels among cases with seizures when compared to the cases without seizures

 (P < 0.01)
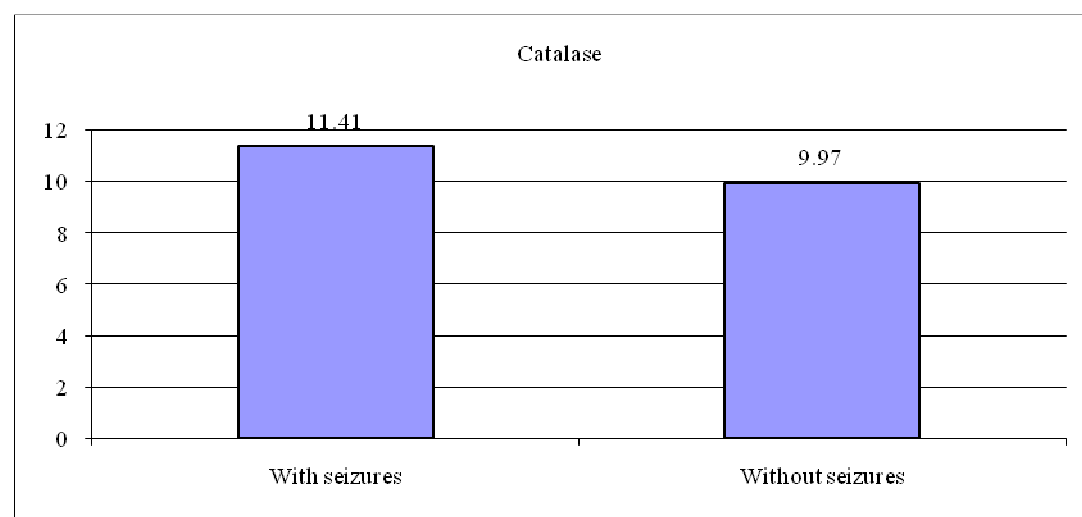
Fig(4)   : Comparison between serum catalase levels among cases with and without seizures.

Table (15): Correlation between serum Catalase levels and other studied parameters among cases.

	Catalase (r value)	P value
Maternal Age	0.199	**> 0.05**
Gestational Age	0.135	**> 0.05**
Weight	0.095	**> 0.05**
Length	-0.082	**> 0.05**
Head circ	-0.208	**> 0.05**
HR	0.142	**> 0.05**
RR	0.262	**> 0.05**
Temp	0.175	**> 0.05**
Apgar 5	-0.412	**> 0.05**
PH	-0.331	**> 0.05**
PCO2	0.170	**> 0.05**
PO2	-0.178	**> 0.05**
HCO3	0.197	**> 0.05**
Hb	0.124	**> 0.05**
RBCs	0.330	**> 0.05**
WBCs	-0.187	**> 0.05**
PLT	-0.224	**> 0.05**
CRP	0.123	**> 0.05**
Na	0.033	**> 0.05**
K	-0.103	**> 0.05**
ALT	0.010	**> 0.05**
AST	0.073	**> 0.05**

There was no significant correlation between serum catalase levels and the levels of the studied parameters among cases

Table (16): Prognosis among cases and controls.

Prognosis	Cases		Control	
	Number	**%**	**Number**	**%**
CP	13	**43.33**	0	**0.00**
D	10	**33.33**	0	**0.00**
H	7	**23.33**	15	**100.00**
Total	**30**	**100**	**15**	**100**

As regard the prognosis, 43.33% of the cases developed CP, 33.33% died and 23.33% survived. On the other hand, 100% of the controls survived.
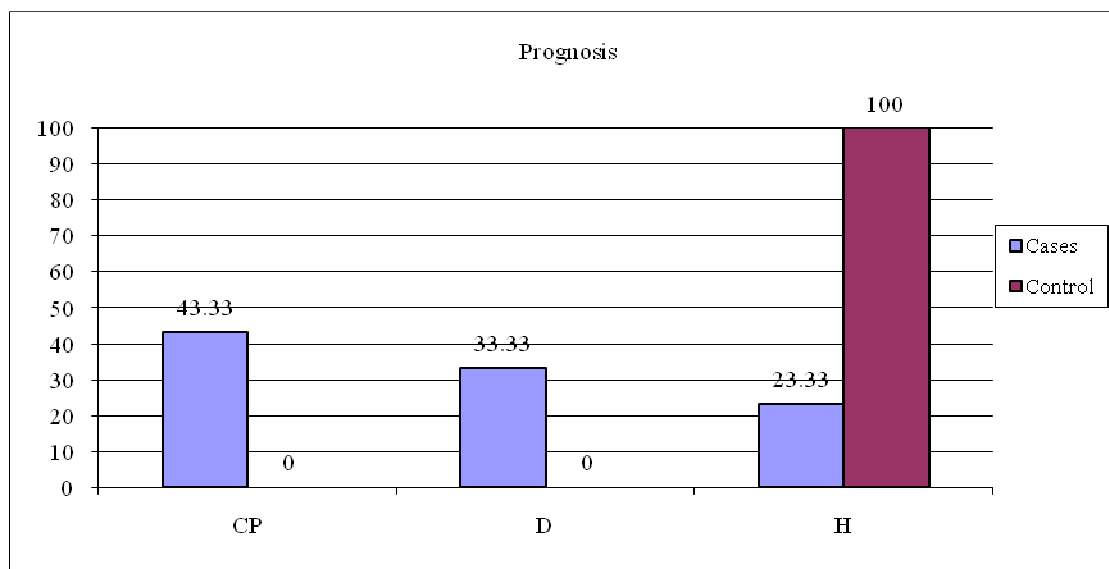

Fig(5) : Prognosis among cases and controls.

Table (17): Comparison between serum catalase levels among different prognosis of hypoxic ischemic encephalopathy

Catalase	healthy	die	CP
Mean	**8.83**	**11.40**	**11.25**
SD	**1.33**	**1.51**	**1.13**
F value	9.67		
Pvalue	0.0007		

The tables shows that serum catalase levels were higher in the cases that died (11.40±1.51unit/nmol/min/ml) or suffer from CP(11.25±1.13unit/nmol/min/ml) than the healthy cases(8.83±1.33unit/nmol/min/ml).