RESULTS

The results of this study are illustrated as follow.

Tables (1) and (2) shows clinical data of group 1,2 and 3.

- The range of age in group 1 was 20 days - 9 years, their mean age was 3.35 ± 1.27 years, their mean weight was 8.15 ± 2.93kg and their mean length was 70.22 ± 7.97cm.
- The range of age in group 2 was 1 month – 9 years. Their mean age was 3.39 ± 1.47 years, their mean weight was 6.37 ± 2.23kg and their Mean length was 66.34 ± 7.22cm.
- The range of age in group 3 was 2 month – 9 years, their mean age was 3.42 ± 1.52, years, their mean weight was 9.13 ± 3.22kg and their mean length was 85.21 ± 8.31cm.

The previous results showed statistical significant difference in weight and length among the studied groups. Which were lower in group of V.S.D. with pulmonary hypertension.

- Table (3) shows the clinical data of G1 and G2

- in group 1 shortness of breathing was in 25% of cases with (Chi-square 1.5), Excessive sweating was in 20% of cases with (Chi-square 1.1), chest infection was in 40% of cases with (Chi- square 1.3), thrill was in 20% of cases with (Chi- square 1.1) and Murmur was in 100% with (Chi- square 5.2).

- In group 2 Shortness of breathing was in 80% of cases with (Chi-square 3.6), Excessive sweating was in 70% of cases with (Chi-square 3.2), repeated chest infection was in 90% of cases with (Chi-square 3.7), failure to thrive was in 80% of cases with (Chi- square 3.1), weight below 3rd percentile was in 80% of cases with (Chi-square 3.6), length below 3rd percentile was in 80% of cases with (Chi- square 3.1), thrill was in70% of cases with (Chi- square 3.2), and Murmur was in 100% of cases with (Chi- square 6.2).

Table (4) Shows that Tei index was not statistically affected as regarding age of patients of group 1(G1) with (P. value = 0.138).

The table (5) the same results were obtained in group 2.

Table (6): shows statistical analysis of Tei index among control group (G3) as regard age. It shows a progressive reduction from birth up to the age of 2 years, then the Tei index shows no further change to children older than 2 years. The changes in the index may reflect changes during the maturation of the myocardial characteristics of the LV in neonates and children. During development, the relation between total collagen and total protein reaches normal levels in 6 months and the relation between type I collagen which mainly provides rigidity to type III collagen which provides elasticity stabilizes after 2 years.

Table (7): shows statistical comparison between G1 and (control) G3 as regard echo measurements. It showed no statistical significant difference in [left atrium diameter (L.A) (P value = 0.55), left ventricular end diastolic diameter (LVEDD) (P value = 0.82), left ventricular end

systolic diameter (LVESD), (P value = 0.66), right ventricular diameter (R.V), (P value = 0.79) and Aorta (A.O), (P value = 0.29).

Table (8): shows statistical comparison between G2 and (control) G3 as regard echo measurements. It showed statistical significant difference in [left atrium diameter (L.A), (P value = 0.04), left ventricular end diastolic diameter (LVEDD) (P value = 0.03), left ventricular end systolic diameter (LVESD)(P value = 0.03), right ventricular diameter (R.V) (P value = 0.08) and Aorta (A.O) (P value = 0.29).

Table (9): shows the statistical comparison between G1 and G2 as regard echo measurements. It showed statistical significant difference in [left atrium diameter (L.A) (P value = 0.04), left ventricular end diastolic diameter (LVEDD) (P value = 0.03) and left ventricular end systolic diameter (LVESD) (P value = 0.03). it showed no statistical significant different in [right ventricular diameter (R.V) (P value = 0.08) and Aorta (A.O) (P value = 0.09).

Table (10): Shows statistical significant difference of Tei index among the studied groups as (P. value = 0.004).

Table (11): Shows the correlation between Tei index, E.F and E/A ratio in G1. It showed significant negative correlation between Tei index and Ejection fraction (E.F) where (P value = 0.03), on other hand it showed no significant correlation between Tei index and E/A ratio (P value = 0.06).

Table (12): Shows the correlation between Tei index, and E/A ratio in G2. Which showed significant negative correlation between Tei index and Ejection fraction (E.F) as (P value = 0.03).

Also it showed significant negative correlation between Tei index and E/A ratio as (P value = 0.03).

Table (13): Shows the statistical comparison of the Tei index value in G1 and G3 as regard isovolamic contraction time (a-value) and isovolamic relaxation time (b-value). It showed statistical significance difference between G1 and G3 as [(a value), P. value = 0.04, (b value) P value = 0.03] and Tei index was (P. value = 0.02).

Table (14): Shows the statistical comparison of the Tei index value in G2 and G3 as regard isovolamic contraction time (a-value) and isovolamic relaxation time (b-value). It showed statistical significance difference between G2 and G3 as [(a value), P. value = 0.03, (b value) P. value = 0.01] and Tei index was [P. value = 0.04].

Table (15): Shows the statistical comparison of the Tei index value in G1 and G2 as regard isovolamic contraction time (a-value) and (isovolamic relaxation time) b-value. There is no significance statistical different between G1 and G2 as [(a value) P. value = 0.06, (b value), P. value = 0.07] and Tei index was [P. value = 0.08].

Table (16): Shows the negative correlation between Tei index and echo measurements in G1 where [left atrium diameter, (P. value = 0.07), left ventricular end systolic diameter, (P. value = 0.06), right ventricular diameter, (P. value = 0.07) and Aorta, (P. value = 0.08) there is no statistical significant difference in this group. there is only significant positive correlation between Tei index and left ventricular end diastolic diameter where (P. value = 0.04).

Table (17): Shows the correlation between Tei index and echo measurements in G2 where left atrium (P. value = 0.04), left ventricular end diastolic diameter (P. value = 0.03), left ventricular end systolic diameter (P. value = 0.03), right ventricle (P. value = 0.003) and Aorta (P. value = 0.04). There is statistical significant difference in all acho measurements.

Table (1): The mean ± standard deviation (SD) of ages among the studied groups.

	No	Age	Mean ± SD
G1	20	20 days – 9 years	3.35 ± 1.27
G2	10	1 month – 9 years	3.39 ± 1.47
G3	10	2 months – 9 years	3.42 ± 1.52

G : group

No : Number

SD: Standard deviation.

Table (2): The mean ± standard deviation (SD) of weight and length among the studied groups.

	No	Mean weight M ± SD	Mean length M ± SD
G1	20	8.15 ± 2.93	70.22 ± 7.97
G2	10	6.37 ± 2.23	66.43 ± 7.22
G3	10	9.13 ± 3.22	85.21 ± 8.13
p. value		**0.03***	

There is significant different
between both diseased groups and control group.

Table (3): The clinical data among G1 and G2 patients

Symptoms and signs	No.	%	Chi-square	P. value
Shortness of breathing				
G1	5	25%	1.5	0.03
G2	8	80%	3.6	
Excessive sweating				
G1	4	20%	1.1	0.04
G2	7	70%	3.2	
Chest infection				
G1	8	40%	1.3	0.03
G2	9	90%	3.7	
Thrill				
G1	4	20%	1.1	0.04
G2	7	35%	3.2	
Murmur				
G1	20	100%	5.2	0.09
G2	10	100%	6.2	

G 1: V.S.D. without P.H.

G 2: V.S.D. with P.H.

Table (4): Mean ± SD of Tei index value in patients of G1 with different ages.

Tei / Age	No. 20	Mean ± SD	Range	F	p. value
20 days ≤ 6months	6	0.947 ± 0.174	1.3-2.4	1.959	0.138
6mo ≤ 12mo	4	0.204 ± 0.117	2.4-2.6		
12mo ≤ 24 mo	5	0.273 ± 0.119	2.6-2.7		
24mo ≤ 9 yrs	5	0.283 ± 0.143	2.7- 2.9		

There is no statistical significant different between age groups .

Table (5): Mean ± SD of Tei index value in patients of G2 with different ages.

Tei / Age	No. 10	Mean ± SD	Range
1months ≤ 6 months	4	0.967± 0.189	0.16-0.28
6mo ≤ 12mo	2	0.167 ± 0.113	0.28 - 0.29
12mo ≤ 24 mo	2	0.287 ± 0.143	0.29-0.31
24mo ≤ 9 yrs	2	0.197 ± 0.153	0.31- 0.34

Statistical analysis cannot show difference because of small number, however in this group the Tei index not affected by age.

Table (6): Shows mean Tei value in control cases with different ages.

Tei / Age	No. 10	Mean ± SD	Range
20 days ≤ 6months	**3**	**0.293 ± 0.197**	**0.179- 0.79**
6mo ≤ 12mo	**2**	**0.133 ± 0.103**	**0.179- 0.42**
12mo ≤ 24 mo	**2**	**0.195 ± 0.131**	**0. 41- 0.29**
24mo ≤ 9 yrs	**3**	**0.195 ± 0.131**	**0. 41-0.29**

Statistical analysis cannot show difference because of small number in each group however the Tei index was affected by showing progressive reduction in its value from birth up to the age of 2 years. Then it showed no further statistical changes of children older than 2 years.

Table (7): The statistical comparison between G1 and (control) G3 as regard echo measurements.

		Range	Mean	± SD	T	P. value
L.A.	G1	0.79-1.1	1.31	0.150	0.03	0.55
	G3	0.59- 0.79	1.36	0.260		
LVEDD (cm)	G1	1.4-1.9	1.80	0.384	0.06	0. 82
	G3	3.3 -0.8	3.80	0.418		
LVESD(cm)	G1	1.3-1.8	1.78	0.334	0.07	0. 66
	G3	2.1-0.5	2.2	0.355		
R.V.	G1	1.3-2.1	1.10	0.474	0.08	0. 79
	G3	0.99-1.79	1.27	0.210		
A.O.	G1	1.4-2.1	1.19	0.250	0.06	0. 29
	G3	0.89-1.76	1.17	0.190		

There is no significant difference between G1 and (control) G3 as regarding Echo measurement.

Table (8): The statistical comparison between G2 and (control) G3 as regard echo measurements.

		Range	Mean	± SD	t	P. value
L.A.	G2	1.4-1.9	1.41	0.379	0.05	0.04*
	G3	0.59-0.79	1.36	0.260		
LVEDD(cm)	G2	2.2-2.89	2.41	0.618	0.09	0.03*
	G3	3.3-0.8	3.8	0.418		
LVESD(cm)	G2	2.3-2.59	2.26	0.535	0.08	0.03*
	G3	2.1 -0.5	2.2	0.355		
R.V.	G2	2.1-2.69	1.31	0.311	0.06	0.08
	G3	0.99-1.79	1.46	0.210		
A.O.	G2	1.09-2.1	1.56	0.215	0.05	0.29
	G3	0.89-1.76	1.17	0.190		

There is significant difference between G2 and (control) G3 as regard echo measurements in left atrium (L.A.) , left ventricular end diastolic diameter (LVEDD) and left ventricular end systolic diameter (LVESD).

Table (9): The statistical comparison between G1 and G2 as regard echo measurements.

		Range	Mean	± SD	t	P. value
L.A.	G1	0.79-1.1	1.31	0.150	0.05	0.04*
	G2	1.4-1.9	1.41	0.379		
LVEDD	G1	1.1-1.7	1.51	0.384	0.08	0. 03*
	G2	2.2-2.89	2.41	0.618		
LVESD	G1	1.3-1.8	1.78	0.334	0.09	0. 03*
	G2	2.3-2.59	2.26	0.535		
R.V.	G1	1.3-2.1	1.10	0.474	0.04	0. 08
	G2	2.1-2.69	1.31	0.311		
A.O.	G1	1.4-2.1	1.19	0.250	0.03	0. 09
	G2	1.09-2.1	1.56	0.215		

There is significant difference between G1 and G2 as regard echo measurements in left atrium (L.A.) , left ventricular end diastolic diameter (LVEDD) and left ventricular end systolic diameter (LVESD).

Table (10): Mean Tei index value in the studied groups

VSD with out pulmonary hypertension (G1) Mean ± SD	**VSD with pulmonary hypertension (G2) Mean ± SD**	**Control (G3) Mean ± SD**
0.431 ± 0.234	0.521 ± 0.344	0.213 ± 0.131
F	4.9	
p. value	0.04*	

The Tei index was significant among studied groups.

Table (11): The correlation between Tei index, (E/A) and Ejection fraction (E.F) in (G1).

Tei	r	P value
E.F	- 0. 4	- 0.03*
E/A	0.3	- 0.06

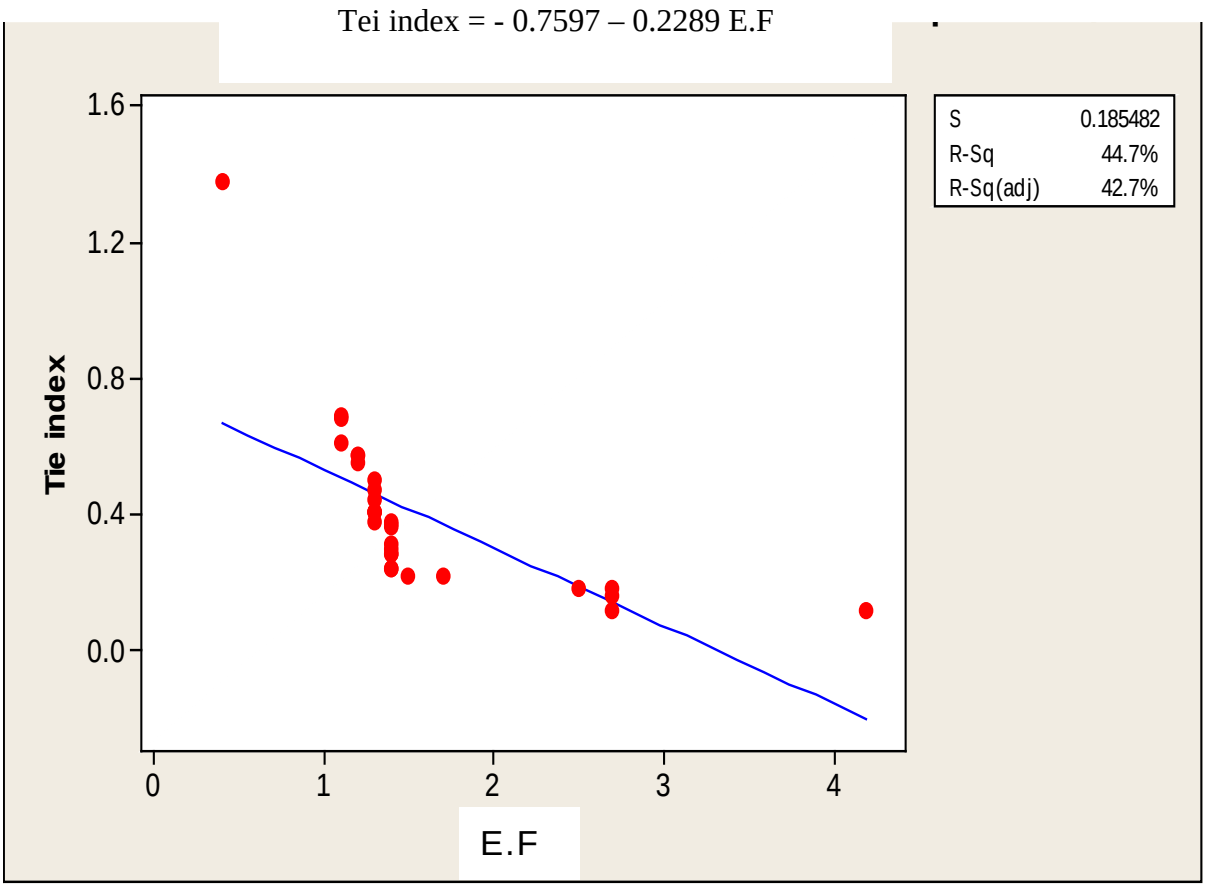
There is significant negative correlation between Tei Index and E.F, there is no significant correlation between Tei index and E/A ratio.

Table (12): The correlation between Tei index, (E/A) and Ejection fraction (E.F) in (G2).

Tei	r	P. value
E.F	- 0.4	0.03*
E/A	- 0. 5	0.03*

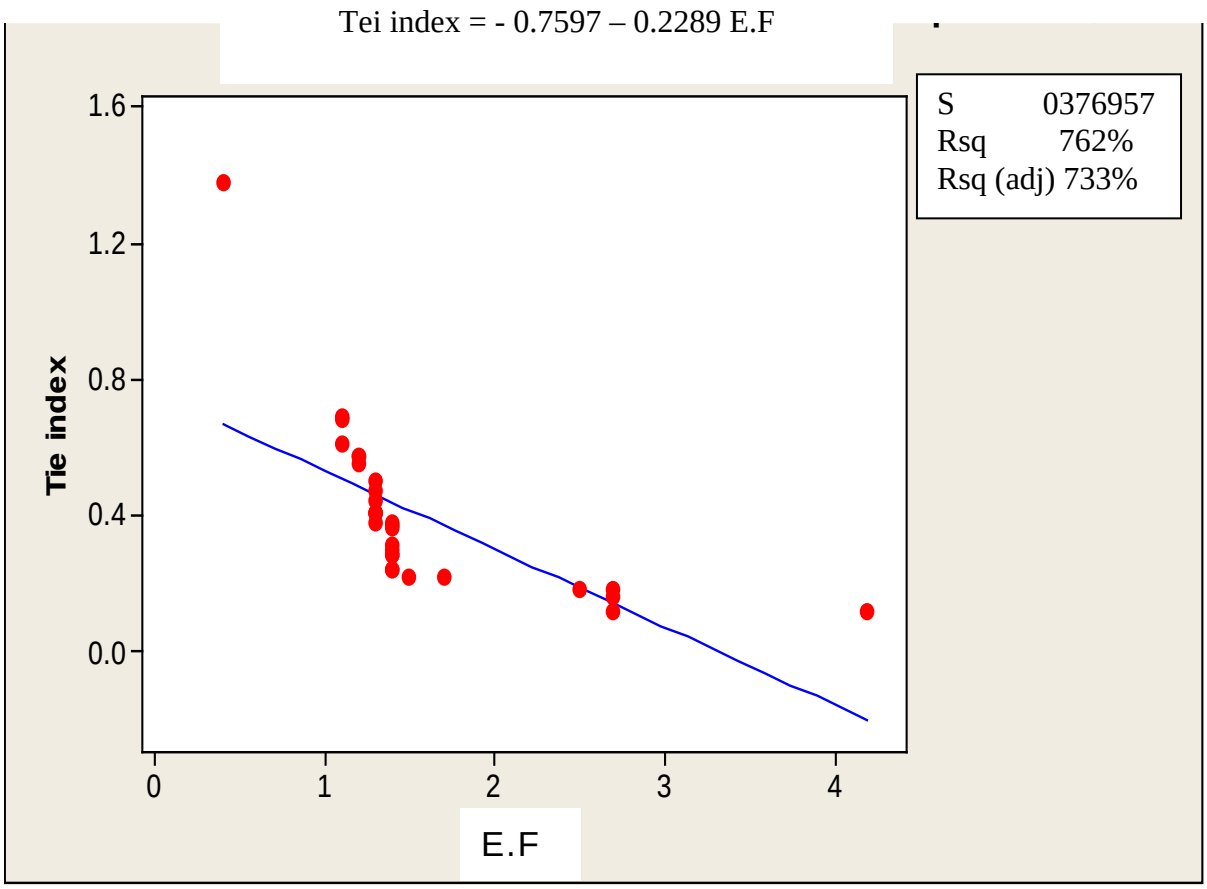
Tei index shows significant negative correlation with E.F and E/A ratio.

Figure No. (I): Shows the correlation between Tei index and E.F in patients with VSD and without pulmonary hypertension.



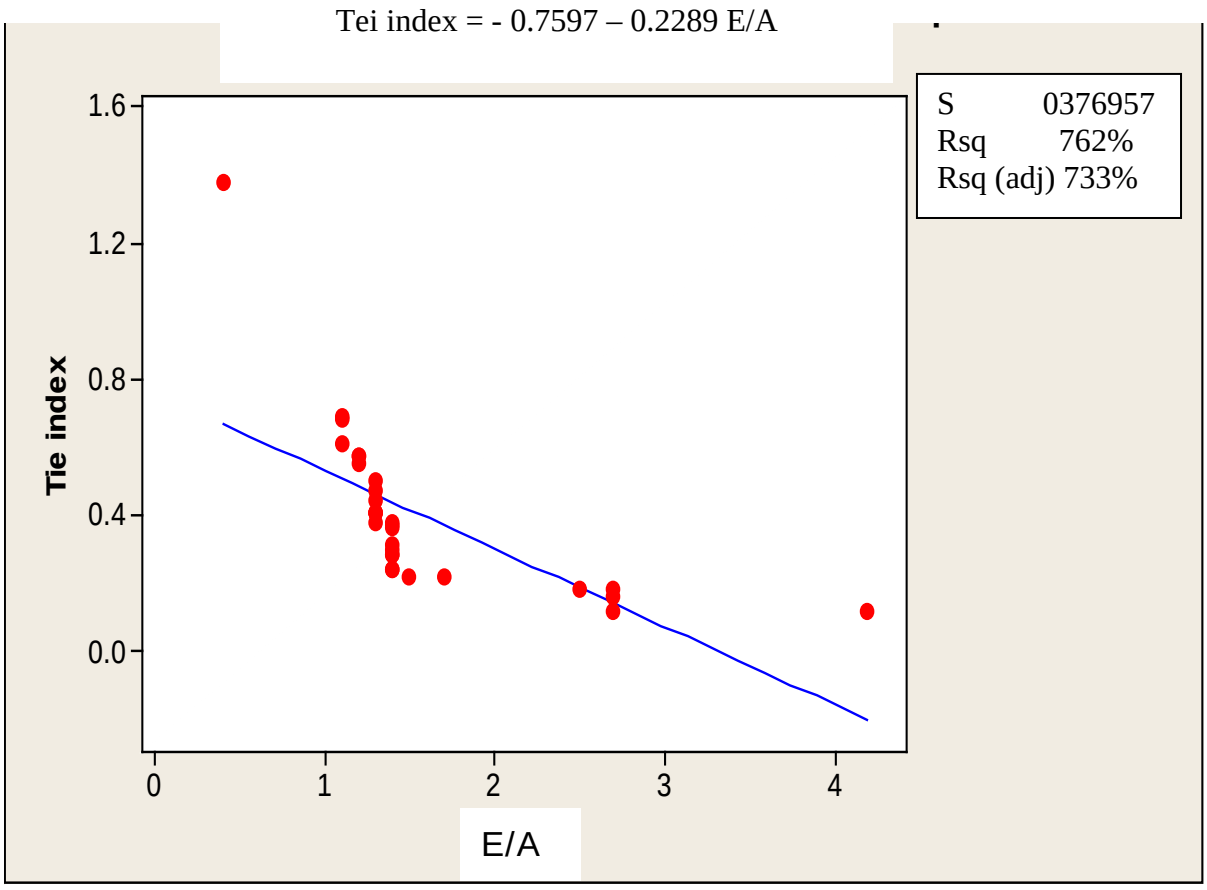
There is significant negative correlation between Tei index and E.F in patients with VSD and without pulmonary hypertension.

Figure No. (II): Shows the correlation between Tei index and E.F in patients with VSD and pulmonary hypertension.



There is significant negative correlation between Tei index and E.F in patients with VSD and pulmonary hypertension.

Figure No. (III): Shows the correlation between Tei index and E/A in patients with VSD and pulmonary hypertension.



There is significant negative correlation between Tei index and E/A in patients with VSD and pulmonary hypertension.

Table (13): The statistical comparison of the Tei index value in G1 and (control) G3 as regarding to a- value and b- value.

		Range	Mean	± SD	t	p. value
a	G1	1.95-2.85	0.279	0.185	3.71	0.04*
	G3	2.1 -0.5	2.2	0.355		
b	G1	1.95-2.70	0.343	0.242	6.77	0.03*
	G3	3.3-0.8	3.8	0.418		
Tei index	G1	0.34-2.47	0.431	0.234	3.5	0. 02*
	G3	0.02-1.38	0.213	0.131		

Tei Index $\frac{a-b}{b}$

- a = ivct - b = ivrt

a = isvolumetric contraction Time. b = isvolumetric relaxtion Time.

* means significant

There is statistical significant difference between G1 and (control) G3 regarding to a,b and Tei index.

Table (14): The comparison of the Tei Index, a, b value in G2 and G3.

		Range	Mean	± SD	t	P. value
a	G2	2.1-2.8	0.389	0.195	4.71	0.03*
	G3	2.1 -0.5	2.2	0.355		
b	G2	1.99-3.1	0.353	0.200	5.77	0.01*
	G3	3.3-0.8	3.8	0.418		
Tei index	G2	1.54-3.2	0.521	0.344	4.5	0.04*
	G3	0.02-1.38	0.213	0.131		

Tei Index $\frac{a-b}{b}$

a = ivct b = ivrt

a = isvolumetric contration time. b = isvolumetric relaxtion time.

* means significant

There is statistical significant difference between both G2 and G3 regarding to a,b value and Tei index.

Table (15): The comparison of the Tei Index, a, b value in G1 and G2.

		Range	Mean	± SD	t	P. value
a	G1	1.95-2.85	0.279	0.185	2.71	0.06
	G2	2.1-2.8	0.389	0.195		
b	G1	1.95-2.70	0.343	0.242	4.77	0.07
	G2	1.99-3.1	0.353	0.200		
Tei index	G1	0.34-2.47	0.431	0.234	3.45	0.08
	G2	1.54-3.2	0.521	0.344		

Tei Index $\frac{a-b}{b}$

a = Ivct b = Ivrt

There is no statistical significant difference between both G1 and G2 regarding to a,b value and Tei index.

Table (16): The correlation between Tei index and echo measurements in patients of (G1).

Tei	r	P value
L.A	0. 6	0. 07
LVEDD	0. 4	0.04*
LVESD	0. 5	0.06
R.V	0. 6	0.07
A.O	0. 7	0.08

There is only significant positive correlation between Tei index and left ventricular end diastolic (LVEDD) in (G1).

Table (17): The correlation between Tei index and echo measurements in patients of (G2).

Tei index	r (Pearson correlation)	P value
L.A	0. 51	0.04*
LVEDD	0. 42	0.03*
LVESD	0. 34	0.03*
R.V	0. 4	0.003*
A.O	0. 4	0.04*

Tei index shows significant correlation with echo measurement in patients of (G2).