Results

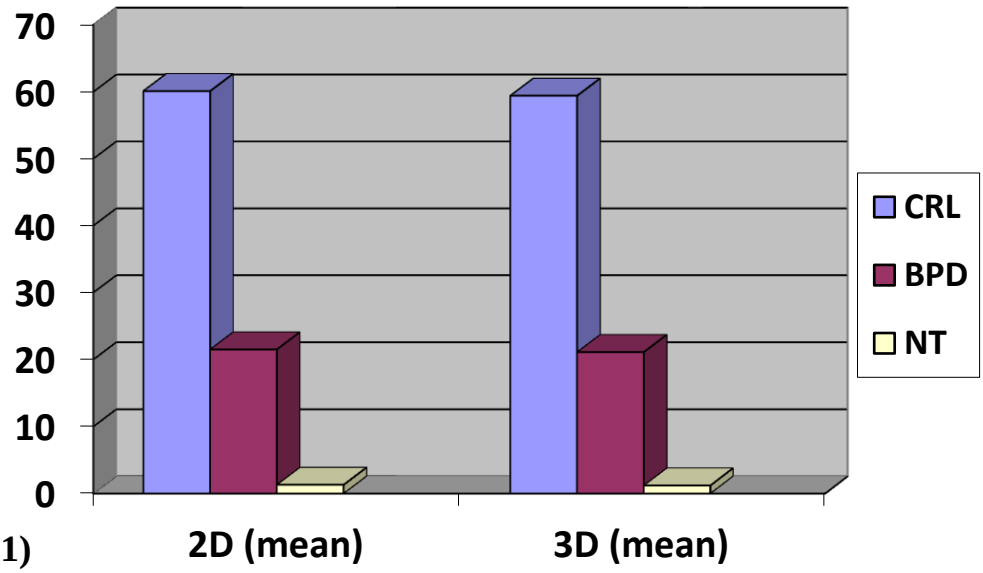
This study was conducted at obstetrics and gynecology department, Benha university hospital, on one hundred women who underwent 2D and 3D ultrasound. The mean maternal age was 26.3 years ± 5 and the range was from 19 to 32 years and the mean parity was 2.26 and SD was 1.03 and ranged from primigravidas to Para 3.

Table (3) shows the measurement of CRL, BPD and NT by the routine 2D scan and those on the stored volume taken by 3D.

Table (3): the correlation between 2D & 3D in relation to CRL, BPD and NT

100 Fetus	2D (mean)	3D (mean)	P value
CRL (mm)	60.1	59.4	>0.05
BPD (mm)	21.5	21.1	
NT (mm)	1.3	1.2	

Statistical analysis was performed and showed no statistical significance between 2D and 3D results (P > 0.05).

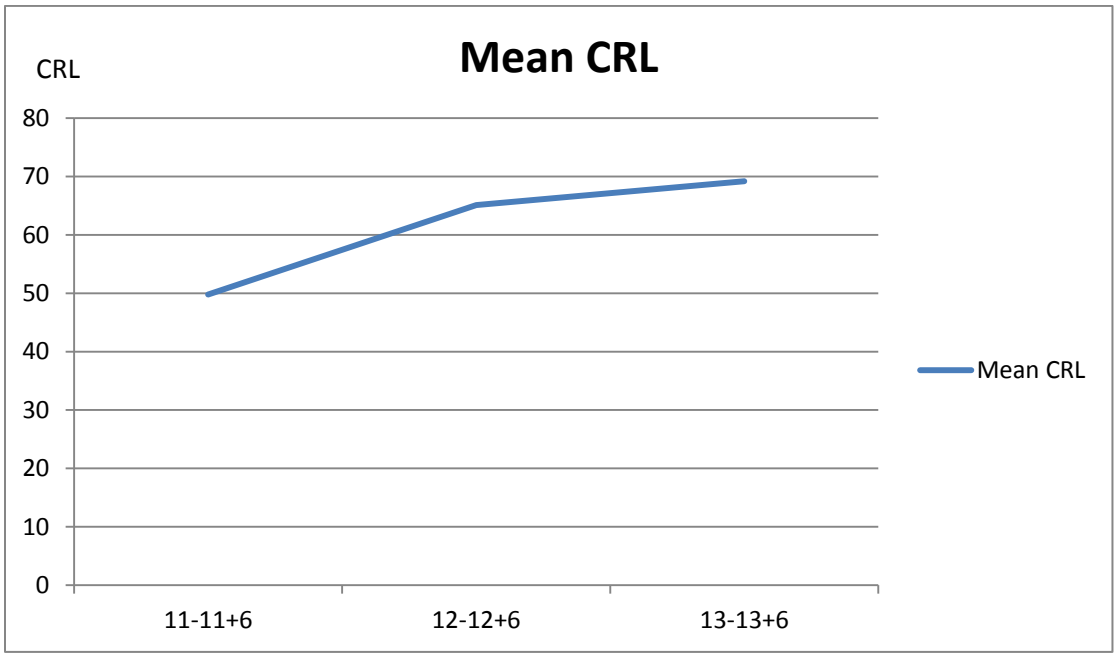


Graph (1)

Graph (1) plots the measurement of CRL, BPD and NT by the routine 2D scan and those on the stored volume taken by 3D ultrasound.

Table (4): the correlation between gestational age and CRL measured by 3D ultrasound.

Gestational age (weeks+ days) 100 fetus	CRL -3D (mm)		
	Range	Mean ± SD	P- value
11 to 11+6	42-60	49.8 ± 6.3	<0.05
12 to 12+6	51-85	65.1 ± 10.5	
13 to 13+6	38-84	69.2 ± 18	

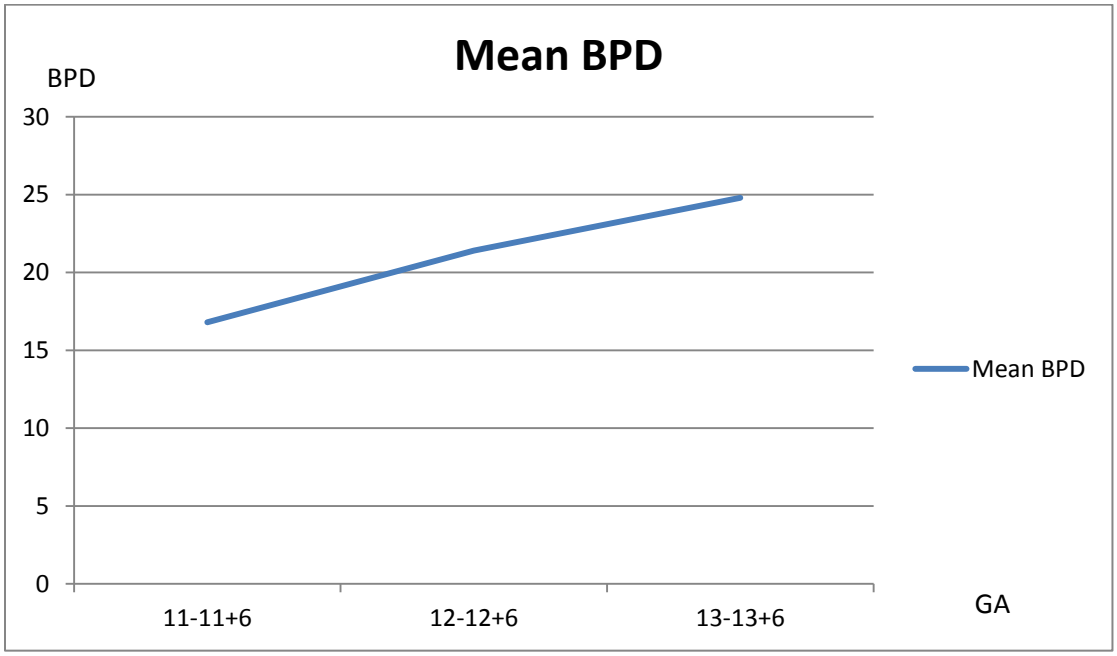


Graph (2)

Table (4) and graph (2) showed the high positive correlation gestational age and CRL. The mean CRL was 49 mm at gestational age 11 to 11+6 weeks, and 64 mm at age 12-12+6 weeks and 69 mm at age of 13-13+6.

Table (5): the correlation between gestational age (GA) and BPD (on 3D stored data)

GA 100 fetus (week+ days)	BPD-3D (mm)		
	Range	**Mean ± SD**	
11-11+6	14-23	16.8± 4.2	P value (<0.05)
12-12+6	16-26	21.4± 4	
13-13+6	21-29	24.8± 3.3	



Graph (3)

Table (5) and graph (3) showed the high positive correlation between BPD and gestational age. Moreover, in this study the mean BPD was 16.8mm for the gestational age 11 to 11+6 weeks, 21.4mm for gestational age 12 to 12+6 week and 24.8 for gestational age 13 to 13+6 weeks.

Table (6) shows the mean gestational age, also it compares gestational age using clinical and that calculated by ultrasound on the stored 3D volume (P value >0.05).

Table (6): the correlation between clinical gestational (GA-Cl) and ultrasound calculated gestational (GA-US)

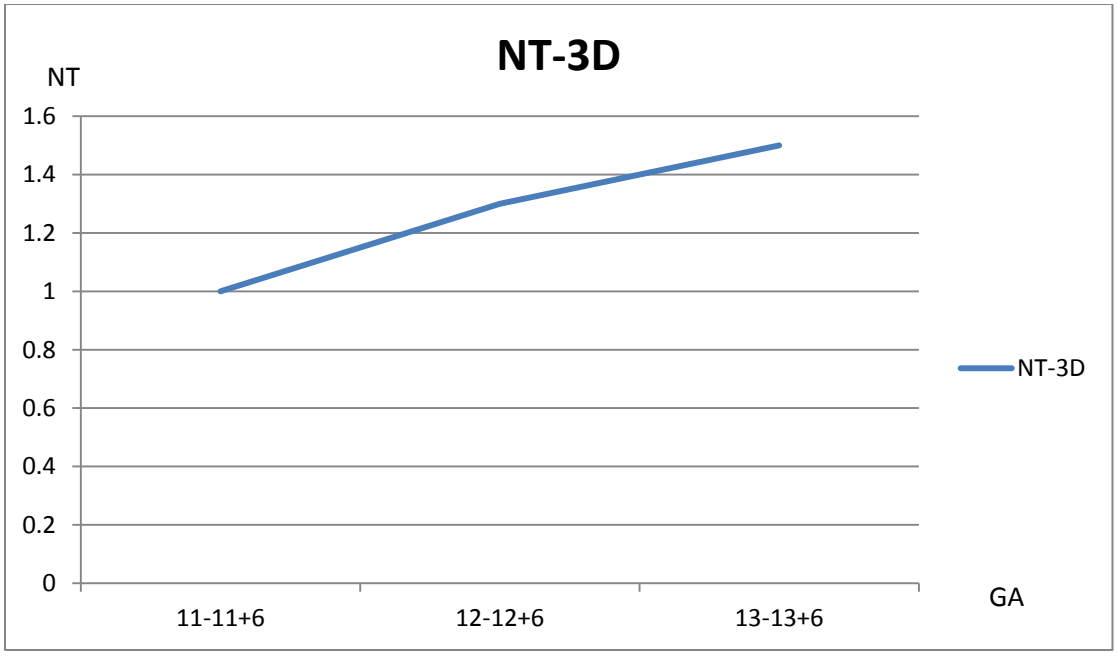
	Minimum	**Maximum**	**Mean± SD**	**P value**
GA- Cl (week+days)	11^{+0}	13^{+6}	$12^{+3} \pm 0.84$	>0.05
GA-US 2D (week+days)	10^{+4}	14^{+2}	$12^{+4} \pm 1$	
GA-US 3D (week+days)	10^{+3}	14^{+1}	$12^{+3} \pm 0.8$	

Table (6) showed that our mean gestational age was 12weeks + 4 days. Also it shows no statistical significant difference between gestational age using clinical and that calculated by ultrasound on the stored 3D volume (P value >0.05).

Table (7) and graph (4) show the correlation between gestational age and NT measured on stored volume taken by 3D

Table (7): the correlation between gestational age and NT measured by 3D ultrasound

GA (week+ days)	No of cases (100 case)	NT-3D (mm)		P value
		Range	Mean ± SD	<0.05
11 to 11+6	32	0.6-1.3	1 ± 0.2	
12 to 12+6	36	0.8-1.6	1.3 ± 0.3	
13 to 13+6	32	1-1.8	1.5 ± 0.4	



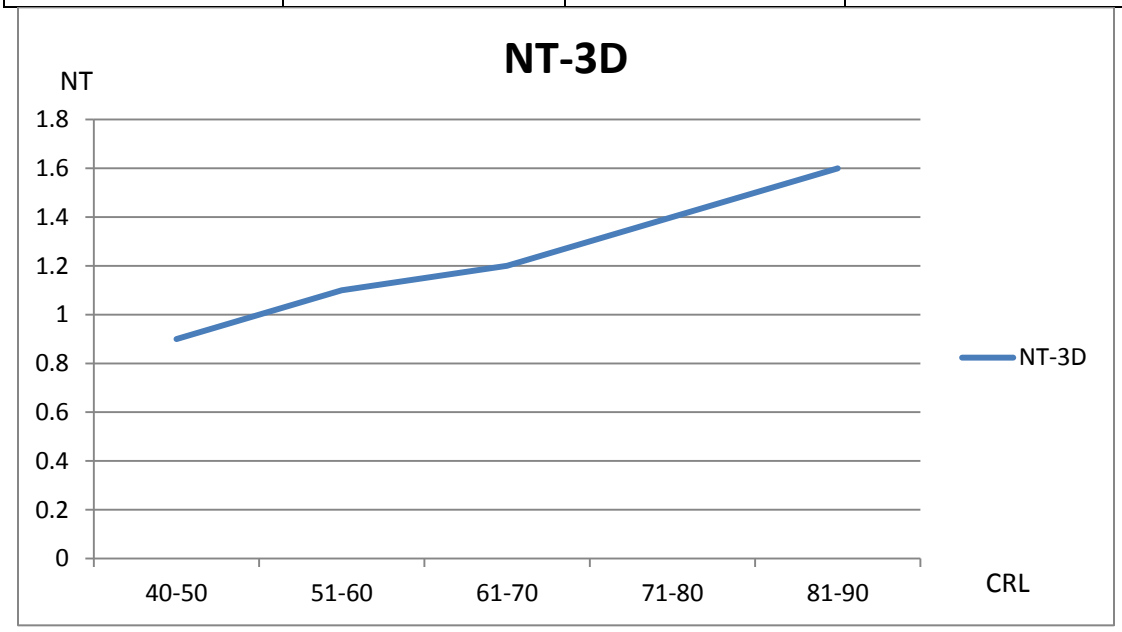
Graph (4)

Table (7) and graph (4) show the high positive correlation between gestational age and NT measured on stored volume taken by 3D. Increase in gestational age is associated with increase in NT thickness. The mean NT thickness was 1mm at gestational age 11 to 11+6weeks, 1.3mm at 12 to 12+6 weeks and 1.5 at 13 to 13+6 weeks.

Table (8) and graph (5) shows the correlation between NT thickness and CRL.

Table (8): the correlation between CRL and NT measured on stored 3D volume

CRL-3D (mm) 100 fetus	NT-3D (mm)		P Value
	Range	Mean ± SD	
40 to 50	0.6 to 1.2	0.9 ± 0.3	
51 to 60	08 to 1.3	1.1 ± 0.2	P >0.05
61 to 70	1.2 to 1.5	1.2 ± 0.4	
71 to 80	1.2 to 1.6	1.4 ± o.3	
81 to 90	1.5 to 1.8	1.6 ± 0.2	



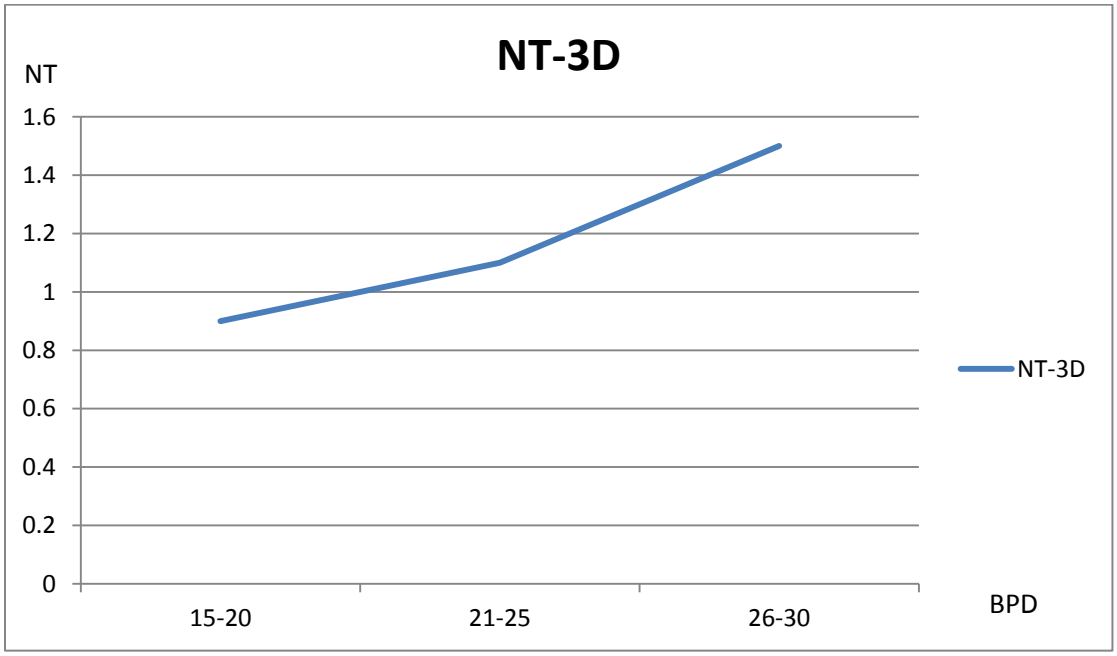
Graph (5)

Table (8) and graph (5) showed the positive correlation between NT thickness and CRL. Moreover, in this study the mean NT was 0.9 mm for the CRL 40-50mm, 1.1mm for the CRL 51-60mm, the mean NT was 1.2 mm for the CRL 61-70mm, the mean NT was 1.4 mm for the CRL 71-80mm and 1.6 for 81-90 mm CRL.

Table (9) and graph (6) show the correlation between NT thickness and BPD.

Table (9): the correlation between BPD and NT measured on stored 3D volume

BPD-3D (mm) 100 fetus	NT-3D (mm)		P Value
	Range	Mean ± SD	
15- 20 mm	0.6 to 1.3	0.9 ± 0.2	
21 – 25 mm	0.7 to 1.3	1.2 ± 0.2	P <0.05
26 – 30 mm	1.1 to 1.5	1.6 ± 0.3	



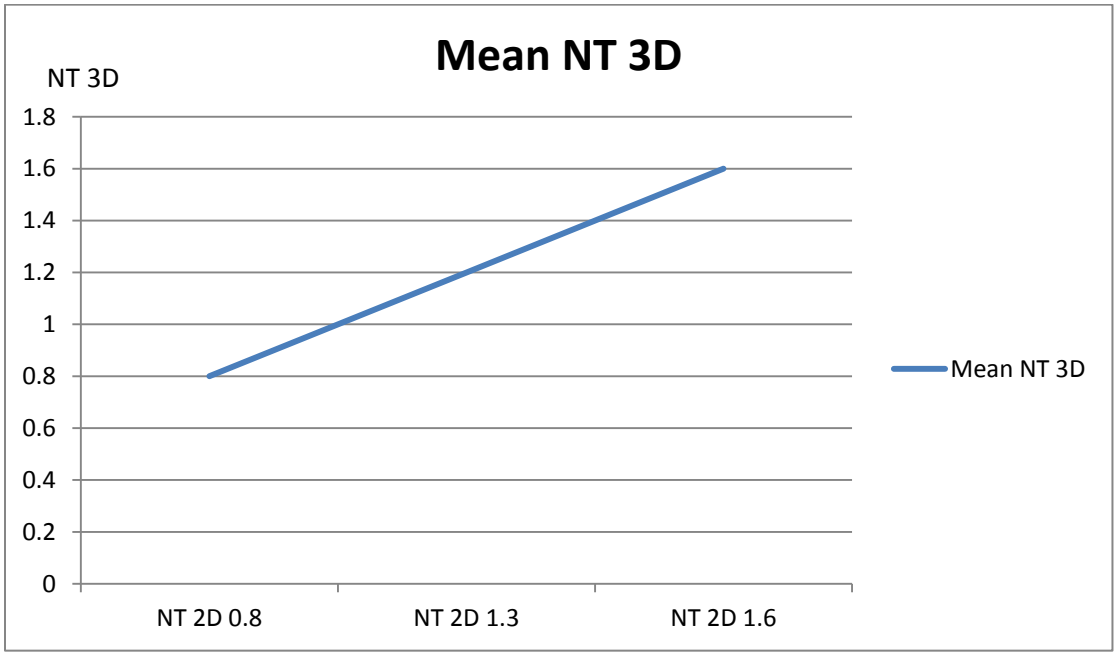
Graph (6)

Table (9) and graph (6) show the positive correlation between NT thickness and BPD. In the present study the mean NT was 1 mm for the BPD 15-20mm, 1.1mm for the BPD 21-25mm and the mean NT was 1.3 mm for the BPD 26-30mm.

Table (10) and graph (7) show the correlation between measurement of NT by 2D and on the stored volume taken by 3D.

Table (10): the correlation between NT-2D and NT-3D

NT-2D (mm)		NT-3D (mm)		P Value
Range	Mean +SD	Range	Mean ± SD	
0.5 to 1	0.8 ± 0.2	0.5 -0.9	0.8 ± 0.1	P >0.05
1.1 to 1.5	1.3 ± 0.12	1-1.4	1.2 ± 0.12	
1.6 to 2	1.6 ± 0.14	1.5-1.8	1.6 ± 0.13	



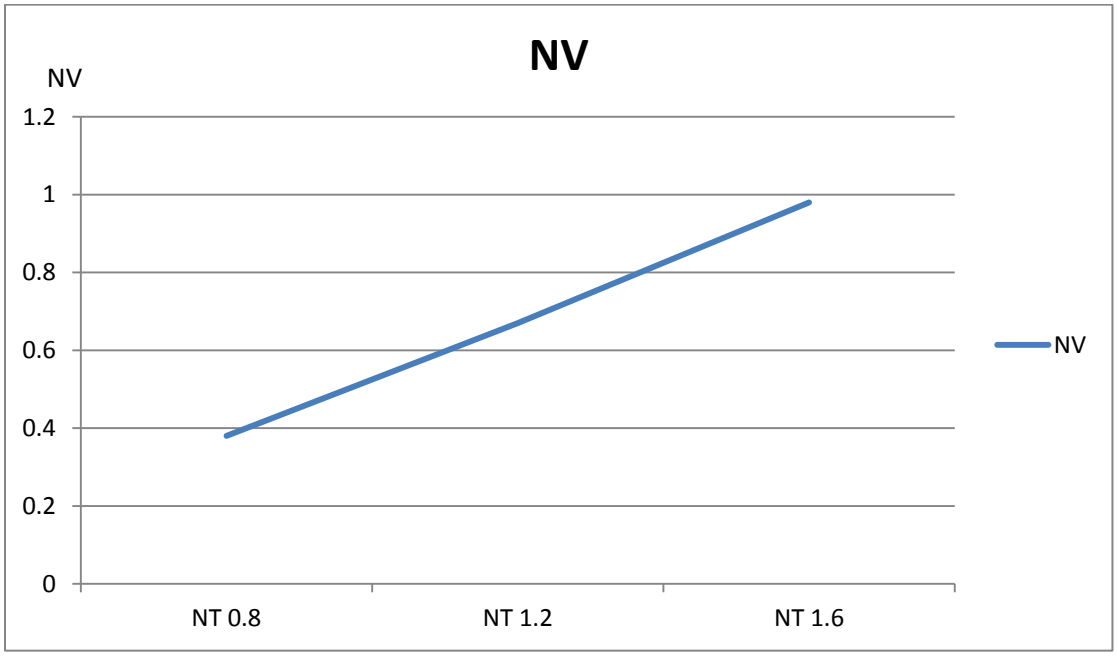
Graph (7)

Table (10) and graph (7) showed no statistical significant difference between measurement of NT by 2D and on the stored volume taken by 3D. The mean NT on stored 3D was 0.8mm at NT by 2D from 0.5 to 1mm, 1.2 mm on 3D volume at NT 1.1 to 1.5mm and 1.6 mm at NT 2D 1.6 to 2 mm.

Table (11) and graph (8) show the correlation between measurement of NT-3D and the calculated NV using VOCAL.

Table (11): the correlation between NT-3D and NV

NT-3D (mm) 100 fetus		NV (cc) 100 fetus		P Value
Range	Mean	Range	Mean	
0.5 to 1	0.8	0.3 -0.5	0.38	P <0.05
1.1 to 1.5	1.2	0.5-0.9	0.67	
1.6 to 2	1.6	0.9-1	0.98	



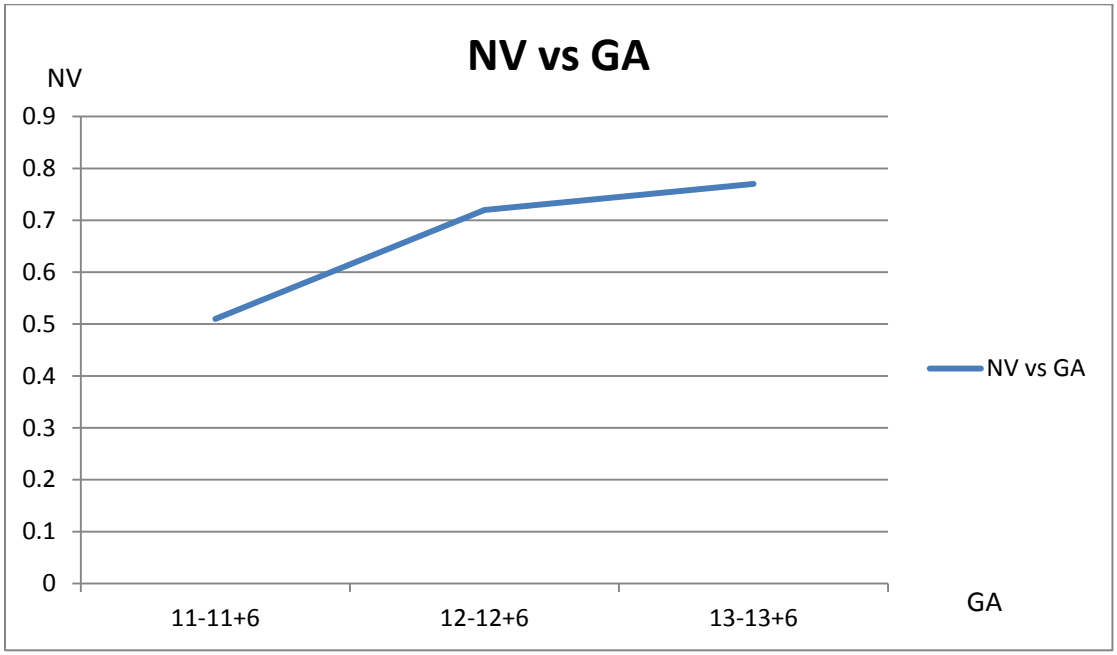
Graph (8)

Table (11) and graph (8) showed a high positive correlation between measurement of NT and NV. The mean NV was 0.38 cc for the NT 0.5 to 1mm, 0.67cc for NT 1.1 to 1.5mm and NV was 0.98 for NT 1.6 till 2mm.

The table (12) and graph (9) show the correlation between gestational age and NV

Table (12): the correlation between gestational age and NV

GA (week+ days)	No of cases 100	NV (in cc)		P value
		Range	Mean ± SD	< 0.05
11 to 11+6	32	0.4-0.7	0.51 ± 0.2	
12 to 12+6	36	0.4-0.9	0.72 ± 0.3	
13 to 13+6	32	0.5-1	0.77 ± 0.2	



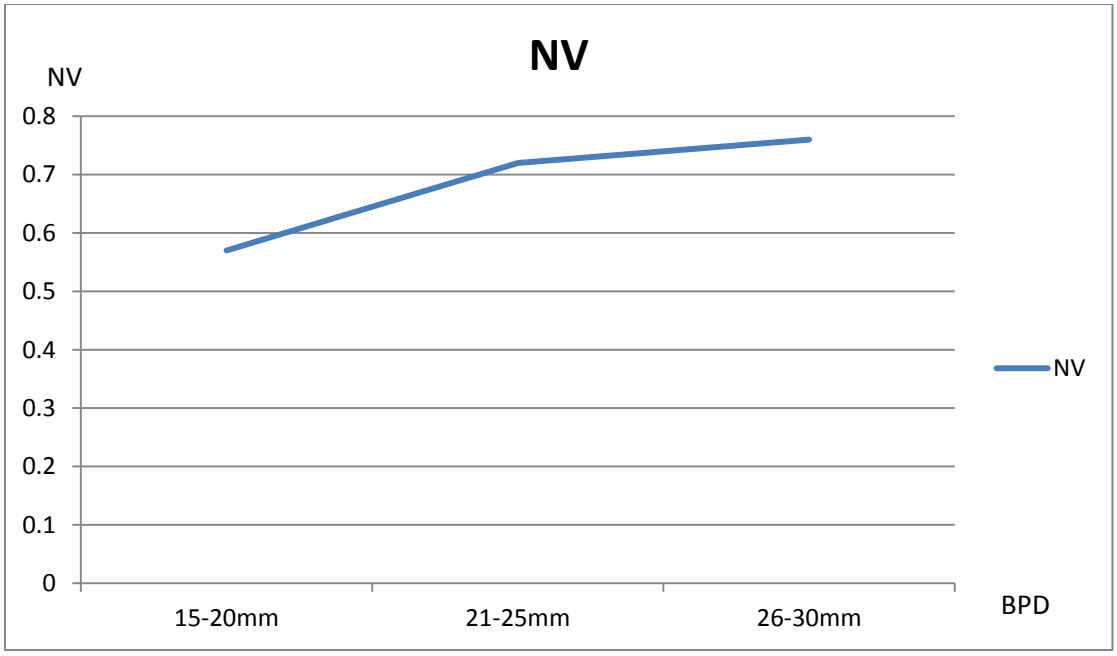
Graph (9)

The table (12) and graph (9) showed the high positive correlation (P>0.05) between gestational age and NV. Increase in gestational age is associated with increase in NV. The mean NV was 0.51cc at gestational age 11 to 11+6 weeks, 0.72cc at 12 to 12+6 weeks and NV calculated was 0.77cc at 13 to 13+6 weeks gestational age.

Table (13) and graph (10) show the between NV and BPD measured on stored volume taken by 3D.

Table (13): the correlation between BPD measured on stored 3D volume and NV.

BPD (mm) 100 fetus	NV (cc)		P Value
	Range	Mean	
15- 20 mm	0.5-0.8	0.57 ± 0.18	
21 – 25 mm	0.4-0.9	0.72 ± 0.3	P <0.05
26 – 30 mm	0.4-1	0.76 ± 0.3	



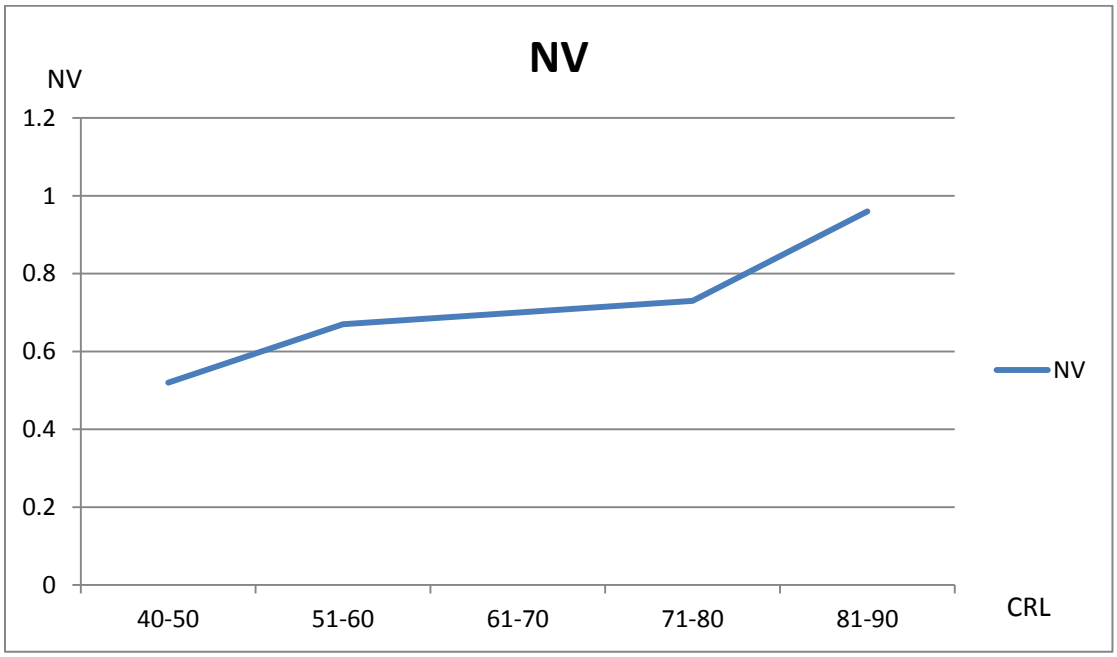
Graph (10)

Table (13) and graph (10) showed a positive correlation between NV and CRL. The study showed a mean NV of 0.57cc for the BPD 15-20mm, 0.72cc for the BPD 21-25mm, the mean NV was 0.76 for the BPD 26-30mm.

Table (14) and graph (11) show the correlation between NV and CRL measured on stored volume taken by 3D.

Table (14): the correlation between CRL measured on stored 3D volume and NV.

CRL (mm) 100 fetus	NV (cc) 100 fetus		P Value
	Range	Mean	
40 to 50	0.3-0.7	0.52	
51 to 60	0.4 – 0.9	0.67	P <0.05
61 to 70	0.4 – 0.8	0.7	
71 to 80	0.5- 0.9	0.73	
81 to 90	0.9- 1	0.96	



Graph (11)

Table (14) and graph (11) showed a positive correlation between NV and CRL. The study showed a mean NV of 0.52cc for the CRL 40-50mm, 0.7cc for the CRL

51-60mm, the mean NV was 0.67 for the CRL 61-70mm, the mean NV was 0.7cc for the CRL 71-80mm and NV was 0.96cc for 81-90 mm CRL.