

R E S U L T S

Cerebrovascular strokes are becoming one of the most common causes of death or, disability in both middle and old ages in medical wards.

The background aetiology of these cases may have a similar role in cardiovascular disease in these patients, that is why it was noticed that some patients with cerebrovascular strokes may have coincidental cardiovascular problems. In this work 50 patients with hemiplegia (or, hemiparesis) were studied for electrocardiographic changes.

These patients included 28 females and 22 males. Out of the 50 cases studied, 38 were between the ages of 50 and 80 years, 10 were between 40 and 50 years and 2 were below 40 years.

These hemiplegic patients included 44 recent and 6 old cases.

These cases included 31 with thrombotic hemiplegia (or, hemiparesis), 12 with cerebral haemorrhage, 6 with cerebral embolism and one case (No. 19) with post-meningitic hemiplegia (Table 3).

Hypertension was found in 35 patients, while the rest of the patients were normotensive .

Diabetes mellitus was present in 14 patients and the rest of the patients were non-diabetic.

9 patients were having both hypertension and diabetes mellitus.

History of angina pectoris was given by 8 patients while the rest gave no such a history.

Abnormal fundus was detected in 36 patients. The fundus picture in these cases involved evidences of different diseases including atherosclerosis, hypertension and diabetes mellitus, either isolated or, in different combinations. Papilloedema was found in only four cases, either alone or, with evidence of other diseases in the fundus. 13 of the patients showed normal fundus and in only one case (No. 33) the fundus could not be visualized because of bilateral cataract (Table 2).

Hypercholesterolemia was present in 20 patients, while 30 of the studied patients were normocholesterolemic (Table 2).

Computerized tomography brain scan was performed in 14 cases. Out of these 14 patients, 7 were having

evidence of cerebral haemorrhage, either parenchymal or, intraventricular and 6 were having evidence of cerebral infarction. Only one case (No. 44) showed evidence of diffuse central and cortical brain atrophy (Table 2).

No evidence of significant electrolyte disturbances, concerning the serum sodium and potassium levels, was detected in any of these 50 patients.

Evidence of rheumatic heart disease was documented in 5 out of these 50 cases with hemiplegia (Cases No. 1, 4, 18, 29 and 48). All had embolic hemiplegia except case No. 4 which had cerebral haemorrhage.

E.C.G. tracings of the studied patients revealed the following data:

I- 33 cases had abnormal E.C.G. changes while 17 cases had normal E.C.G.

Out of those with abnormal findings in the E.C.G.,
(21 cases had hypertension, ^(a) 8 cases had hypertension,
^(b) 5 cases had both hypertension and diabetes and
^(c) 12 cases had raised serum lipids.

II- 20 cases showed data denoting the presence of coronary heart disease including ST-T changes

LBBB (one case, No. 49), left anterior hemiblock (cases No. 23 and 24), atrial fibrillation (cases No. 34 and 39), or combination of these (cases No. 32, 36 and 46).

Out of these, 15 cases had hypertension, 5 cases had diabetes mellitus, 4 cases had both hypertension and diabetes and 7 cases had high serum lipids.

III- 13 cases had other electrocardiographic changes including the following:

- a- E.C.G. data of left ventricular hypertrophy either alone or, with other changes (cases No. 2, 3, 4, 5 and 6).
- b- E.C.G. evidence of right ventricular hypertrophy and first degree A-V block (case No. 18).
- c- E.C.G. evidence of RBBB (case No. 7).
- d- Evidence of premature supraventricular contractions with aberration and digitalis effect (case No. 40).
- e- Evidence of junctional tachycardia (cases No. 33 and 42).
- f- E.C.G. criteria of atrial fibrillation (A.F.), all were having evidence of rheumatic heart disease (cases No. 1, 29 and 48).

* Refer to the next table.

* Examples of these E.C.G. tracings are also presented on the next pages.

IV- Cases with ischemic changes in the E.C.G. could be classified according to type of stroke into 3 groups:

A- 14 cases were having thrombotic accident.

B- 5 cases were having cerebral haemorrhage.

C- One case showed evidence of cerebral embolism with hemiplegia.

Also, these cases could be classified according to the duration of hemiplegia into recent hemiplegia including all the 20 cases with no old hemiplegia among them.

Concerning the control group, 17 patients showed normal E.C.G. tracings and only 3 E.C.G. records were abnormal.

Cases with abnormal E.C.G.

- a- Twenty cases showed data denoting the presence of ischemic heart disease.

Pattern of E.C.G.	No. of cases
ST-T changes	12
Left anterior hemiblock	2
A.F. (ischemic)	2
L.B.B.B.	1
Combination of the above patterns	3

- b- Thirteen cases showed data denoting other non-ischemic E.C.G. changes.

Pattern of E.C.G.	No. of cases
Left ventricular hypertrophy	3
Left ventricular hypertrophy, multiple premature atrial contractions	1
Left ventricular hypertrophy, A.F.	1

Right ventricular hypertrophy, <u>1st</u> degree heart block	1
R.B.B.B.	1
Premature supraventricular contractions with aberration, digitalis effect	1
Junctional tachycardia	2
A.F. (with mitral valve disease)	3

Statistical analysis of the E.C.G. findings shown in the control group put together in comparison with those shown in the hemiplegic patients group revealed that the E.C.G. changes were statistically very highly significant; after application of the chi square (χ^2) test; where $\chi^2 = 14.875$, $P < 0.001$.

	No. of patients with abnormal E.C.G.	No. of patients with normal E.C.G.	Total
Hemiplegic patients group	33	17	50
Control group	3	17	20

Statistical analysis of the whole E.C.G. changes in patients with hemiplegia was not specific and not statistically significant; where $\chi^2 = 0.2506$, $P > 0.05$; after application of the chi square test as mentioned before.

N.B.: P is the level of significance.

Table (1)

Case no.	Sex	Age	Main Presentation	Clinical Cardiac Diagnosis
1	F	40 y	Lt.sided H.	Rh.H.D.,D.M.,P.H.,C.H.F., A.F.
2	M	62 y	Rt.sided H. & Aphasia	I.H.D.
3	F	45 y	Lt.sided H.	Hypert.H.D.
4	F	35 y	Lt.sided H.	Rh.H.D.,D.M.,P.H.,C.H.F., A.F
5	M	59 y	Rt.sided H. & S.	Free
6	F	53 y	Lt.sided H. & D.	I.H.D.
7	M	80 y	S.	Hypert.H.D.
8	F	55 y	Rt.sided H. & D.	Hypert.H.D.
9	F	52 y	Lt.sided H.	I.H.D.
10	M	70 y	Rt.sided H. & Dysarth.	Free
11	M	54 y	Lt.sided H.	Free
12	F	65 y	Lt.sided H.	I.H.D.
13	M	64 y	Lt.sided H. & Dysarth.	Hypert.H.D.
14	F	45 y	Rt.sided H.	Free
15	M	40 y	Rt.sided H. & Dysarth.	Free

Cont. table (1)

Case no.	Sex	Age	Main Presentation	Clinical Cardiac Diagnosis
16	M	61 y	Rt.sided H. & Dysarth.	Hypert.H.D.
17	M	50 y	Lt.sided H.	Free
18	F	45 y	Rt.sided H.	Rh.H.D.,M.S.,P.H.
19	F	45 y	Semicoma	Free
20	M	55 y	S.	Free
21	F	60 y	Semicoma	I.H.D.
22	M	65 y	Semicoma	I.H.D.
23	M	60 y	Lt.sided H.	Hypert.H.D.
24	M	55 y	Rt.sided H. & Aphasia	Hypert.H.D.
25	M	50 y	Rt.sided H. & Aphasia	Free
26	F	60 y	Rt.sided H.	Hypert.H.D.
27	F	75 y	S.	I.H.D.
28	F	50 y	Lt.sided H. & S.	Free
29	M	35 y	Rt.sided H. & Aphasia	Rh.H.D.,D.M.,P.H.,T.R., C.H.F.,A.F.
30	M	60 y	Lt.sided H.	I.H.D.
31	F	45 y	S.	Hypert.H.D.
32	M	80 y	Lt.sided H. & D.	I.H.D.

Cont. table (1)

Case no.	Sex	Age	Main Presentation	Clinical Cardiac Diagnosis
33	F	35 y	S.	I.H.D.
34	F	58 y	Semicoma	I.H.D.,A.F.
35	M	62 y	Lt.sided H. & D.	Free
36	F	55 y	S.	I.H.D.,A.F.
37	M	46 y	Rt.sided H. & Dysarthria	I.H.D.
38	F	40 y	Rt.sided H. & Dysarthria.	Free
39	F	75 y	Semicoma	I.H.D.,A.F.
40	F	60 y	S.	I.H.D.
41	F	65 y	Lt.sided H. & D.	Hypert.H.D.
42	F	62 y	Semicoma	I.H.D.
43	M	63 y	Lt.sided H.	Hypert.H.D.
44	F	60 y	Semicoma	Free
45	M	50 y	Lt.sided H.	Free
46	F	55 y	D.& Convultions	I.H.D.,A.F.
47	F	60 y	Semicoma	Free
48	M	40 y	S.	Rh.H.D.,D.M.,P.H.,T.R., C.H.F.,A.F.
49	F	75 y	Rt.sided H. & Aphasia	I.H.D.

Cont. table (1)

Case no.	Sex	Age	Main Presentation	Clinical Cardiac Diagnosis
50	F	50 y	Rt.sided H. & D.	Free

- * I.H.D. =Ischemic heart disease
 - * Hypert.H.D. =Hypertensive heart disease
 - * Rh.H.D. =Rheumatic heart disease
 - * H. =Hemiplegia
 - * S. =Stupor
 - * D. =Drowsiness
 - * Dysarth. =Dysarthria
 - * F =Female
 - * M =Male
 - * D.M. =Double Mitral
 - * M.S. =Mitral Stenosis
 - * P.H. =Pulmonary Hypertension
 - * C.H.F. =Congestive heart failure
 - * A.F. =Atrial Fibrillation
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Table (2)

Case no.	S.Cholesterol	Bl.Urea & Creatinine	S.Na & K	Bl. Sugar	Fundus	C.T. Scan
1	N.	N.	N.	N.	N.	—
2	270 mg%	N.	N.	N.	Atheroscl. (grade II)	—
3	N.	N.	N.	N.	Hypertensive Retinopathy	
4	N.	N.	N.	N.	N.	Rt.Mas- sive Infarc- tion
5	280 mg%	N.	N.	N.	Hypertensive Retinopathy	—
6	N.	N.	N.	N.	Hypertensive Retinopathy	Intra Vent.Hge
7	320 mg%	60 mg%	N.	N.	Diabetic Retinopathy	—
8	N.	69 mg% 1.5 mg%	N.	N.	Hypertensive Retinopathy	Lt.Intr- acereb. Hge

Cont. table (2)

Case no.	S.Cholesterol	Bl.Urea & Creatinine	S.Na & K	Bl. Sugar	Fundus	C.T. Scan
9	N.	55 mg% 1.5 mg%	N.	N.	Hypertensive Retinopathy	Rt.Pari-etal In-farction
10	N.	N.	N.	N.	Hypertensive Retinopathy	Lt.Pari-etal In-farction
11	N.	N.	N.	N.	Hypertensive Retinopathy	—
12	300 mg%	N.	N.	140 mg%	Diabetic Retinopathy	—
13	N.	N.	N.	212 mg%	N.	—
14	N.	N.	N.	N.	Hypertensive Retinopathy	—
15	N.	N.	N.	N.	N.	—
16	N.	60 mg% 1.6 mg%	N.	N.	Hypertensive Retinopathy	—
17	N.	N.	N.	N.	N.	—

Cont. table (2)

Case no.	S.Cholesterol	Bl.Urea & Creatinine	S.Na & K	Bl. Sugar	Fundus	C.T. Scan
18	N.	N.	N.	160 mg%	N.	—
19	N.	N.	N.	N.	N.	—
20	N.	N.	N.	N.	Papilledema	Intrav. Hge
21	N.	N.	N.	N.	Papilledema	Rt.I.C. Hge
22	275 mg%	60 mg% 1.5 mg%	N.	N.	Atheroscl. (grade II)	Rt.T.-P. Infarc-tion
23	340 mg%	N.	N.	150 mg%	Diabetic Retinopathy	—
24	357 mg%	N.	N.	N.	Ath.& H.R.	Lt.P.C. hge
25	270 mg%	N.	N.	N.	N.	—
26	N.	N.	N.	170 mg%	N.	Lt.T.-P. Infarc-tion
27	320 mg%	N.	—	N.	Atheroscl. (grade II)	—

Cont. table (2)

Case no.	S.Cholesterol	Bl.Urea & Creatinine	S.Na & K	Bl. Sugar	Fundus	C.T. Scan
28	290 mg%	100 mg% 3 mg%	N.	217 mg%	Atheroscl. (grade I)	Rt.P.In- farction
29	N.	N.	N.	N.	N.	—
30	260 mg%	N.	N.	140 mg%	N.	—
31	N.	N.	N.	N.	Hypertensive Retinopathy	—
32	310 mg%	65 mg% 1.4 mg%	N.	N.	Atheroscl. (grade II)	—
33	N.	N.	N.	N.	—	—
34	N.	N.	N.	N.	N.	—
35	N.	N.	N.	N.	N.	—
36	270 mg%	N.	N.	N.	Atheroscl. (grade I)	—
37	N.	N.	—	N.	N.	—
38	N.	N.	N.	N.	Hypertensive Retinopathy	—
39	270 mg%	62 mg%	N.	N.	Atheroscl.	—
40	N.	N.	N.	N.	Papilledema	—

Cont. table (2)

Case no.	S.Cholesterol	Bl.Urea & Creatinine	S.Na & K	Bl. Sugar	Fundus	C.T. Scan
41	310 mg%	N.	N.	175 mg%	Diabetic Retinopathy	—
42	280 mg%	N.	N.	N.	N.	—
43	360 mg%	N.	N.	N.	Atheroscl. (grade II)	—
44	280 mg%	66 mg%	N.	186 mg%	Ath.& H. Retinopathy	Brain Atrophy
45	N.	N.	N.	N.	N.	—
46	N.	N.	N.	N.	N.	—
47	280 mg%	—	—	190 mg%	Atheroscl. (grade II)	Rt.I.V. Hge
48	N.	N.	N.	N.	Papilledema	—
49	N.	—	N.	191 mg%	Hypertensive Retinopathy	—
50	310 mg%	N.	N.	185 mg%	Atheroscl. (grade II)	—

- * Atheroscl. =Atherosclerosis
 - * I.C. =Intracerebral
 - * I.V. =Intraventricular
 - * T.P. =Temporoparietal
 - * P.C. =Parietal Cerebral
 - * N. =Normal
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Table (3)

Case no.	Duration of illness	Neurol. diag.	E.C.G.changes
1	7 months	Embolic H.	A.F.
2	hours	Thromb.H.	L.V.H.
3	18 months	Thromb.H.	L.V.H.
4	hours	Embolic H.	A.F., L.V.H.
5	hours	Cerebral hge.	L.V.H.
6	hours	Cerebral hge.	Multiple PACs., L.V.H.
7	hours	Thromb.H.	R.B.B.B.
8	hours	Cerebral hge.	Inf.-Lat.Isch.
9	hours	Thromb.H.	Normal (N.)
10	hours	Thromb.H.	N.
11	6 months	Thromb.H.	N.
12	hours	Thromb.H.	N.
13	hours	Thromb.H.	Lat.Isch.
14	hours	Thromb.H.	Ant.-Lat.Isch, L.V.H.
15	hours	Thromb.H.	N.
16	hours	Thromb.H.	Ant.Injury, Diff.Isch.
17	hours	Thromb.H.	N.
18	7 months	Embolic H.	R.V.H., 1 st.deg.A.V.block
19	9 days	Post.Mening.h.	N.
20	hours	Thromb.H.	N.
21	hours	Thromb.H.	L.A.H.B.

Cont. table (3)

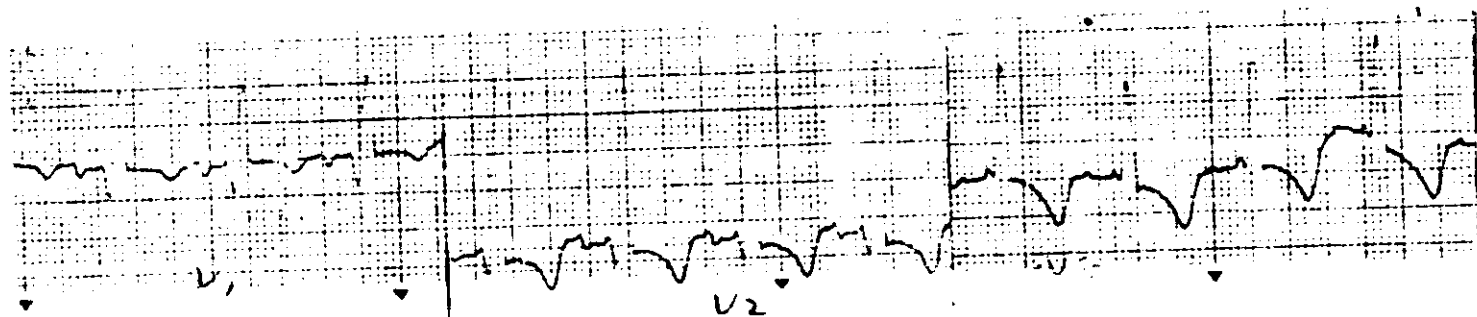
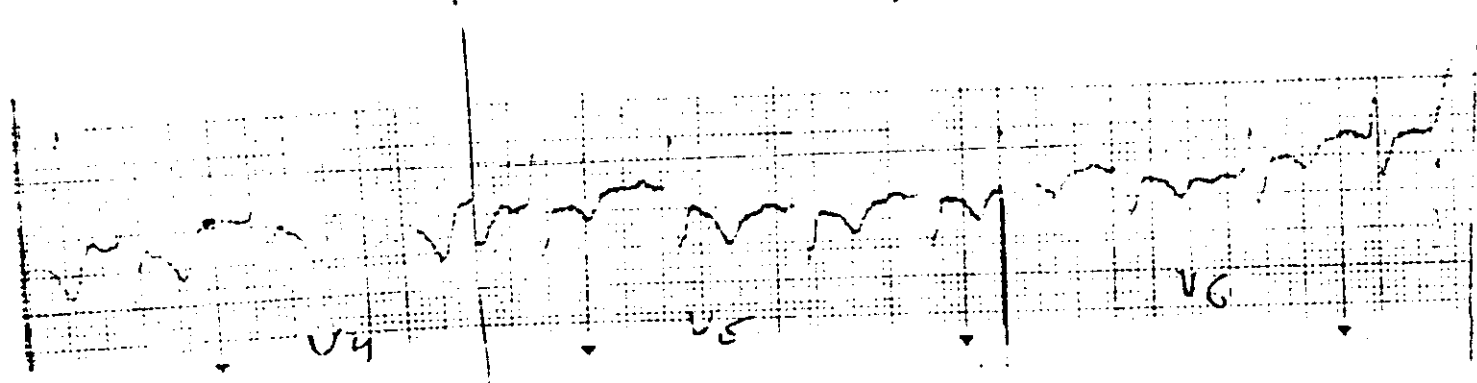
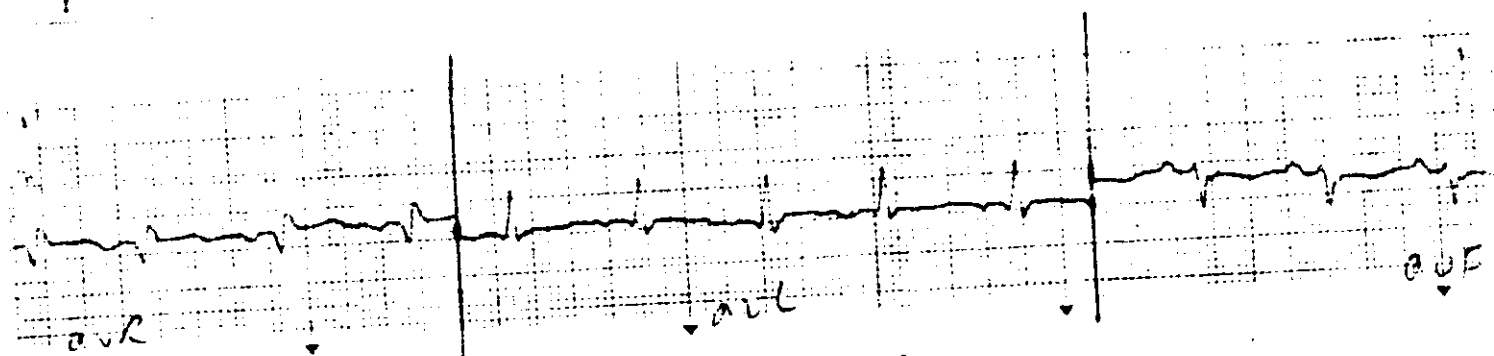
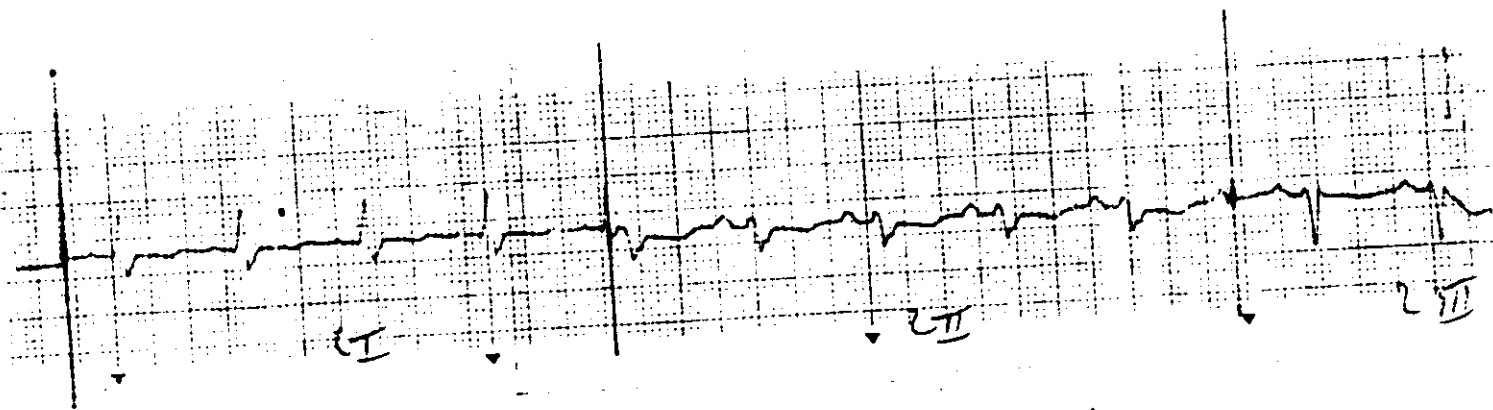
Case no.	Duration of illness	Neurol. diag.	E.C.G.changes
22	hours	Thromb.H.	Lat.Isch.
23	hours	Thromb.H.	L.A.H.B.
24	hours	Thromb.H.	N.
25	hours	Thromb.H.	N.
26	9 years	Thromb.H.	N.
27	3 days	Thromb.H.	N.
28	hours	Thromb.H.	N.
29	hours	Embolie H.	A.F.,PVCs,Incomp.RBBB
30	12 months	Thromb.H.	N.
31	hours	Thromb.H.	Inf. & Ant.-Lat.Isch.,LVH
32	hours	Thromb.H.	Inf.Isch.,LAH
33	4 days	Cerebral hge.	J.Tachycardia
34	5 days	Thromb.H.	A.F.(Isch.)
35	6 days	Thromb.H.	Old Inf.TMI,Inf.-Lat.Isch,
36	1 day	Thromb.H.	A.F.,Inf.Isch.
37	5 days	Thromb.H.	N.
38	1 day	Thromb.H.	Inf.-Lat.Isch.
39	hours	Embolie H.	A.F.(Isch.)
40	hours	Thromb.H.	PSVCs,Digitalis effect
41	hours	Thromb.H.	L.V.H.
42	1 day	Cerebral hge.	J.Tachycardia

Cont. table (3)

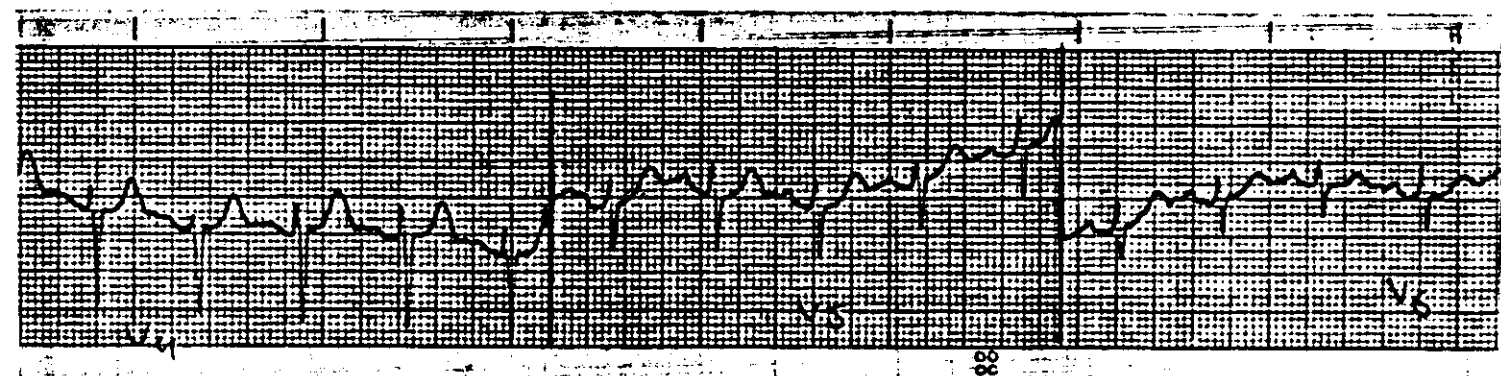
Case no.	Duration of illness	Neurol. diag.	E.C.G.changes
43	hours	Cerebral hge.	Diff.Isch.Recent Inf.TMI
44	hours	Cerebral hge.	Lat.Isch.
45	hours	Thromb.H.	Lat.Isch.,P.Pulmonale
46	hours	Thromb.H.	A.F.,Lat.Isch.
47	hours	Thromb.H.	N.
48	hours	Embolic H.	A.F.,RVH
49	4 days	Thromb.H.	L.B.B.B.
50	hours	Thromb.H.	N.

- * A.F. =Atrial Fibrillation
- * L.V.H. =Left Ventricular Hypertrophy
- * L.A.H.B. =Left Anterior Hemiblock
- * PACs =Premature Atrial Contractions
- * R.B.B.B. =Right Bundle Branch Block
- * L.B.B.B. =Left Bundle Branch Block
- * PSVCs =Premature Supraventricular Contractions
- * J. =Junctional
- * Inf. =Inferior
- * Ant. =Anterior
- * Lat. =Lateral
- * Diff. =Diffuse

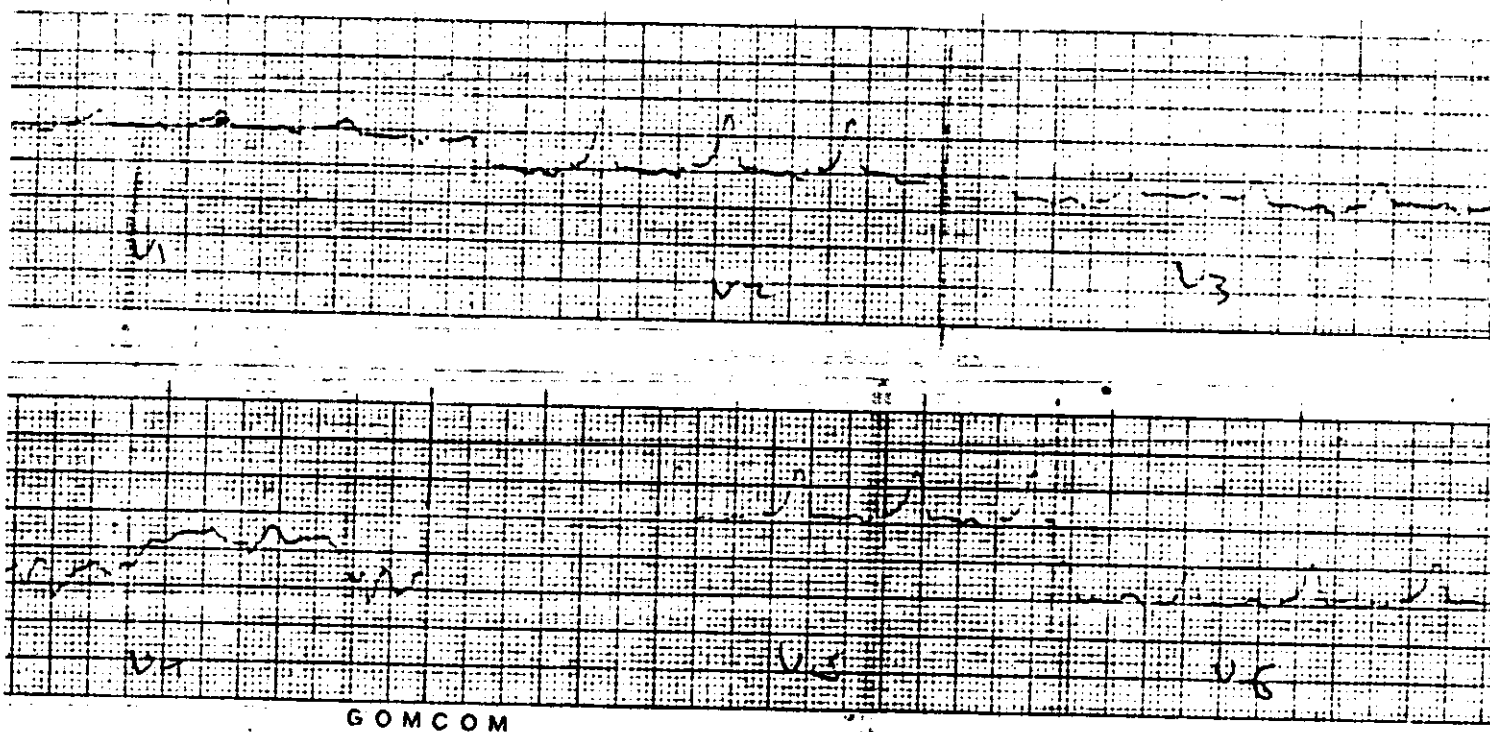
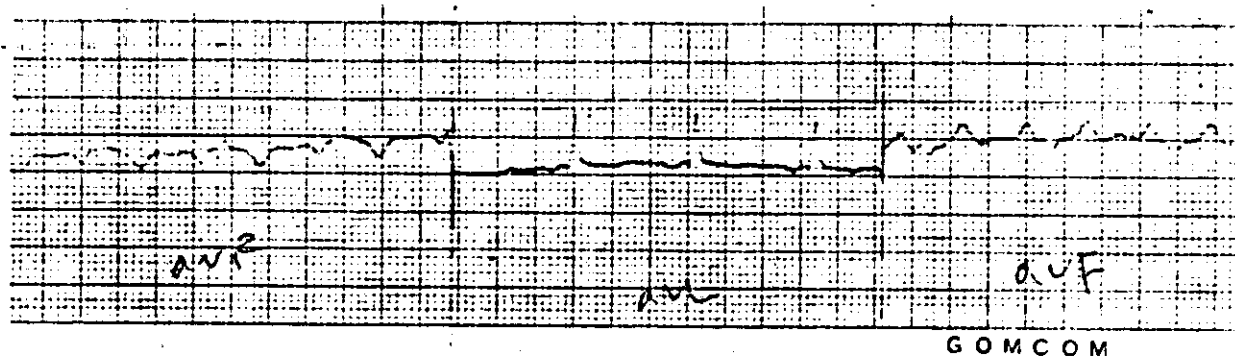
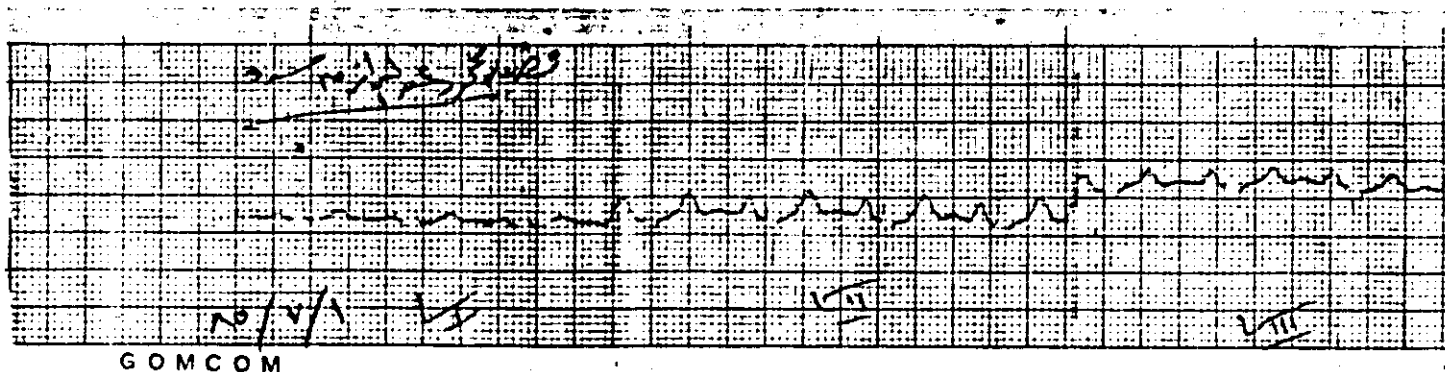
* Isch.	=Ischemia
* TMI	=Transmural infarction
* H.	=Hemiplegia
* hge.	=Haemorrhage



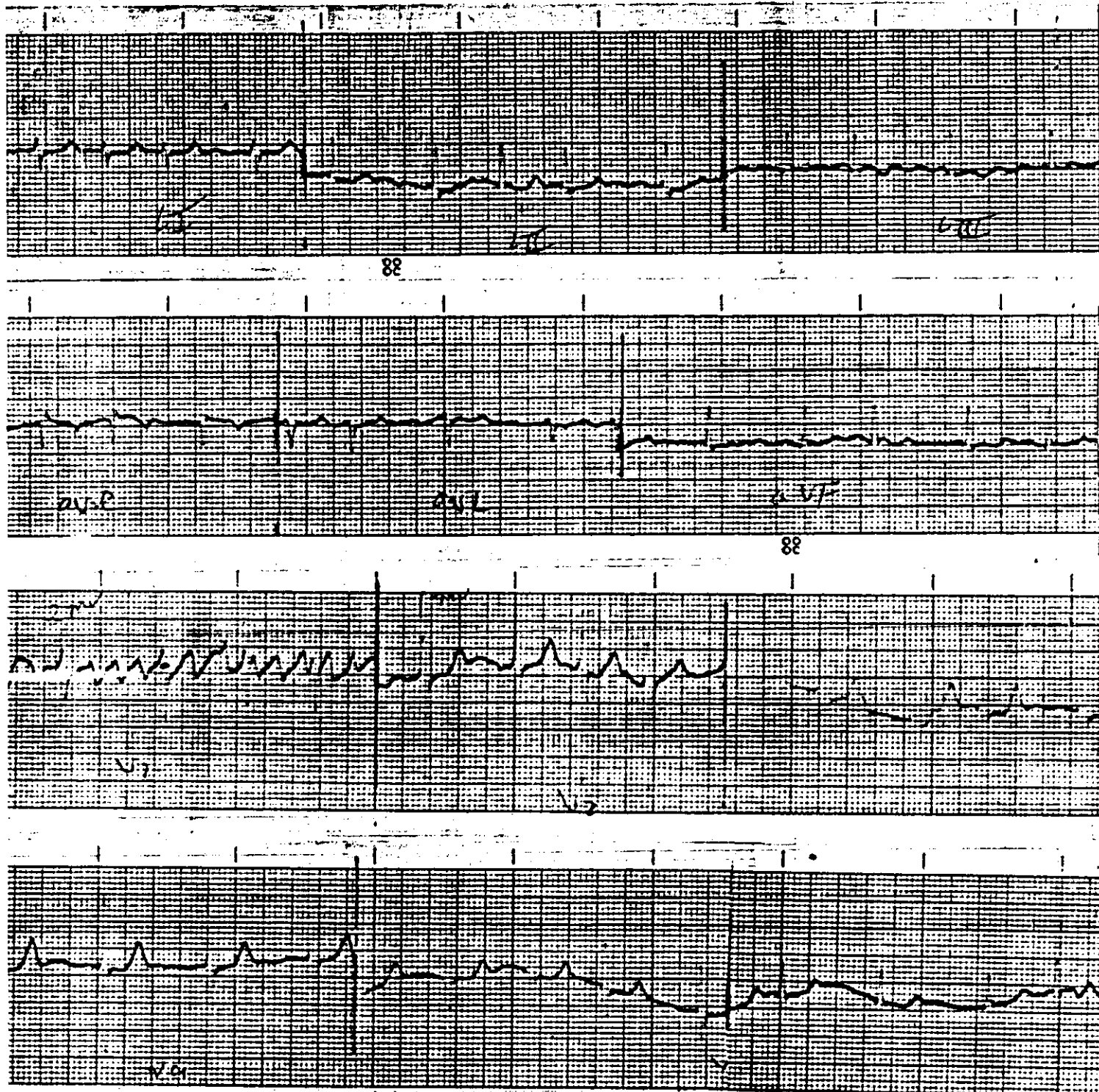
Case No. 7: Male, 80 years old. No history of angina pectoris given by the patient.



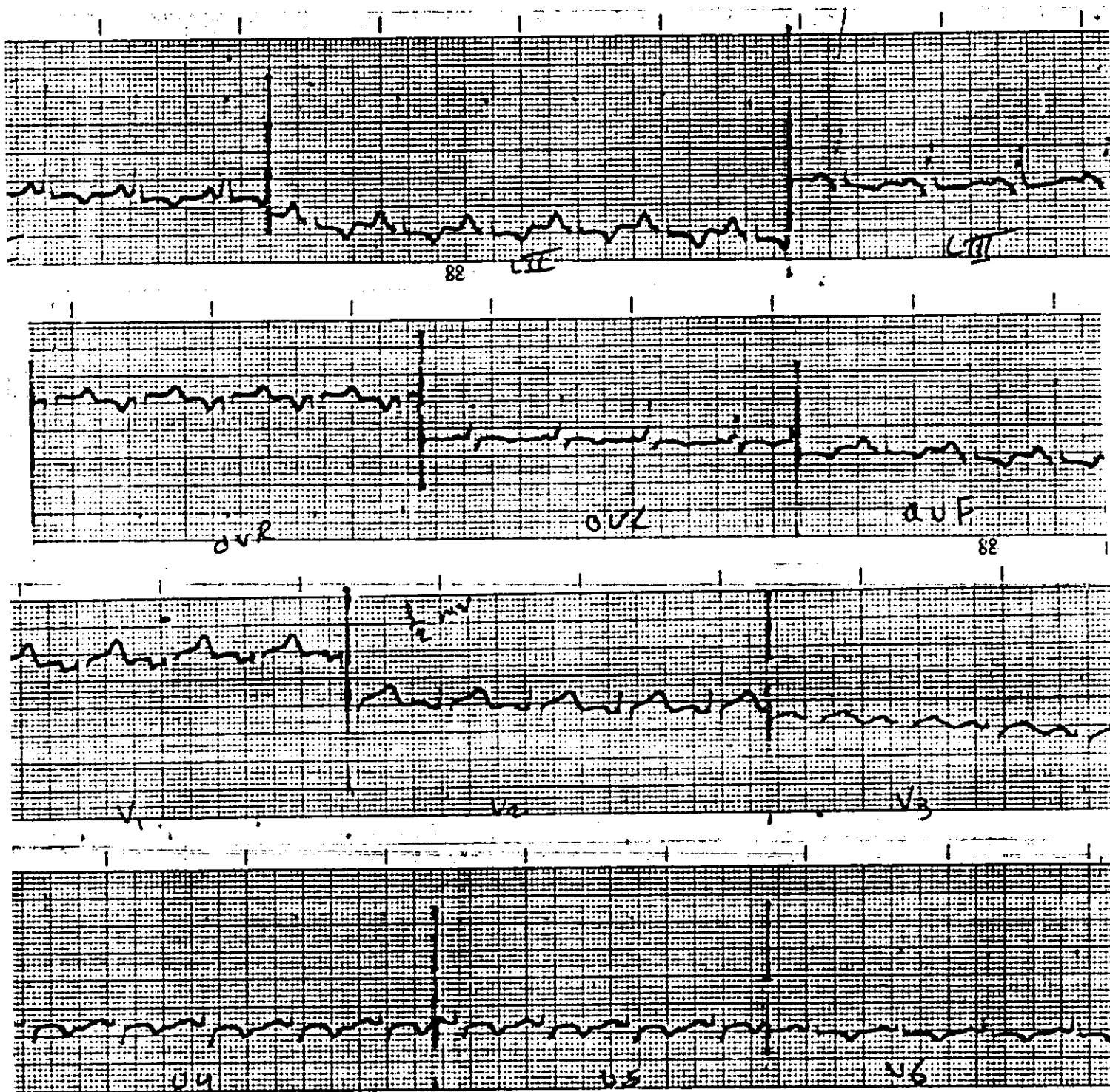
Case No. 18: Female, 45 years old. The patient was suffering from Rh. H.D. with evidence of mitral stenosis, pulmonary hypertension and right ventricular hypertrophy.



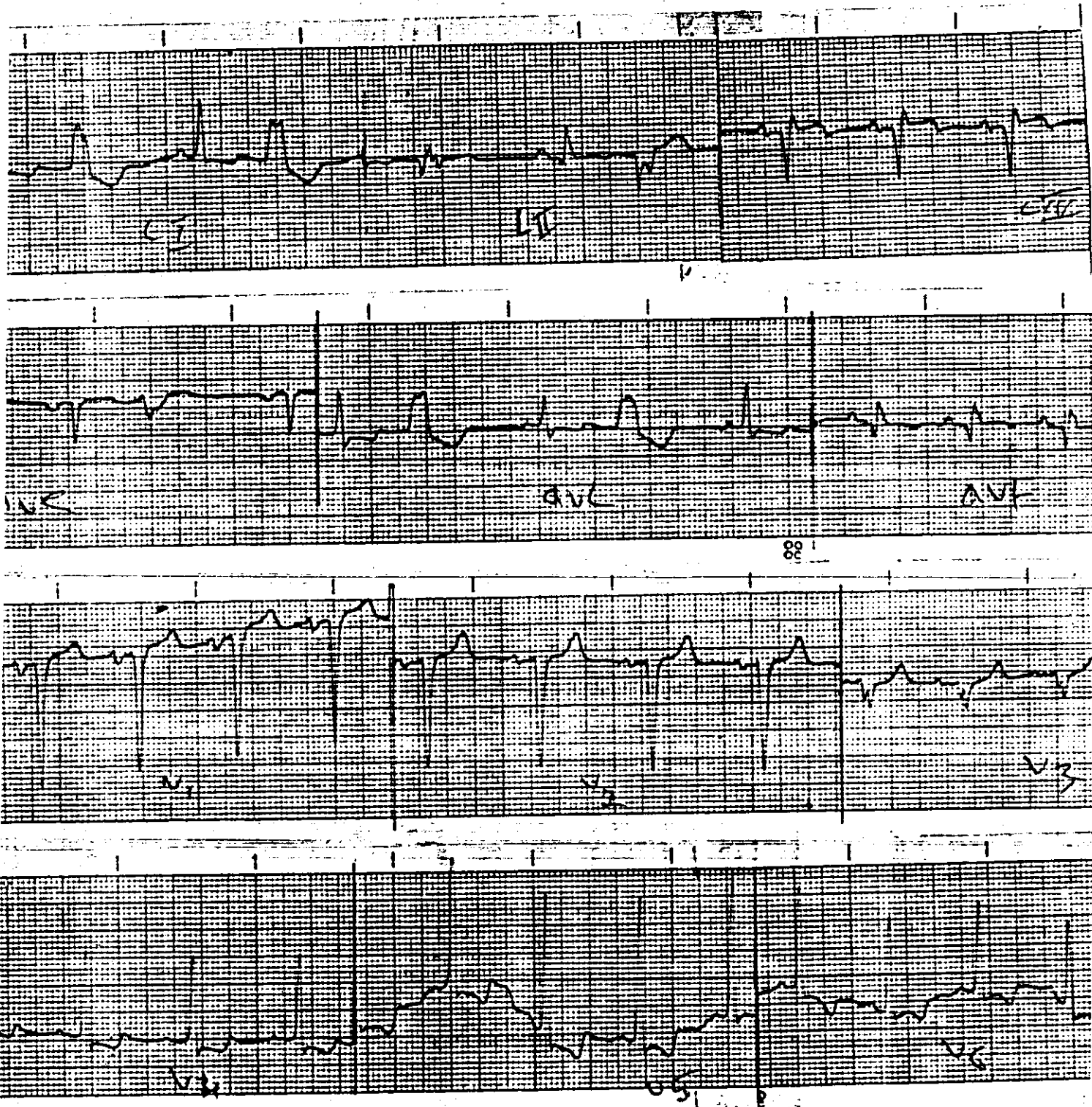
Case No. 21: Female, 60 years old. She gave history of
 anginal chest pain. On examination no evidence
 of valvular heart disease could be detected.



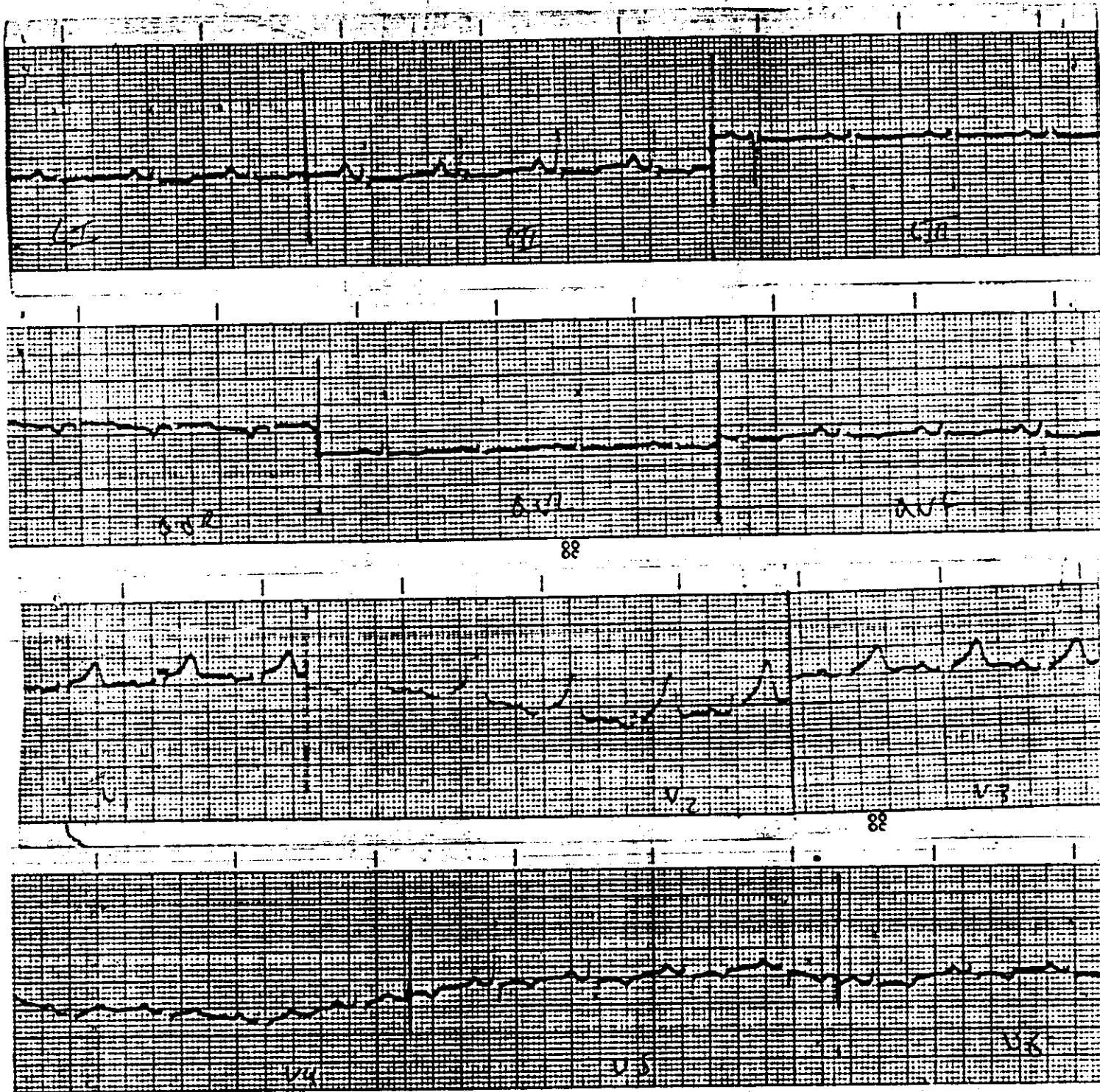
Case No. 29: Male, 35 years old. The patient was suffering from Rh. H.D. with clinical evidence of valvular affection (mitral valve disease).



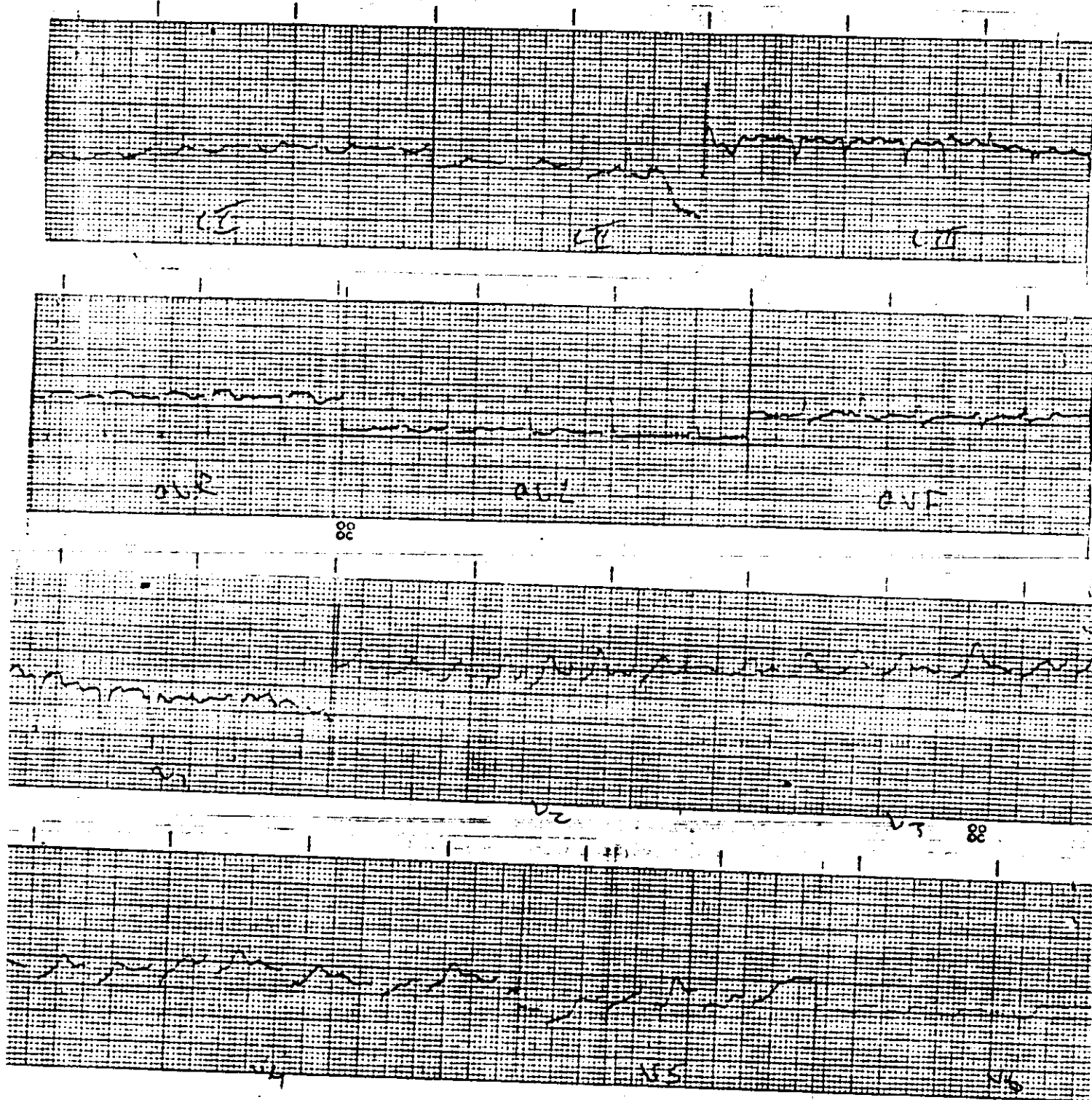
Case No. 31: Female, 45 years old. The patient was hypertensive and gave history of anginal chest pain.



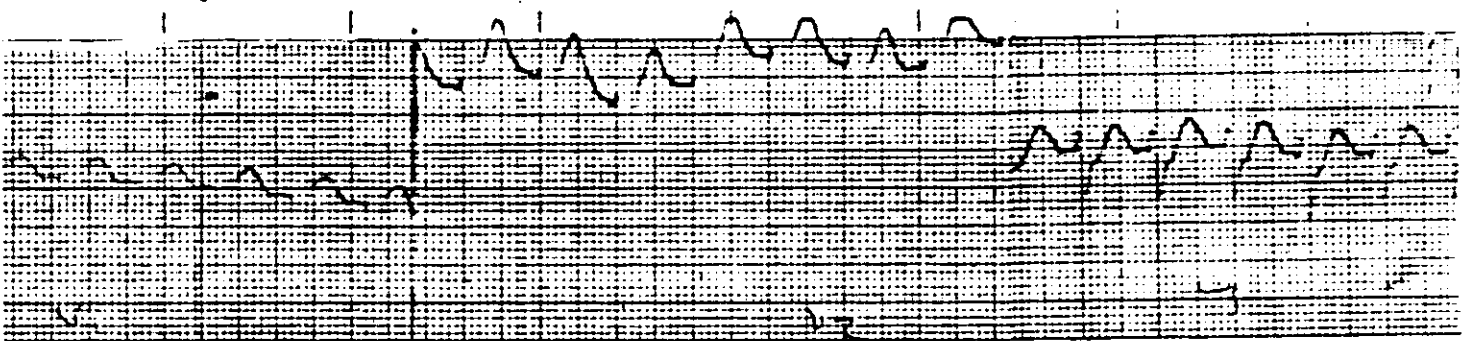
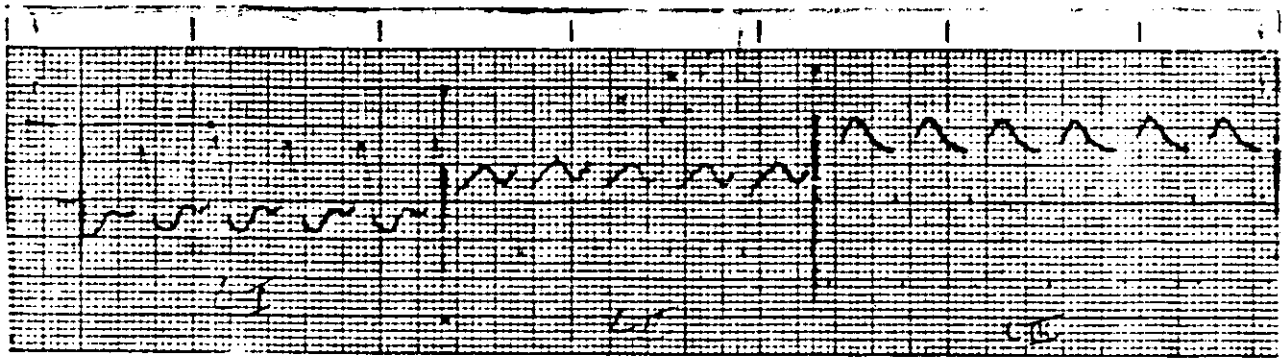
Case No. 35: Male, 62 years old. The same pattern was present in a previous E.C.G. tracing. The patient was suffering from ischemic heart disease and was receiving digitalis.



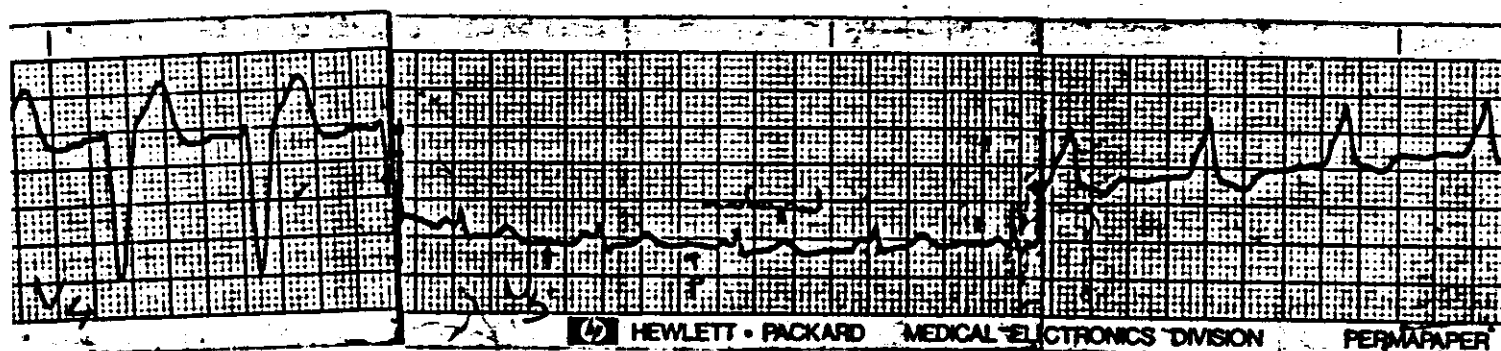
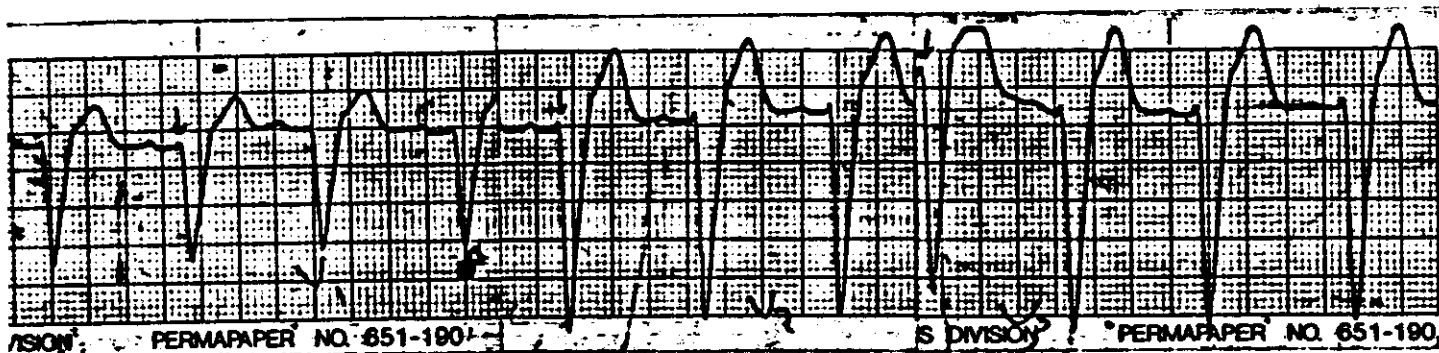
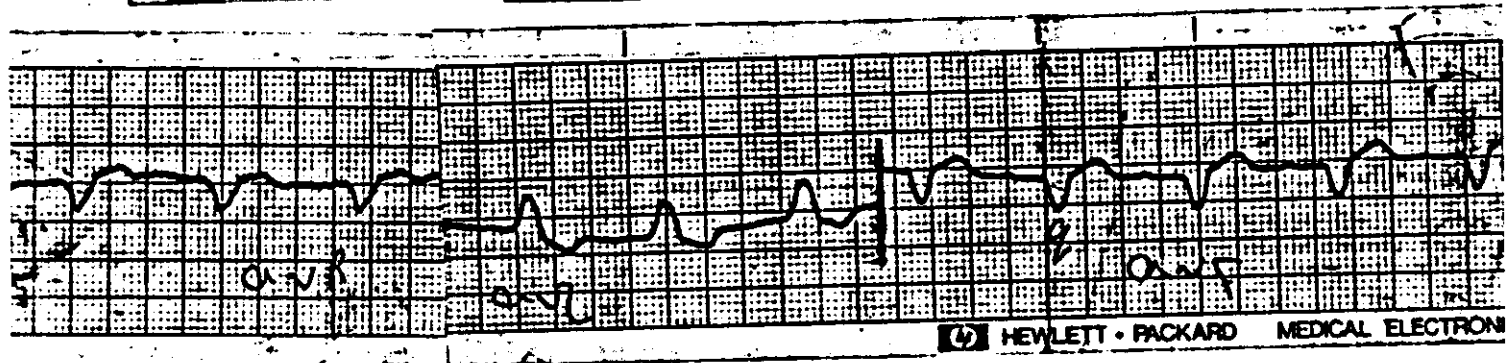
Case No. 38: Male, 40 years old. The patient gave no history of anginal chesh pain. He had no previous E.C.G. record.



Case No. 39: Female, 75 years old. Clinically the patient gave history of anginal chest pain suggestive of ischemic heart disease. On examination there was no evidence of valvular lesions, hypertension or any other condition that can explain the A.F.



Case No. 42: Female, 62 years old. The patient was suffering from angina pectoris and this E.C.G. pattern developed recently for the first time with the onset of the cerebrovascular accident (was not present in a previous E.C.G.).



Case No. 49: Female, 75 years old. The patients was suffering from angina pectoris and evidence of left bundle branch block was present in a previous E.C.G. i.e. before her recent insult.