Results

Our study was carried on 19 patients suffering from congenital cyanotic heart disease. Their age mean ± S.D. was 6.26±3.1 years.

The second group of patient was congenital acyanotic heart disease. Their number was 12, and age mean ±S.D. was 7.87 ± 3.7 years.

This two groups were compared to 16 apperently normal subjects served as a control group. Their age mean ± S.D. was 9.4±2.9years.

Carefull clinical history, physical examination, laboratory investigations in the form of complete blood picture, hematocrite value, erythrocyte sedimentation rate, serum urea and creatinine levels, echo., ECG and x-ray chest were done.

Plasma levels of erythropoietin, renin activity and aldosterone were estimated.

Table (1) shows the clinical and hematological data of the control group including to :

- Age, the mean ± S.D. is 9.4 ± 2.9 year.
- Sex, 9 subjects are male and 7 are female.
- Blood pressure, the mean ± S.D. is $\frac{107.9}{67.7} \pm \frac{10.7}{8.2}$ mmHg.

- Pulse, the mean ± S.D is 91.8± 12.4/min.
- Hemoglobin, the mean ± SD is 13.6 ± 1.8 gm%.
- Hematocrite value, the mean ± SD was 33.4 ± 2.1
- Red blood cells, the mean ± SD is 4.37±0.54 million/cc^3.
- White blood cells, the mean ±SD is 8.5 ± 1.3 thausand/cc^3.
- Platelets count, the mean ± SD is 197 ± 38.3 thaysand /cc^3.
- Serum urea, the mean ± SD is 24.7± 3.3 mg%
- Serum creatinine, the mean ± SD is 0.42 V 0.2 mg%.

Table (2) shows the clinical and hematological data of the acyanotic group.

Including to:

- Age, the mean ± SD is 7.87±3.7 years.
- Sex, 6 subjects are male and 6 are female.
- Blood pressure, the mean ± SD is 106.6 /67.5 ± 11.9/8.1 mmHg.
- Pulse, the mean ± SD is 100.6 ± 11/min.
- Hemoglobin, the mean ± SD is 11.3±1.3 gm%.
- Hematocrite value, the mean ± SD is 34.8 ± 3.1.
- ESR (1 st hour), the mean ± SD is 17.9 ± 8.8 and (2 nd hour), the mean ± SD is 31.7 ± 11.9.
- R B Cs, the mean ± SD is 4.36 ± 0.57 milboris/cc.
- WBCs, the mean ± SD is 9.1 ± 1.6 thousands/cc.
- Platelets, the mean ± SD is 216.4 ± 41.4 thousands/cc.
- Serum urea, the mean ± SD is 24.4±7.1 .
- Serum creatinine , the mean ± SD is 0.31 ± 0.17 mg%.

Table (3) shows the clinical and hematological data of the cyanotic group.

- Age, the mean ± SD is 6.26 ± 3.1 years.
- Sex, 11 subjects are male and 8 are female.
- Blood pressure, the mean ± SD is 116/77.6 ± 10.717.5 mmHg.
- Pulse, the mean ± SD is 102.3±8.6/min .
- Hemoglobin, the mean ± SD is 18.5± 4.9 gm%.
- Hematocrite value, the mean ± SD is 50.7 ± 9.5.
- ESR (1 st hour), the mean ± SD is 9.2 ± 5.1 and (2 nd hour), the mean ± SD is 20 ± 10.8.
- RB Cs, the mean ± SD is 6.7 ± 1.29 millous/cc.
- WBCs , the mean ± SD is 8.56 ± 2.7 thousands/cc.
- Platelets, the mean ± SD is 264.9 ± 44.8 thousands/cc.
- Serum urea, the mean ± SD is 22.7 ± 4.1 mg%.
- Serum creatinine, the mean ± SD is 0.25 ± 0.16 mg%.

As regard pulse, the mean values ± SD is 91.8 ± 12.4, 100.6 ± 11 and 103.3 ± 8.6/min respectively. By statistical analysis there is no significant changes among the three groups (P>0.05).

Table (4) shows echo, ECG and x-ray chest of both acyanotic and cyanotic groups.

- As regard echo of the acyanotic group :

- A.S.D., was encountered in 3 cases which respresents 25% of all cases of the acyanotic group.
- V.S.D. + subaortic stenosis, was encountered in 2 cases which represents 16.7% of all cases of the acyanotic group .
- Pulmonary stenosis, was encountered in 2 cases which represents 16.7% of all cases of the acyanotic group.
- P.D.A., was encountered in 3 cases which represents 25% of all cases of the acyanotic group.
- Pulmonary hypertension + coarctation of aorta, was encountered in 2 cases which represent 16.7% of all cases of the acyanotic group .
- As regard echo of the cyanotic group :
- Fallot's tetralogy, was encountered in 14 cases which represents 74% of all cases of the cyanotic group .
- Complete AV canal, was encountered in 1 cases which represents 5.5% of all cases of the cyanotic group.
- Big VSD + AV canal was encountered in 3 cases which represents 15% of all cases of the cyanotic group.
- F_4 + persistant high S.V. cava, was encountered in 1 case which represents 5.5% of all cases of the cyanotic group .
- As regard ECG of both acyanotic and cyanotic groups respectively:
- RV^{++}+ Rt, axis, was encountered in 3 cases which represent 25% of all cases of the acyanotic group and 17 which represent 86% of all cases of the cyanotic group.
- RV^{++}, was encountered in 1 case which represents 8.3% of all cases of the acyanotic group.

- Bivent $^{++}$, was encountered in 2 cases which represent 16.7 % of all cases of the acyanotic group and 1 case which represent 7% of all cases of the cyanotic group.
- Normal, was encountered in 6 cases which represent 50% of all cases of the acyanotic group and 1 case which represent 7% of all cases of the cyanotic group.
- As regard X-ray chest of both acyanotic and cyanotic groups.
- RV^{++}+ oligemia + narrow base, was encountered in 2 cases which represents 16.7% of all cases of the acyanotic group and 14 cases which represents 74% of all cases of the cyanotic group.
- RV^{++}, was encountered in 3 cases which represents 25% of all cases of the acyanotic group and 2 which represents 11% of all cases of the cyanotic group.
- Cardiomegally, was encountered in 3 cases which represents 25% of all cases of the acyanotic group.
- Plethoric lung, was encountered in 3 cases which represents 15% of all cases of the cyanotic group.
- Normal, was encountered in 3 cases which represents 33.3% of all cases of the acyanotic group.

Table (5) shows the mean values ±SD±SE of plasma erythropoietin (mu/ml) renin activity (ng/ml/h) and Aldosterone (pg/ml) in the control group.

- As regard to plasma erythropoietin , the mean values ± SD ±SE is 8.88± 4.4 ± 1.1 (mu/ml).

- The mean values ± SD±SE for plasma renin activity is 4.97 ± 1.58 ± 0.5 mg/ml/L .
- and the mean values ±SD±SE for Aldosterone is 129.86 ± 126 ± 31.5 pg/ml).

Table (6) shows the mean values ±SD±SE of plasma erythropoietin (mu/ml) renin activity (ng/ml/h) and aldosterone (pg/ml) in acyanotic group.

- As regand To plasma erythropoietin, the mean values ± SD±SE is 16.7± 20 ± 5.8 mu/ml.
- The mean values ± SD SE for plasma renin activity is 4.24 ± 1.61 ± 0.6 mg/ml/h. and the mean values ± SD ± SE for aldosterone is 282±337.7 ±97.49 pg/ml.

Table (7) show the mean values ±SD of plasma erythropoietin (mu/ml) renin activity (mg/ml/h) and aldosterone (pg/ml/ in cyanotic group.

As regard to plasma erythropoietin, the mean values ± SD±SS is 18.29 ± 23.4± 5.5 mu/ml.

The mean values ± SD ± SE for plasma renin activity is 4.71 ± 2.29± 0.7 mg/ml/h and the mean values ± SD ± SE for aldosterone is 166.34 ± 169.1±39.86 pg/ml.

Table (8) & Fig. (1, 2 &3) showed the statistical analysis of the clinical data of the control, acyanotic and cyanotic group.

As regard to the age, the mean values ± SD are 9.4 ± 2.9, 7.87 ± 7.3 and 6.26 ± 3.1 years respectively.

By statistical analysis, there are no significant changes among the three groups ($P>0.05$).

As regard to the systolic blood pressure, the mean values ± SD are 107.9± 10.7, 106.6±11.9 and 116 ± 10.7 mmHg respectively. By statistical analysis, there is significant increase in the cyanotic group compared to the control one ($P<0.05$), and also between cyanotic group compared to the acyanotic one ($P<0.05$).

As regard to the diastolic blood pressure, the mean values ± SD are 67.6±8.2 , 67.5 ± 8.1 and 77.6 ± 7.5 mmg Hg respectively.

By statistical analysis, these is significant increase between the cyanotic compared to the control group ($P<0.05$) and also between the cyanotic and acyanotic groups ($P<0.05$).

Table (9) shows statistical analysis of the hematological data of both acyanotic and cyanotic group.

As regard to ESR (1 st hour), the mean values ± S.D. are 17.9±8.8 and 9.2 ± 5.1 respectively. By statistical analysis there is a significant increase in the acyanotic group compared to the cyanotic one ($P<0.05$).

As regard to ESR (2nd hour), the mean values ± S.D. are 31.7±11.9 and 20±10.8 respectively. By statisticalanalysis there is a significant increase in the acyanotic group compared to the cyanotic one (P<0.05).

As regard to hemoglobin (gm%) the mean values ± SD are 11.3±1.3 and 18.5 ± 4.9 gm% respectively. By statistical analysis there is a significant increase in the acyanotic group compared to the cyanotic one (P<0,05),

As regard to hematocrite value, the mean values ± S.D. are 34.8 ± 3.1 and 50.7 ± 9.5 respectively. By statistical analysis there is a significant increase in the acyanotic group compared to the cyanotic one (P<0.05).

As regard to Red blood count (millions/cc), the mean values ± S.D. are 4.36 ± 0.57 and 6.7 ± 1.29 millions/cc respectively. By statistical analysis there is a significant increase in the acyanotic group compared to the cyanotic one (P<0.05).

As regard to White blood cells count (thausands/cc), the mean values ± S.D. are 9.1 ± 1.6 and 8.56± 2.7 thausands/cc respectively. By statistical analysis there is no significant changes between both cyanotic and acyanotic groups (P>0.05).

As regard to Platelets count (thausands/cc), the mean values ± S.D. are 216.4 ±41.4 and 264.9±74.8 respectively. By statistical analysis, there is no significant changes between both groups (P>0.05).

Table (10) show statistical analysis of the laboratory data in the contol, acyanotic and cyanotic groups as regard :

To serum creatinine (mg%), the mean values are ± S.D. are 0.42 ± 0.2, 0.31±0.17 and 0.25± 0.16 mg% respectively.

By statistical analysis, there are no significat changes among the three groups (P>0.05) and for serum urea (mg%), the mean value ± S.D. are 24.7 ± 3.3, 24.9±7.1 and 22.7± 4.1 mg% respectively. There are no significant changes among the three groups (P>0.05).

Table (11) shows statistical analysis of plasma Erythropietin , renin activity and oldosterone in the control, acyanatic and cyantic groups.

As regard to plasma Erythopoeitin the mean values ± SD ±SE are 8.88±4.4±1.1, 16.7±20 ± 5.8 and 18.29±23.4 ± 5.5 (mu/ml) respectively. By statistical analysis there is no significant changes among the three groups (P>0.05).

As regard to plasma renin activity the mean values ±SD ±SE are 4.97 ± 1.58 ± 0.5, 4.24 ± 1.6 ± 0.6 and 4.71 ± 2.29 ± 0.7 (ng/ml/L)

respectivity,. By statistical analysis these is no significant changes among the three groups (P>0.05).

As regard to plasma oldosterone the mean values ± SD ± SE are 129.86±126±31.5, 282± 337.7 ± 97.49 and 166.34 ± 169.1 ± 39.86 pg/ml respectively. By statistical analysis there is no significant changes among the three groups (P>0.05).

Table (12) shows correlation coeffecient of erythropoietin with the following parameters in the control, acyanotic and cyanotic groups respectively :

Systolic blood pressure : there is a positive significant correlation coeffecient in the acyanotic group (r 0.81 & p<0.01) but no significant correlation coefficient in both control and cyanotic groups.

Diastolic blood pressure : there is a positive significant correlation coefficient in the acyanotic group (r 0.74 and p <0.01(but no significant correlation coeficient in both control and cyanotic groups respectively .

Erythrocyte sedimentation rate in 1st and 2nd hours, there are negative significant correlation coefficient in the cyanotic group (r-0.61 &-0.62) for 1 st & 2 nd hour respectively, but no significant correlation coefficient for both control and acyanotic groups in 1st & 2nd hour.

Hemoglobin gm% there is no significant correlation coefficient of hemoglobin in the three studied groups.

Hematocrite there is a positive significant correlation coefficient in the cyanotic group (r 0.69 & $p<0.01$) while in both control and acyanotic groups, there are no siginficant correlation coefficient.

Serum urea (mg%), there is no significant correlation coefficient in the three groups .

Table (1) : Clinical and hematological data of the control group.

No.	*Age years*	*Sex*	*Blood pressure mm/Hg*	*Pulse / min*	*Hemoglo-bin gm%*	*Hemat-ocrite value*	*RBCs million /cc*	*WBC thausand /cc*	*Platelets thausand /cc*	*Serum Urea mg%*	*Serum creatinine mg%*
1	9	M	110/70	100	12.0	36.0	3.60	7.9	250	20	0.7
2	8.5	M	110/75	92	13.5	33.0	3.88	8.5	190	24	0.4
3	10	M	100/60	84	14.0	31.4	4.2	6.3	185	23	0.3
4	8	M	105/65	88	11.7	35.0	4.1	10.2	173	28	0.3
5	13	M	115/80	92	15.0	30.0	5.0	9.8	230	26	0.4
6	12	F	110/70	96	13.0	36.0	4.9	6.9	210	24	
7	5	F	100/60	100	14.3	32.0	3.95	9.2	198	20	0.2
8	14	F	120/80	84	15.2	34.3	4.8	9.36	173	25	0.2
9	5	M	110/60	108	14.0	38.3	3.75	8.6	195	22	
10	7	M	105/60	100	15.0	32.2	4.50	8.2	201	27	0.14
11	11	F	115/75	96	15.3	36.2	5.20	7.3	178	26	
12	9	M	100/65	92	15.0	33.0	4.6	10.1	292	30	0.7
13	6	F	100/60	92	15.0	32.0	4.32	6.9	200	29	0.6
14	14	F	120/65	86	14.8	31.5	4.57	7.7	184	22	0.7
15	12	F	100/65	88	11.5	36.4	5.1	8.2	163	26	
16	8	M	105/75	92	15.0	34.0	3.5	9.3	180	26	0.4
X	9.4	-	107.9/67.7	91.8	13.6	33.4	4.37	8.5	197	24.7	0.42
SD	2.9	-	10.7/8.2	12.4	1.8	2.1	0.54	1.3	38.3	3.3	0.2

Table (2) :- Clinical and hematological data of the acyanotic group

No.	*Age year*	*Sex*	*Blood pressure mmHg*	*Pulse /min*	*hemog-lobin gm%*	*hemat-ocrite value*	*ESR*		*Blood picture*			*Serum Urea*	*Serum Creati-nine*
							1 st hour	2 nd hour	RBCs million/ cc	WBC Thsuzn d/cc	Platelets thsuzand /cc	*mg%*	*mg%*
1	9	M	110/70	100	12	36	15	30	3.5	10	175	24	0.2
2	13	F	110/75	92	8.6	26.3	17	33	3.44	11.2	180	39	0.5
3	5	M	100/60	104	11.8	33	14	27	4	9	190	20	0.3
4	6	F	100/70	92	12	35.9	25	40	4.34	11	276	15	0.1
5	10	F	110/60	88	11.6	36.3	42	63	5.16	5.9	190	25	
6	3.5	M	105/75	116	10.9	34.5	13	22	4.49	7.3	293	25	0.4
7	11	M	135/85	96	9.9	33.9	14	26	4.42	7.7	246	35	0.6
8	14	M	120/70	84	10.5	34	17	32	4.5	8.7	187	30	0.3
9	9	M	105/60	100	13.6	38.2	7	15	5.33	8.6	240	18	0.4
10	7	F	90/60	108	13	38.2	22	38	4.65	11	240	18	0.5
11	4	F	100/60	120	11	34	15	30	4	9	170	23	0.1
12	3	F	95/65	108	11.8	37	14	25	4.56	10.2	210	21	0.1
X	7.87	-	106.6/67.5	100.6	11.3	34.8	17.9	31.7	4.36	9.1	216.4	24.4	0.31
SD	3.7	-	11.9/8.1	11	1.3	3.1	8.8	11.9	0.57	1.6	41.4	7.1	0.17

Table (3) : Clinical and hematological data of the cyanotic group

No.	*Age year*	*Sex*	*Blood pressure mmHg*	*Pulse /min*	*hemog-lobin gm%*	*hemat-ocrite value*	*ESR*		*Blood picture*			*Serum Urea*	*Serum Creati-nine*
							1 st hour	2 nd hour	RBCs million/ cc	WBC Thaus-and/cc	Platelets Thausa-nd/cc	mg%	mg%
1	10	M	130/80	92	28.3	43	9	22	6.73	9.88	176	30	0.4
2	6	M	125/75	100	31.9	44.6	10	25	5.74	10.1	192	28	0.4
3	5	F	110/70	108	14.3	47.3	9	20	5.52	12.8	405	24	-
4	10	F	130/85	96	13	36	18	38	4.62	10	260	22	0.6
5	5	F	115/75	100	23.4	42	15	30	6.33	9.7	255	24	0.3
6	3.5	F	100/60	120	14.3	44.6	11	24	5.44	11.9	360	26	0.1
7	2.5	F	105/65	116	16	48.3	10	24	6.21	10.5	295	25	0.1
8	12	M	135/90	92	17	43	18	40	7	10.8	301	21	0.1
9	11	M	120/85	100	22	41.3	12	25	5.9	11.3	290	26	-
10	9	M	115/80	108	19.8	57.1	15	27	6.45	7.4	303	23	0.2
11	9	M	130/70	100	19.1	69.7	0	0	9.5	4.3	148	26	-
12	3	M	110/75	96	14	42.6	10	22	7.11	11	312	22	0.2
13	6	F	120/85	112	20.9	67.2	2	3	9.18	4.1	222	18	0.4
14	3	M	110/80	100	16.2	57.1	8	15	6.9	7.3	324	21	0.3
15	3	F	100/80	112	15.6	51.7	5	10	6.27	5.7	275	12	-
16	3.5	M	105/80	100	16.3	54	4	10	7.35	8	210	21	-
17	2.5	F	110/75	108	15	53.6	6	12	6.5	6.2	180	18	0.1
18	7	M	125/85	96	18	66	3	8	9.1	4.77	156	25	0.1
19	8	M	110/80	88	18	55.6	11	25	6.33	7	370	22	
X	6 .26	-	116/77.6	102.3	18.5	50.7	9.2	20	6.7	8.56	264.9	22.7	0.25
SD	3.1	-	10.7/7.5	8.6	4.9	9.5	5.1	10.8	1.29	2.7	44.8	4.1	0.16

Table (4) : Echo, ECG and X-ray chest of the acyanotic and cyanotic groups.

Variables	Acyanotic group		Cyanotic group	
	No.	%	No.	%
Echo				
A.S.D	3	25	-	
V.S.D. + sub. aortic stenosis	2	16.7	-	
P.S.	2	16.7	-	
P.D.A.	3	25	-	
Pul. hypertension+coarctation aorta	2	16.7	-	
F. tetralogy	-		14	74
Complete AV canal	-		1	5.5
Big VS D + AV canal	-		3	15
F4+persistent high S.V. cava	-		1	5.5
ECG				
RV^{++}+ Rt, axis	3	25	17	86
RV^{++}	1	8.3	-	
$Bivent^{++}$	2	16.7	1	7
Normal	6	50	1	7
X-ray chest				
RV^{++}+oligemia+narrow base	2	16.7	14	74
RV^{++}	3	25	2	11
Cardiomegally	3	25	-	
Plethoric lung	-		3	15
Normal	4	33.3	-	

F_4 = F. tetralogy

SV= Superior vena

Table (5) : The mean value ±SD & ± SE of plasma erythropoietin (mu/ml), renin activity (ng/ml/h) and aldosterone (pg/ml) in the control group.

Serial No.	plasma EPO (mu/ml)	Plasma renin (ng/ml/h)	plasma aldosterone (pg/ml)
1	11.52	4.867	59.99
2	13.98	4.269	94.34
3	10.03	6.889	41.4
4	11.83	6.958	38.09
5	10.72	4.642	25.08
6	11.51	6.303	47.39
7	8.96	1.620	27.34
8	4.38	5.559	52.85
9	5.77	4.608	332.37
10	2.87	4.024	117.72
11	1.54	-	137.46
12	19.09	-	368.39
13	6.04	-	122.58
14	6.35	-	214.60
15	8.0	-	382.00
16	9.49	-	15.89
X	8.88	4.97	129.86
± SD	4.4	1.58	126
± SE	1.1	0.5	31.5

Table (6) : The mean value ±SD & ± SE of plasma erythropoietin (mu/ml), renin activity (ng/ml/h) and aldosterone (pg/ml) in the acyanotic group.

Seral No.	*plasma EPO (mu/ml)*	*Plasma renin (ng/ml/h)*	*plasma aldosterone (pg/ml)*
1	8.71	5.667	198.15
2	17.11	3.868	70.28
3	10.86	4.141	125.62
4	10.57	6.612	33.39
5	21.42	3.677	74.14
6	19.71	1.482	742.06
7	78.49	4.241	1069.73
8	11.22	-	80.61
9	8.72	-	77.86
10	4.86	-	24.26
11	3.00	-	585.34
12	5.96	-	302.65
X	16.7	4.24	282.0
± SD	20.0	1.61	337.7
± SE	5.8	0.6	97.49

Table (7) : The mean value ±SD & ± SE of plasma erythropoietin (mu/ml), renin activity (ng/ml/h) and aldosterone (pg/ml) in the cyanotic group.

Seral No.	*plasma EPO (mu/ml)*	*Plasma renin activity (ng/ml/h)*	*plasma aldosterone (pg/ml)*
1	1.00	1.740	105.48
2	5.77	4.716	28.18
3	3.78	7.885	99.15
4	4.91	4.716	32.99
5	13.06	4.371	303.39
6	2.00	1.650	319.42
7	16.63	7.044	377.56
8	5.60	6.442	3.39
9	9.54	2.016	103.01
10	12.78	6.602	1.00
11	96.81	-	65.41
12	11.86	-	354.35
13	7.36	-	574.55
14	21.26	-	361.25
15	23.98	-	15.25
16	20.34	-	41.03
17	24.23	-	109.21
18	57.50	-	99.65
X	18.29	4.71	166.34
± SD	23.4	2.29	169.1
± SE	5.5	0.7	39.86

Figure (1) : Individual mean ± SE of plasma ERYTHROPOIETIN (mu\ml)in control , acyanotic and cyanotic groups.

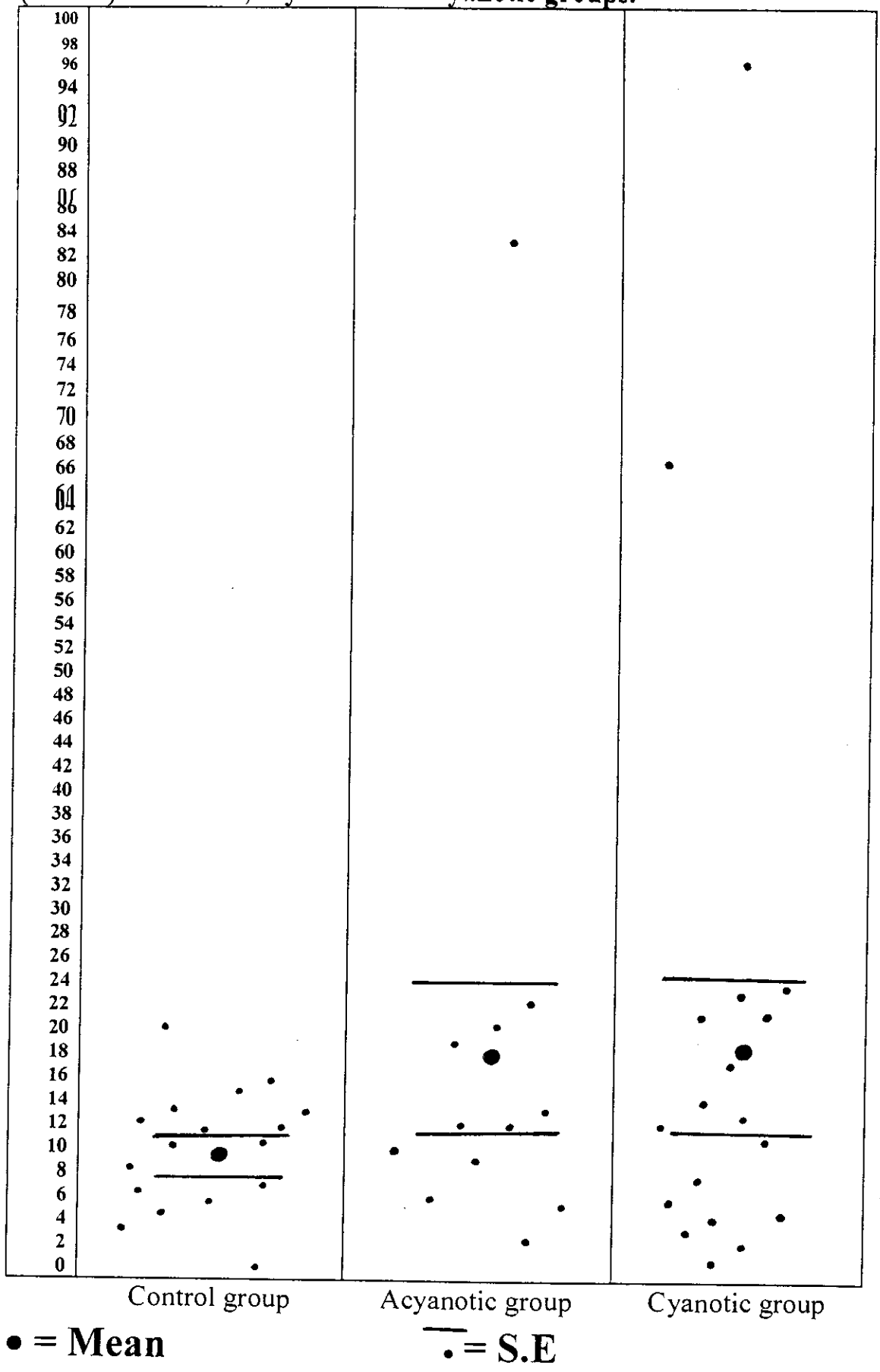
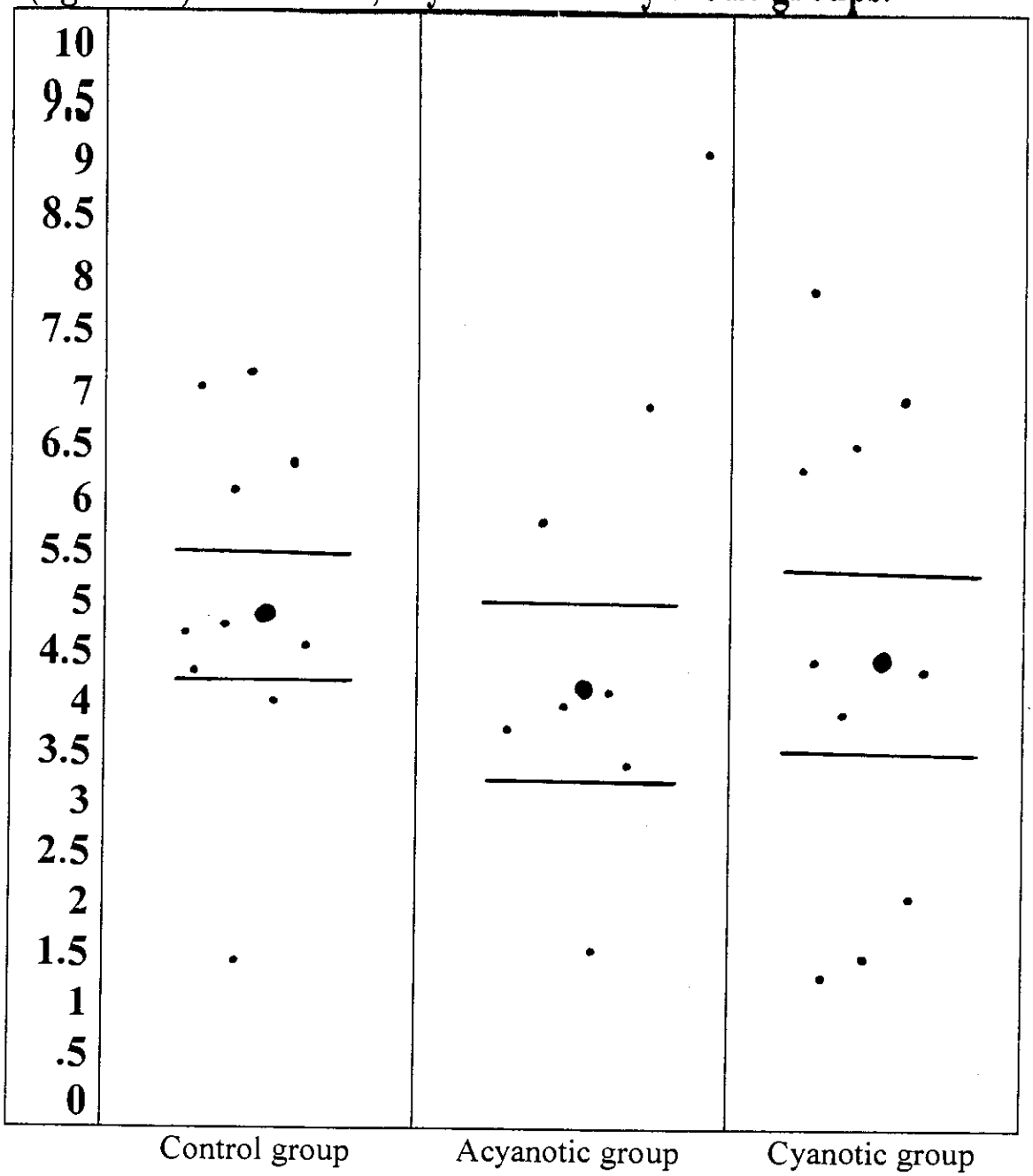


Fig. (2): Individual values and mean ± SE of plasma RENIN activity **(ng\ml\h.) in control , acyanotic and cyanotic groups.**



• = Mean

— = S.E

Fig. (3): Individual values and mean ± SE of plasma ALDOSTERONE **(pg\ml)in control , acyanotic and cyanotic groups.**

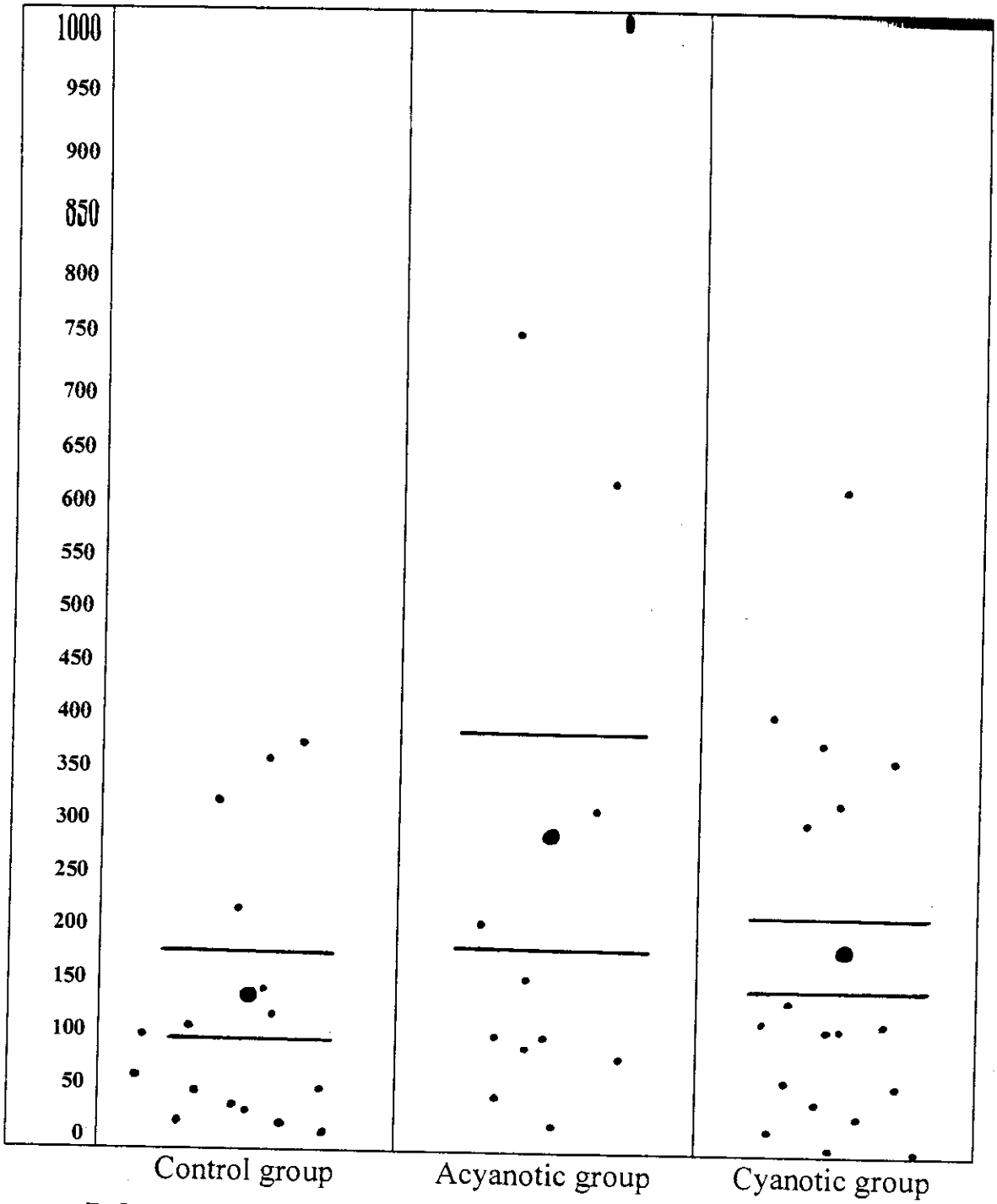


Table (8) : Statistical analysis of the clinical data of the control, acyanotic and cyanotic groups.

Parameters	Control group n = 16 X±SD	Acyanotic group n = 12 X±SD	Cyanotic group n = 19 X±SD	P	P_1	P_2
Age (years)	9.4±2.9	7.87±3.7	6.26±3.1	>0.05 N.S	>0.05 N.S	>0.05 N.S
Systolic blood pressure mmHg	107.9±10.7	106.6±11.9	116.0±10.7	>0.05 N.S	<0.05 S	<0.05 S
Diastolic blood pressure mmHg	67.6±8.2	67.5±8.1	77.6±7.5	>0.05 N.S	<0.05 S	<0.05 S
Pulse (min)	91.8±12.4	100.6±11.0	102.3±8.6	>0.05 N.S	>0.05 N.S	>0.05 N.S

P : Comparison of both control and acyanotic groups.

P_1: Comparison of both control and cyanotic groups.

P_2: Comparison of both acyanotic and cyanotic groups.

S : Significant

NS: Non significant

Table (9) : Statistical analysis of the hematological data of both acyanotic and cyanotic groups.

Parameters	*Acyanotic group n = 12 X±SD*	*Cyanotic group n = 19 X±SD*	*P*
Erythrocyte sedementation rate (1st hour).	17.9±8.8	9.2±5.1	<0.05 S
Erythrocyte sedementation rate (2 nd hour).	31.7±11.9	20.0±10.8	<0.05 S
Hemoglobin (gm%).	11.3±1.3	18.5±4.9	<0.05 S
Hematocrite value	34.8±3.1	50.7±9.5	<0.05 S
Red blood cells (million/cc)	4.36±0.57	6.7±1.29	<0.05 S
White blood cells (thausand /cc)	9.1±1.6	8.56±2.7	>0.05 N.S
Platelets (thausand/cc).	216.2±41.4	264.9±74.8	>0.05 N.S

p : Comparison of both acyanotic and cyanotic groups.

NS: Non significant

S : significant.

Table (10) : Statistical analysis of laboratory data in control , acyanotic and cyanotic groups.

Parameters	*Control group X±SD*	*Acyanotic group X±SD*	*Cyanotic group X±SD*	*P*
Serum Crearinine (mg%)	0.24±0.2	0.31±0.17	0.25±0.16	P> 0.05 N.S p_1>0.05 N.S p_2>0.05 N.S
Serum Urea (mg%)	24.7±3.3	24.4±7.1	22.7±4.1	P>0.05 N.S p_1>0.05 N.S p_2>0.05 N.S

p : Comparison of both acyanotic and control groups.

p_1 : Comparison of both acyanotic and control groups.

p_2 : Comparison of both acyanotic and cyanotic groups.

NS : Non significant

Table (11) : Statistical analysis of plasma erythropoietin (mu/ml) renin activity (ng/ml/h) and oldosterone (pg/ml) in the three groups.

Parameters	*Control group ±SD ±SE*	*Acyanotic group ±SD ± SE*	*Cyanotic group ±SD ± SE*	*P*
Plasma erythropoietin (mu/ml)	8.88 ±4.4 ±1.1	16.7 ±20 ±5.8	18.29 ±23.4 ±5.5	p > 0.05 P_1>0.05 P_2>0.05 N.S.
Plasma renin activity ng/ml/h	4.97 ±1.58 ±0.5	4.24 ±1.61 ±0.6	4.71 ±2.29 ±0.7	p > 0.05 P_1>0.05 P_2>0.05 N.S.
Plasma aldosterone (pg/ml)	129.86 ±126 ±31.5	282 ±337.7 ±97.49	166.34 ±169.1 ±39.86	p > 0.05 P_1>0.05 P_2>0.05 N.S.

P : Comparison of both acyanotic and control groups.

P_1 : Comparison of both cyanotic and control groups.

P_2 : Comparison of both cyanotic and acyanotic groups.

NS : Non significant.

Table (12) : Correlation coeffecient of erythropoietin with other parameters in the control , acyanotic and cyanotic groups.

Parameters	Control group		Acyanotic group		Cyanotic group	
	r	p	r	p	r	p
Systotic blood pressure	0.31	>0.05 N.S	0.81	<0.05 S	0.20	>0.05 N.S
Diastolic blood pressure	-0.08	>0.05 N.S	0.74	<0.05 S	-0.09	>0.05 N.S
ESR 1st hour	-0.009	>0.05 N.S	-0.07	>0.05 N.S	-0.61	<0.05 S
ESR 2nd hour	-0.029	>0.05 N.S	-0.034	>0.05 N.S	-0.62	<0.05 S
Hemoglobin gm%	-0.32	>0.05 N.S	-0.45	>0.05 N.S	-0.08	>0.05 N.S
Hematocrite value	-0.23	>0.05 N.S	-0.18	>0.05 N.S	0.69	<0.05 S
Urea (mg%)	0.49	>0.05 N.S	0.56	>0.05 N.S	0.03	>0.05 N.S

NS: Non significant $P > 0.05$.

S : significant $P < 0.05$.