RESULTS

Data of study group:

The study group comprised 20 patients, their age ranged between 9- 18 year with a mean of 13.76 ± 2.69 years. Their height ranged between 115-- 164 cm with a mean of 142.8 ± 11.74 cm. their weight was between 18- 52 kg with a mean of 31.88 ± 7.97 kg. 11 patients were females (55%) and 9 males (45%). The duration of the start of treatment has a wide range between 1-60 months with a mean of 22.72 ± 15.53 months.

Table (8) Clinical data of patients

	Patients data	**Mean ± SD**
No	20	
Males (No. - %)	9 – (45%)	
Females (No. - %)	11 – (55%)	
Age (Year)	9- 18	13.76 ± 2.697
Wt (kg)	18- 52	31.889 ± 7.970
Ht (cm)	115- 164	142.8 ± 11.740
Duration of HD. (months)	1- 60	22.72 ± 15.528

Table (9)Vital signs of the studied patients

	Range	**Mean ± SD**
HR	76 - 110	88.86 ± 8.3
RR	18 - 24	20.60 ± 2.3
Temp	36.4 – 38.4	37.2 ± 0.6
S.B.P	80 - 200	133.8 ± 30.2
D.B.P	40 - 150	92 ± 25.7

HR : heart rate. **RR: Respiratory rate.**

Temp : Temperature. **S.B.P : Systolic blood pressure**

D.B.P : diastolic blood pressure.

Table (10) Cardiac manifestations of the studied patients

Clinical sings	**Patients**	
	No.	**%**
Exersional dyspnea	13	65
Low cardiac output	10	50
Cyanosis	2	10
Tachycardia	15	75
Cardiomegaly	8	40
Valvular lesion (tricuspid regurge)	6	30
Valvular lesion (mitral regurge)	4	20
Pericardial effusion	6	30

Tachycardia considered when heart rate exceed range of (60-96) beat per minute for the age of (6-12) years and when heart rate exceed range (55-85) beat per minute for the age of (12-18).

Table (11) Laboratory data in studied patients

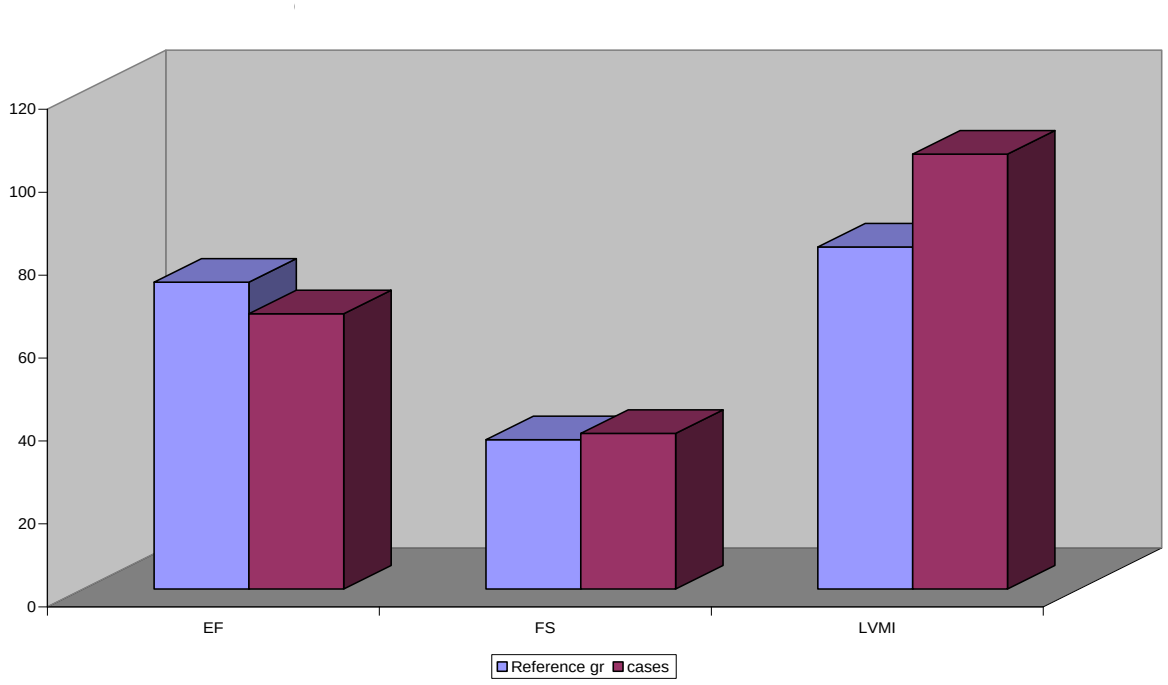
	Range		Mean ± SD		
GFR	3-10	ml/min/1.73m^2	19.2	±	9.8
BUN	47- 257	mg/dl	138.6	±	59.9
Cr.	1.1- 9.3	mg/dl	5.4	±	2.1
Albumin	2.5 -4.6	gm/dl	3.8	±	0.6
Hb	4- 11.5	gm/dl	7.6	±	1.7
Ca	5.2- 9	mg/dl	7.5	±	1.03
PO_4	3.8- 6.7	mg/dl	5.3	±	0.8
Na^+	122- 159	mEq/l	116.7	±	10.8
K^+	3.2 – 6.5	mEq/l	4.6	±	0.8

* Laboratory data of the patient show low GFR from (3-10 ml/ min/ 1.73 m^2) in all studied patients that mean ESRD established in these patients.
* Elevation of mean BUN in most of patients.
* Most of patients are anemic.

Table (12) Systolic functions in comparison with reference values

Systolic functions	Reference values		patients values		T	P
	Range	X ± SD	Range	X ± SD		
- EF %	46 – 87	74 ± 10	48 - 85	66.4 ± 9.8	1.82	> 0.05
- FS %	23 – 52	36 ± 5	24 – 59	37.55 ± 9.1	0.67	> 0.05
- LVMI (gm/m^2)	63 – 98	82.4 ± 20	67 – 160	104.9 ± 28.8	2.87	< 0.01

Fig (2) Systolic functions in comparison with reference values

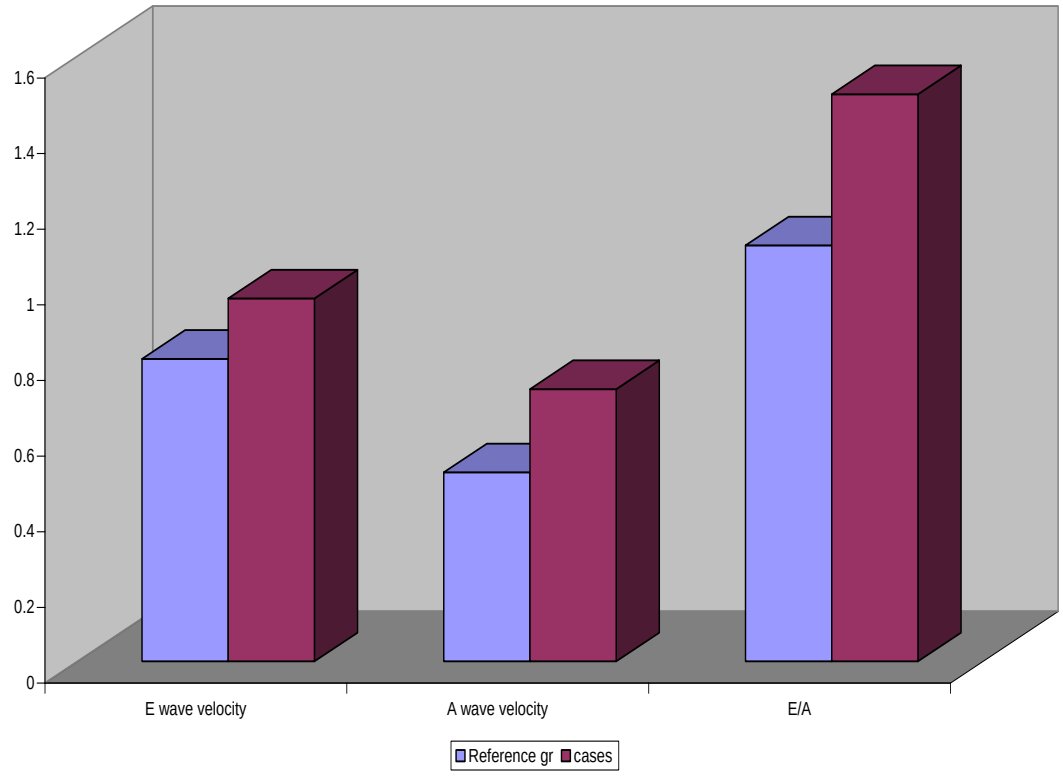


EF & FS show no significant deference when compared with reference values while LVMI is significantly higher (P< 0.01) in comparison to reference values

Table (13) Diastolic functions of the lt side of the heart in comparison with reference values

Diastolic Functions		Reference Values		Patients values		T	P
		Range	X ± SD	Range	X ± SD		
lt side	- E wave velocity m/sec	0.57 – 0.9	0.8 ± 0.2	0.63 – 1.37	0.96 ± 0.22	2.41	< 0.05
	- A wave velocity m/sec	0.4 – 0.8	0.5 ± 0.1	0.3 – 1.3	0.72 ± 0.29	3.21	< 0.01
	- E / A ratio	0.7 – 1.4	1.1 ± 0.1	0.48 – 3	1.5 ± 0.65	2.72	< 0.01

Fig (3) Diastolic functions in comparison with reference values

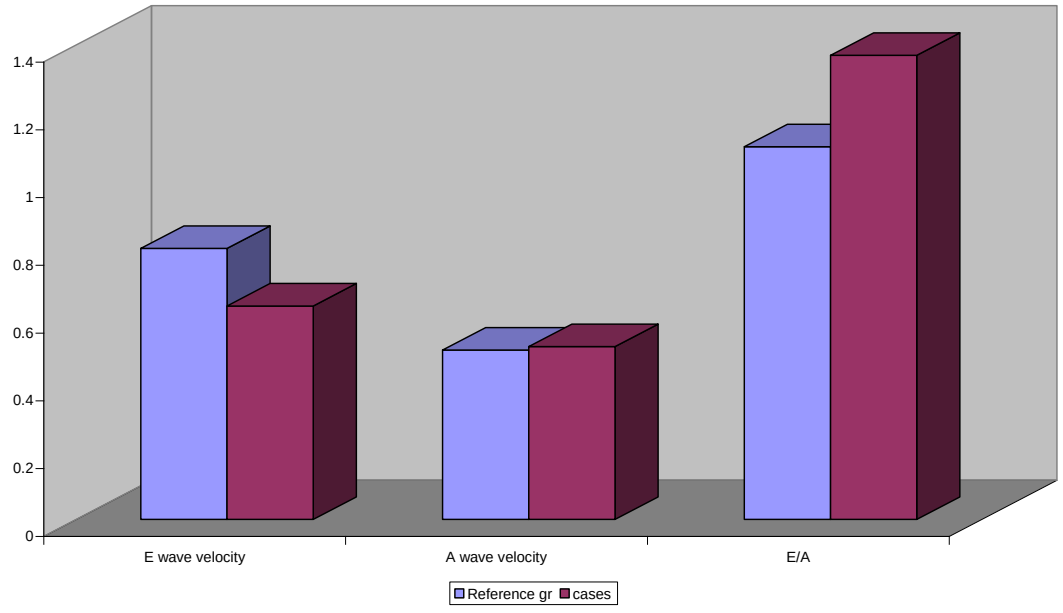


All diastolic functions show significant lower values than reference values

Table (14) Diastolic functions of the RT side of the heart in comparison with reference values

Diastolic Functions		Reference values		Patients values		T	P
		Range	X ± SD	Range	X ± SD		
rt Side	- E W V m/sec	0.34 - 2.1	0.8 ± 0.2	0.39 – 1.9	0.63 ± 0.17	2.9	< 0.01
	- A W V m/sec	0.2 – 0.7	0.5 ± 0.1	0.2 - 0.8	0.51 ± 0.2	0.2	> 0.05
	- E / A ratio	0.6 – 2.1	1.1 ± 0.1	0.6 – 2.8	1.37 ± 0.66	1.81	> 0.05

Fig (4) Diastolic functions in comparison with reference values

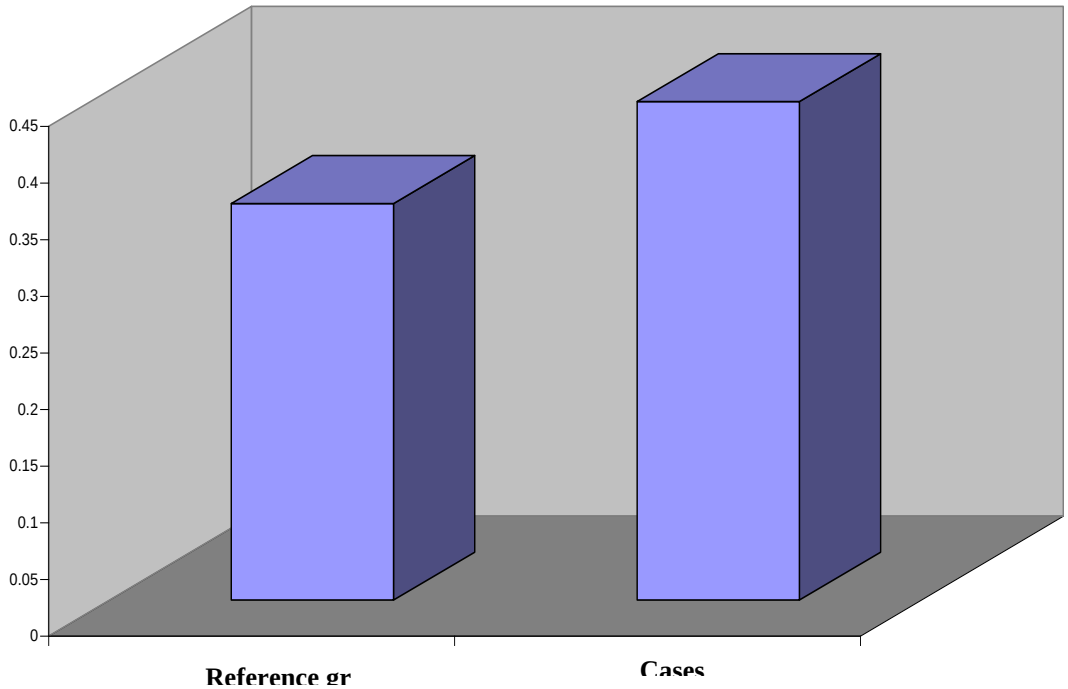


- E wave velocity is significantly lower in studied patients when compared with reference values (P < 0.01).
- A wave velocity & E/A ratio show no significantly deference when compared with reference values.

Table (15) Myocardial performance index in comparison with reference values

	Reference values		Patients values		T	P
	Range	X ± SD	Range	X ± SD		
MPI m/sec	0.22 – 0.36	0.35 ± 0.1	0.2-0.61	0.44 ± 0.35	2.45	< 0.05

Fig (5)*Myocardial performance index in comparison with reference values*



MPI is significantly higher in studied patients when compared with reference values (P< 0.05).

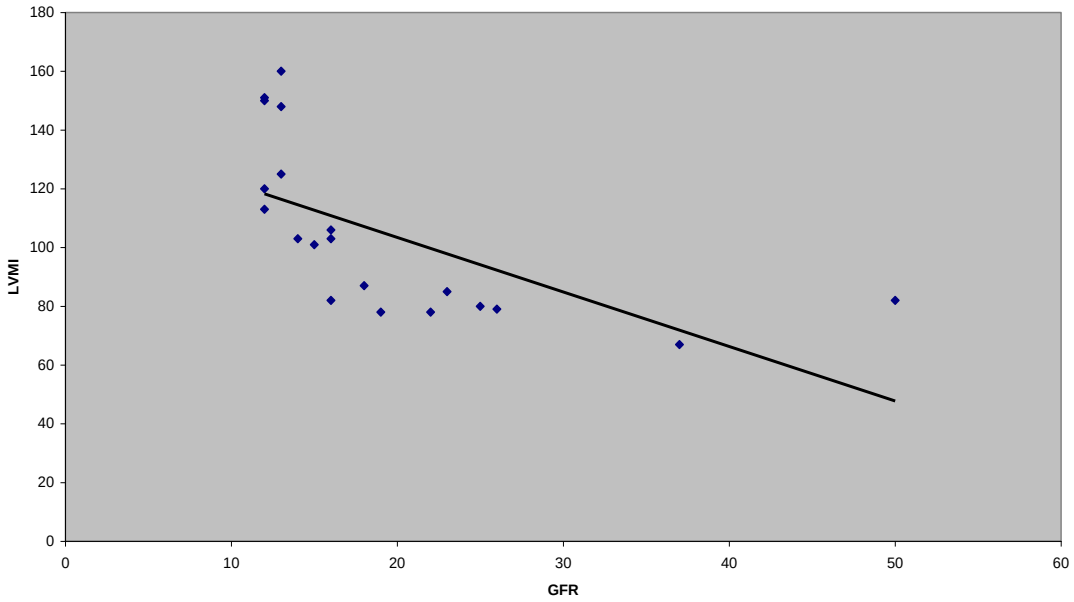
Table (16) Correlation Coefficient "r" between GFR and systolic functions

GFR / Variable	" r "	P
- E F %	0.009	> 0.05
- FS %	0.233	> 0.05
- LVMI gm/m^2	- 0.622	< 0.01

-There is no significant correlation between EF and GFR. (P > 0.05)

- FS show also no significant correlation with GFR.

Fig (6) Correlation Coefficient "r" between GFR and systolic functions

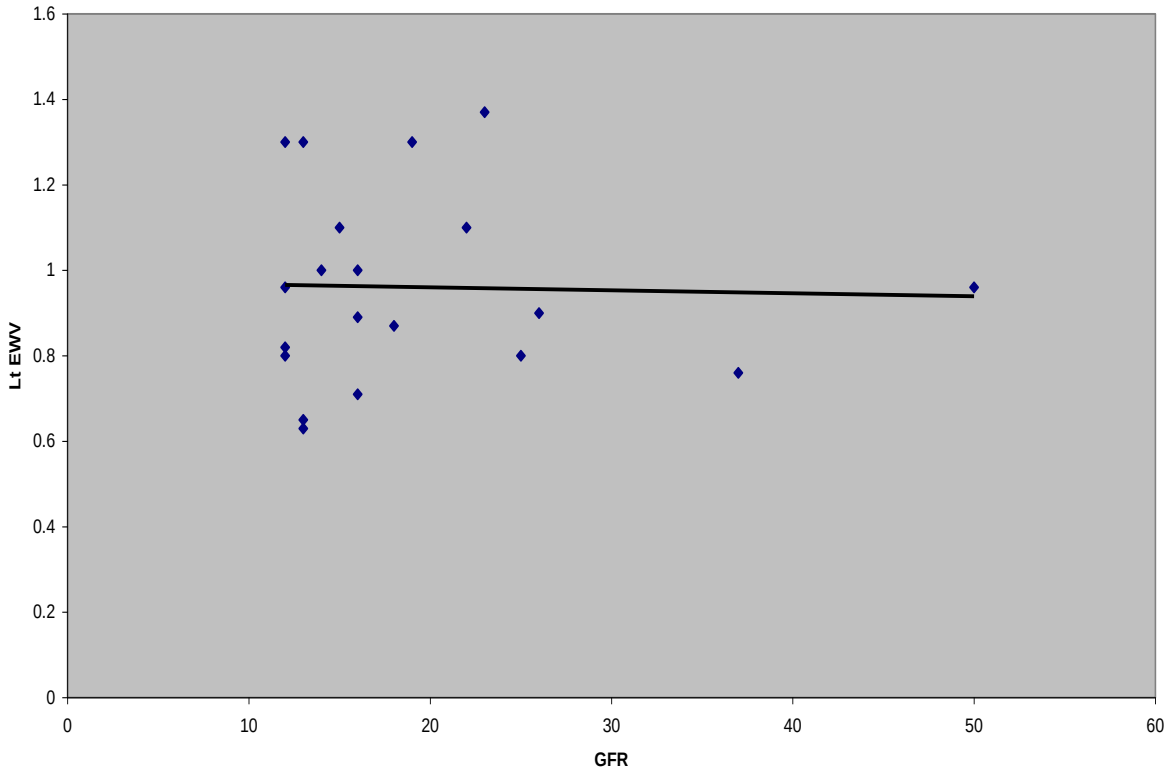


-LVMI show –ve significant correlation with GFR (P< 0.01) as show in figure (6).

Table (17) Correlation Coefficient "r" between GFR and diastolic functions on LT side

GFR / Variable	" r "	P
-EWV (LT)	- 0.4516	< 0.05
- AWV (LT)	- 0.389	< 0.05
- E / A (LT)	- 0. 4516	< 0.05

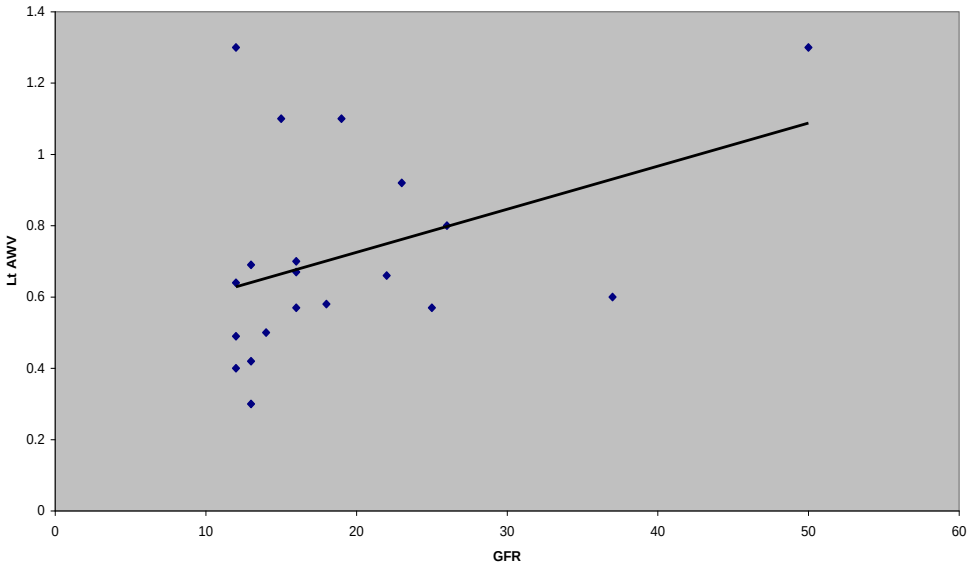
Fig (7) Correlation Coefficient "r" between GFR and LT E wave velocity



- E wave velocity show + ve significant correlation with low GFR

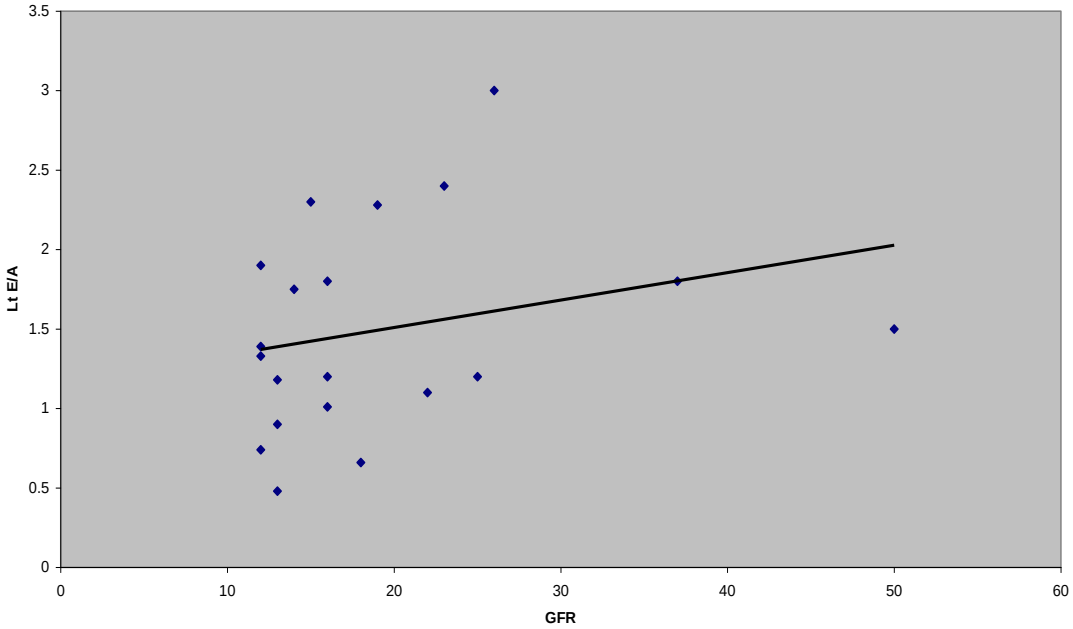
  ($P < 0.05$) as show in Figure (8).

Fig (8) Correlation Coefficient "r" between GFR and LT A wave velocity



- A wave velocity show –ve significant correlation with GFR (P< 0.05) as show in figure (8).

Fig (9) correlation between GFR and LT E/A



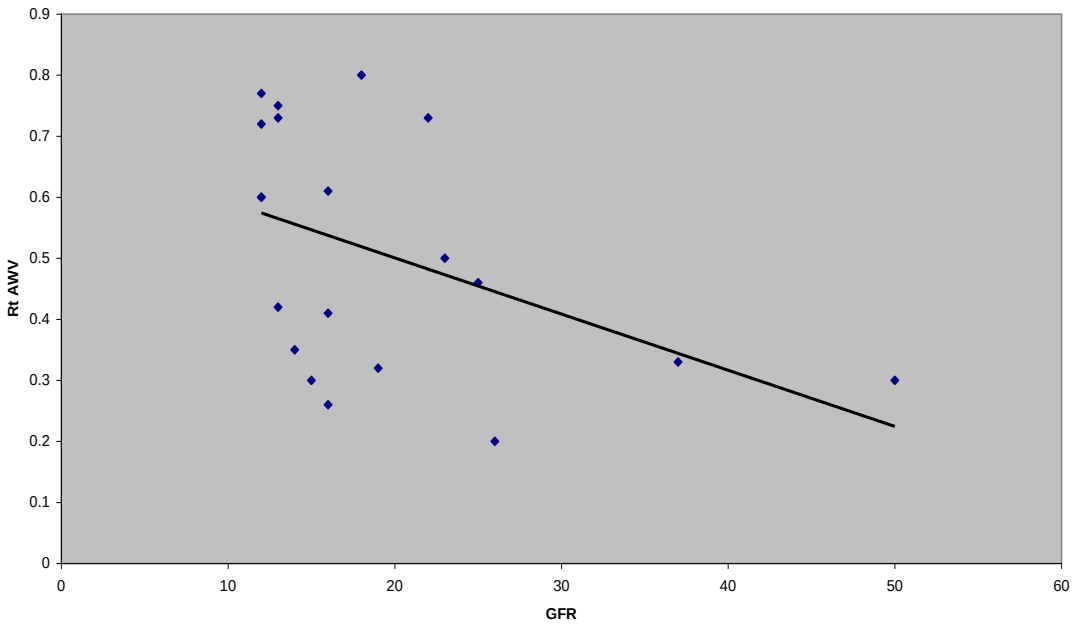
- E/A ratio show –ve significant correlation with low GFR (P<0.05) as show in figure (9).

Table (18) Correlation Coefficient "r" between GFR and diastolic functions of RT side

Variable \ GFR	" r "	P
- EWV (RT)	0.1394	> 0.05
- AWV (RT)	- 0.45	< 0.05
- E / A (RT)	- 0.133	> 0.05

- E wave velocity show no significant correlation with GFR(P> 0.05)
- No significant correlation between E/A ratio and GFR (P> 0.05)

Figure (10) correlation between GFR and RT AWV

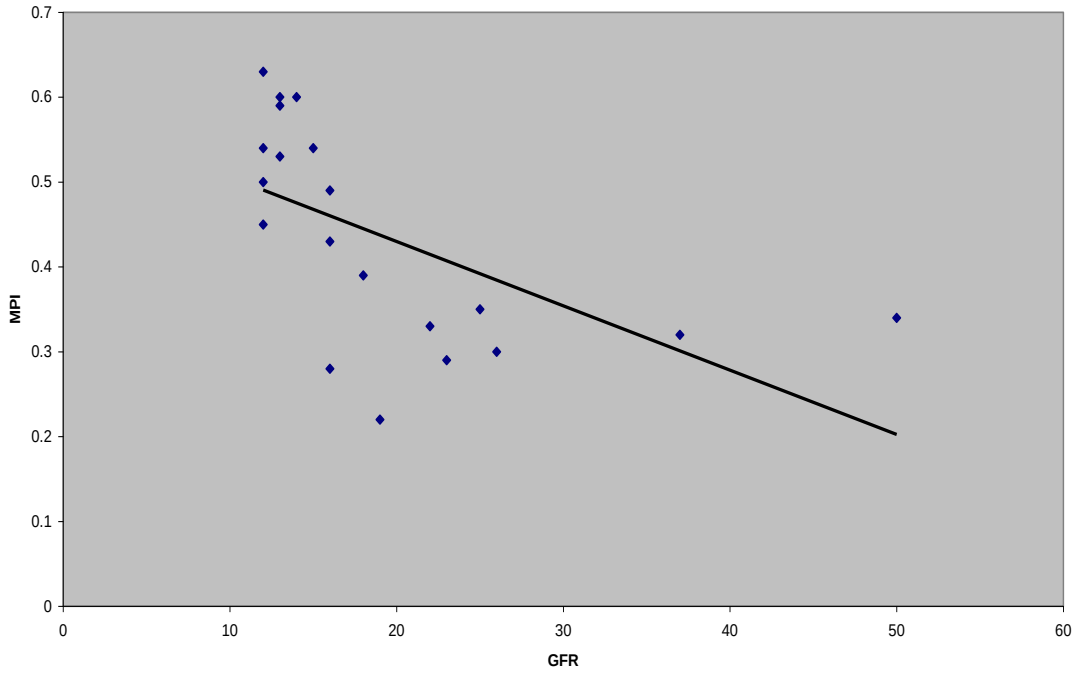


- A wave velocity show –ve significant correlation with GFR (P< 0.05) as show in figure (10)

Table (19) Correlation Coefficient "r" between GFR and MPI

GFR / Variable	" r "	P
- MPI	- 0.575	< 0.01

Figure (11) correlation between GFR and MPI



- MPI show –ve significant correlation with low GFR as show in figure (11).

Table (20) Correlation Coefficient "r" between Hb and different echocardiographic parameters.

Hb / Variable	" r "	P
- E F	- 0.261	> 0.05
- FS	- 0.178	> 0.05
- LVMI	0.151	> 0.05
- EWV (LT)	-0.4414	< 0.05
- AWV (LT)	0.2356	> 0.05
- E / A (LT)	-0.375	< 0.05
-EWV (RT)	-0.043	> 0.05
- AWV (RT)	0.2196	> 0.05
- E / A (RT)	-0.133	> 0.05
- MPI	0.2235	> 0.05

As regard systolic functions of the heart

-EF show no significant correlation with Hb (P> 0.05).

-FS show no significant correlation with Hb (P> 0.05).

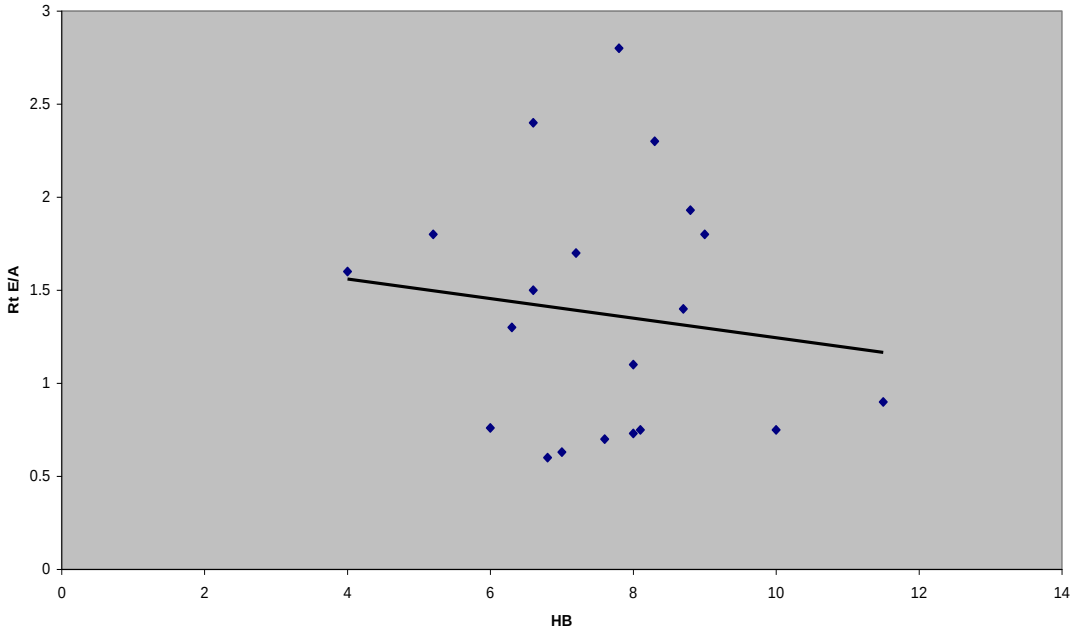
-LVMI show no significant correlation with Hb (P> 0.05).

As regard diastolic functions on LT side of the heart

-E wave velocity show +ve significant correlation with Hb (P< 0.05)

-A wave velocity show no significant correlation with Hb (P> 0.05)

Figure (12) correlation between Hb and Rt E/A ratio.



- E/A show –ve significant correlation with Hb (P< 0.05) as show in figure (13).

As regard diastolic functions on RT side of the heart

-E wave velocity show no significant correlation with Hb (P> 0.05)

-A wave velocity show no significant correlation with Hb (P> 0.05)

-E/A show no significant correlation with Hb (P> 0.05)

As regard myocardial performance index

Show no significant correlation with Hb (P> 0.05).

Table (21) Correlation Coefficient "r" between BP and different echocardiographic parameters.

BP Variable	" r "	P
- E F	0.276	> 0.05
- FS	0.238	> 0.05
- LVMI	0.443	< 0.05
- EWV (LT)	-0.459	< 0.05
- AWV (LT)	0.383	< 0.05
- E / A (LT)	0.446	< 0.05
-EWV (RT)	-0.281	> 0.05
- AWV (RT)	0.147	> 0.05
- E / A (RT)	-0.25	> 0.05
- MPI	0.443	< 0.05

As regard systolic functions of the heart

-EF show no significant correlation with BP (P> 0.05).

-FS show no significant correlation with BP (P> 0.05).

-LVMI show +ve significant correlation with BP (P< 0.05).

As regard diastolic functions on LT side of the heart

-E wave velocity show –ve significant correlation with BP (P< 0.05)

-A wave velocity show +ve significant correlation with BP (P< 0.05)

-E/A show +ve significant correlation with BP (P< 0.05)

As regard diastolic functions on RT side of the heart

-E wave velocity show no significant correlation with BP ($P > 0.05$)

-A wave velocity show no significant correlation with BP ($P > 0.05$)

-E/A show no significant correlation with BP ($P > 0.05$)

As regard myocardial performance index

Show +ve significant correlation with BP ($P < 0.05$).