

SUPPLEMENTAL MATERIAL

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A New Electrode Placement Method for 12-lead Electrocardiography.

The supplement gives standard (STD) and new electrode placement (NEP) ECGs that were verified by a blinded interpreter. They focus on the four errors known to occur with torso (modified) leads).

Marked changes in R wave amplitude causing:

- disappearance of inferior infarcts;
- appearance of QS in leads 1, aVL – probable false lateral infarcts;
- right axis deviation.

eAppendix 1. 30 ECGs from patients in group A, all with proven inferior MI. The abdominal electrode was placed 3 inches below the umbilical level and 8 inches apart. Standard and new electrode placement ECGs show identical wave forms, and similar interpretations.

eAppendix 2. 16 ECGs from patients in group A: these ECGs were chosen from 786 group A patient's ECGs because of the presence of very low R waves in leads 1 and aVL; that may reveal a QS on the NEP ECG simulating a false lateral MI; test cases to fault the new electrode placement method.

eAppendix 3. 13 ECGs from patients in group C: 10 with inferior MI, 1 with low R waves lead 1, AVL ; 1 patient with severe right ventricular hypertrophy and marked right axis deviation; 1 patient with standard ECG showing artifacts that clear on NEP ECG, a better quality ECG.

All group C patients 1 to 264 and all ECGs provided in appendix 1 to 3 have been validated by a blinded interpreter unknown to the author.

Table 1. QRS Axis deviation in 50 consecutive patients

eAppendix 1. 30 subjects with proven inferior MI: test cases from group A; abdominal placement 8 inches apart: Standard and new electrode placement ECGs are virtually identical. All ECGs verified by blinded- interpreter.

eFigure 1. Patient 01 old Inferior MI STD ECG

eFigure 2. Patient 01 old Inferior MI NEP ECG

eFigure 3. Patient 02 old inferior MI STD ECG

eFigure 4. Patient 02 old inferior MI NEP ECG

eFigure 5. Patient 03 old inferior MI STD ECG

eFigure 6. Patient 03 old inferior MI NEP ECG

eFigure 7. Patient 04 old inferior MI STD ECG
eFigure 8. Patient 04 old inferior MI NEP ECG
eFigure 9. Patient 05 old inferior MI STD ECG
eFigure 10. Patient 05 old inferior MI NEP ECG
eFigure 11. Patient 06 old inferior MI STD ECG
eFigure 12. Patient 06 old inferior MI NEP ECG
eFigure 13a. Patient 07 old inferior MI STD ECG
eFigure 13b. Patient 07 old inferior MI NEP ECG
eFigure 14. Patient 08 old inferior MI STD ECG
eFigure 15. Patient 08 old inferior MI NEP ECG
eFigure 16. Patient 09 old inferior MI STD ECG
eFigure 17. Patient 09 old inferior MI NEP ECG
eFigure 18. Patient 10 old inferior MI STD ECG
eFigure 19. Patient 10 old inferior MI NEP ECG
eFigure 20. Patient 11 old inferior MI STD ECG
eFigure 21. Patient 11 old Inferior MI NEP ECG
eFigure 22. Patient 12 old inferior MI STD ECG
eFigure 23. Patient 12 old inferior MI NEP ECG
eFigure 24. Patient 13 old inferior MI STD ECG
eFigure 25. Patient 13 old inferior MI NEP ECG
eFigure 26. Patient 14 old inferior MI STD ECG
eFigure 27. Patient 14 old inferior MI NEP ECG
eFigure 28. Patient 15 old inferior MI STD ECG
eFigure 29. Patient 15 old inferior MI NEP ECG
eFigure 30. Patient 16 old inferior MI STD ECG
eFigure 31. Patient 16 old inferior MI NEP ECG
eFigure 32. Patient 17 old inferior MI NEP ECG
eFigure 33. Patient 17 old inferior MI STD ECG
eFigure 34. Patient 18 old inferior MI STD ECG
eFigure 35. Patient 18 old inferior MI NEP ECG
eFigure 36. Patient 19 old inferior MI STD ECG
eFigure 37. Patient 19 old inferior MI NEP ECG
eFigure 38. Patient 20 old inferior MI STD ECG
eFigure 39. Patient 20 old inferior MI NEP ECG
eFigure 40. Patient 21 old inferior MI STD ECG
eFigure 41. Patient 21 old inferior MI NEP ECG
eFigure 42. Patient 22 old inferior MI STD ECG
eFigure 43. Patient 22 old inferior MI NEP ECG
eFigure 44. Patient 23 old inferior MI STD ECG
eFigure 45. Patient 23 old inferior MI NEP ECG
eFigure 46. Patient 24 old inferior MI STD ECG
eFigure 47. Patient 24 old inferior MI NEP ECG
eFigure 48. Patient 25 inferior MI NEP ECG similar to STD
eFigure 49. Patient 25 proven inferior MI STD ECG
eFigure 50. Patient 26 inferior MI NEP ECG similar to STD
eFigure 51. Patient 26 proven inferior MI STD ECG

eFigure 52. Patient 27 old inferior MI STD ECG
eFigure 53. Patient 27 old inferior MI NEP ECG
eFigure 54. Patient 28 proven inferior MI STD ECG
eFigure 55. Patient 28 inferior MI NEP ECG similar to STD
eFigure 56. Patient 29 old inferior MI STD ECG
eFigure 57. Patient 29 old inferior MI NEP ECG
eFigure 58. Patient 30 old inferior MI STD ECG artifacts
eFigure 59. Patient 30 old inferior MI NEP ECG artifacts cleared

eAppendix 2. 16 test cases from group a: low R wave amplitude in leads 1 and aVL in standard 12 – lead ECG; NEP ECG shows no decrease in R amplitude or conversion to QS pattern.

eFigure 1. Patient 01 lead 1 aVL STD ECG R waves similar to NEP
eFigure 2. Patient 01 lead 1 aVL NEP ECG R wave amplitude is similar to STD ECG
eFigure 3. Patient 02 lead 1 aVL STD ECG similar R wave amplitude to NEP
eFigure 4. Patient 02 LEAD 1 AVL NEP ECG, R wave amplitude in leads 1, aVL and other leads is similar to the STD ECG
eFigure 5. Patient 03 lead 1 aVL STD ECG very low R wave amplitude leads 1 aVL
eFigure 6. Patient 03 lead 1aVL NEP ECG no change in R wave amplitude compared with STD
eFigure 7. Patient 04 lead 1 aVL STD ECG
eFigure 8. Patient 04 lead 1 aVL NEP ECG
eFigure 9. Patient 05 lead 1 VL STD ECG
eFigure 10. Patient 05 lead 1 aVL NEP ECG R wave amplitude in all leads are similar to STD
eFigure 11. Patient 06 lead 1 aVL STD ECG
eFigure 12. Patient 06 lead 1 aVL NEP ECG R wave amplitude in all 12 leads similar to STD
eFigure 13. Patient 07 lead 1 aVL NEP ECG all R waves similar to STD ECG
eFigure 14. Patient 07 lead 1 aVL STD ECG
eFigure 15. Patient 08 lead 1 aVL STD ECG
eFigure 16. Patient 08 lead 1 aVL NEP ECG similar to STD
eFigure 17. Patient 09 lead 1 aVL STD ECG
eFigure 18. Patient 09 lead 1 aVL NEP ECG similar
eFigure 19. Patient 10 lead 1 aVL STD ECG
eFigure 20. Patient 10 lead 1 aVL NEP ECG similar R waves
eFigure 21. Patient 11 LEAD 1 AVL STD ECG
eFigure 22. Patient 11 lead 1 aVL NEP ECG all R waves amplitude similar to STD
eFigure 23. Patient 12 lead 1 aVL STD ECG
eFigure 24. Patient 12 lead 1 aVL NEP ECG
eFigure 25. Patient 13 lead 1 aVL STD ECG
eFigure 26. Patient 13 lead 1 aVL NEP ECG R wave amplitude in inferior and other leads similar to STD
eFigure 27. Patient 14 lead 1 aVL STD ECG
eFigure 28. Patient 14 lead 1 aVL NEP ECG similar
eFigure 29. Patient 15 lead 1 aVL STD ECG

eFigure 30. Patient 15 Patient 15 LEAD 1 AVL NEP ECG virtually identical R wave amplitude all leads.

eFigure 31. Patient 16 R lead 1 aVL STD ECG

eFigure 32. Patient 16 R wave amplitude NEP ECG no increase in R wave amplitude in 11 111 aVF and no decrease in lead 1 Avl.

eAppendix 3. 10 proven old Inferior MI, and 3 test cases of interest from group C: standard and new electrode placement ECGs.

eFigure 1. 2014/05/30 Standard ECG, deep, wide inferior Q waves; old inferior infarct, QRS axis 19.

eFigure 2. NEP ECG shows virtually the same findings, deep, wide Q waves: old inferior MI; QRS axis 25.

eFigure 3. 2014/ 05/09; standard ECG old inferior MI, QRS axis 74. VPBs.

eFigure 4. new electrode placement ECG, similar Q waves in inferior leads, axis 69.

eFigure 5. standard ECG, 2014/05/23; Q waves 11,111, aVF: old inferior infarct, VPBs.

eFigure 6. NEP ECG reveals virtually the same, Q waves 11, 111, aVF, old inferior MI, VPBs.

eFigure 7. 2014 /05 /16 Standard 12 – lead ECG, Q waves 11, 111, aVF, old inferior MI

eFigure 8. New electrode placement ECG, similar wave form and inferior Q waves

eFigure 9. 14/05/23 Standard ECG; old inferior MI, QRS axis _40. RBBB

eFigure 10. NEP ECG similar wave form, inferior Q waves, axis _35, RBBB. Virtually the same

eFigure 11. 14/05/27; standard ECG; Q waves 11, 111 aVF; old inferior MI, axis -30

eFigure 12. NEP ECG similar inferior Q waves, axis -30; R wave amplitude in lead 1 aVL unchanged

eFigure 13. Standard ECG, old inferior MI, axis -57 virtually the same wave form as NEP ECG shown below

eFigure 14. New electrode placement ECG; similar inferior Q waves; old inferior MI, axis -55

eFigure 15. Standard ECG, old inferior MI; axis -47, note artifacts

eFigure 16. NEP ECG, old inferior MI similar to standard recording, artifacts abolished, axis - 42

eFigure 17. Standard ECG, inferior Q waves: old inferior MI

eFigure 18. NEP ECG, old inferior MI, virtually similar wave forms, inferior Q waves

eFigure 19. Standard ECG old inferior MI, right coronary occlusion, quadruple CABG

eFigure 20. NEP ECG, old inferior MI, similar

eFigure 21. Standard 12 – lead ECG; low amplitude R waves in leads 1 and aVL that can result in a QS pattern as observed with torso (modified) - leads

eFigure 22. New electrode placement ECG showing no change in R wave amplitude in leads 1, aVL or inferior leads. Virtually the same wave forms.

eFigure 23. A standard method ECG shows artifacts; poor quality ECG

eFigure 24. NEP ECG done within 1 minute of STD shows clearing of artifacts a better quality ECG.

This supplementary material has been provided by the author to give readers additional information about the work.

Axis Deviation (50 consecutive subjects)					
Subject	NEP	STD	Subject	NEP	STD
1	-36	-41	26	-18	-25
2	-2	-2	27	42	35
3	65	64	28	10	7
4	44	44	29	58	54
5	27	31	30	64	57
6	21	22	31	-19	-18
7	-21	-24	32	16	14
8	-25	-24	33	18	10
9	-13	-15	34	82	85
10	83	84	35	-2	-3
11	-17	-10	36	2	-5
12	52	45	37	90	90
13	52	47	38	63	62
14	55	52	39	52	41
15	9	16	40	-1	-4
16	10	0	41	-82	-81
17	-14	-9	42	74	78
18	77	74	43	30	34
19	47	40	44	80	75
20	33	24	45	41	40
21	61	59	46	79	75
22	23	13	47	155	153
23	83	80	48	45	31
24	9	0	49	52	44
25	78	77	50	56	60

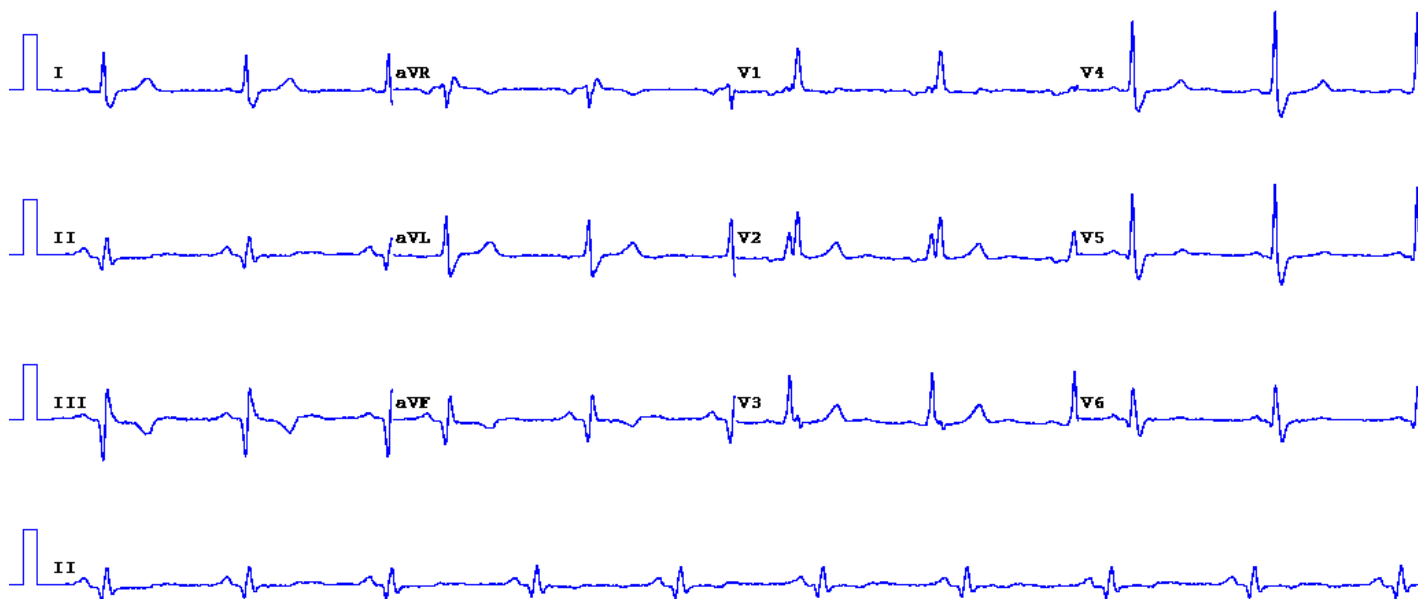
Table 1. QRS Axis deviation in 50 consecutive patients

eAppendix 1



25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 1: Patient 01; deep wide inferior Q waves; old Inferior MI STD ECG



25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

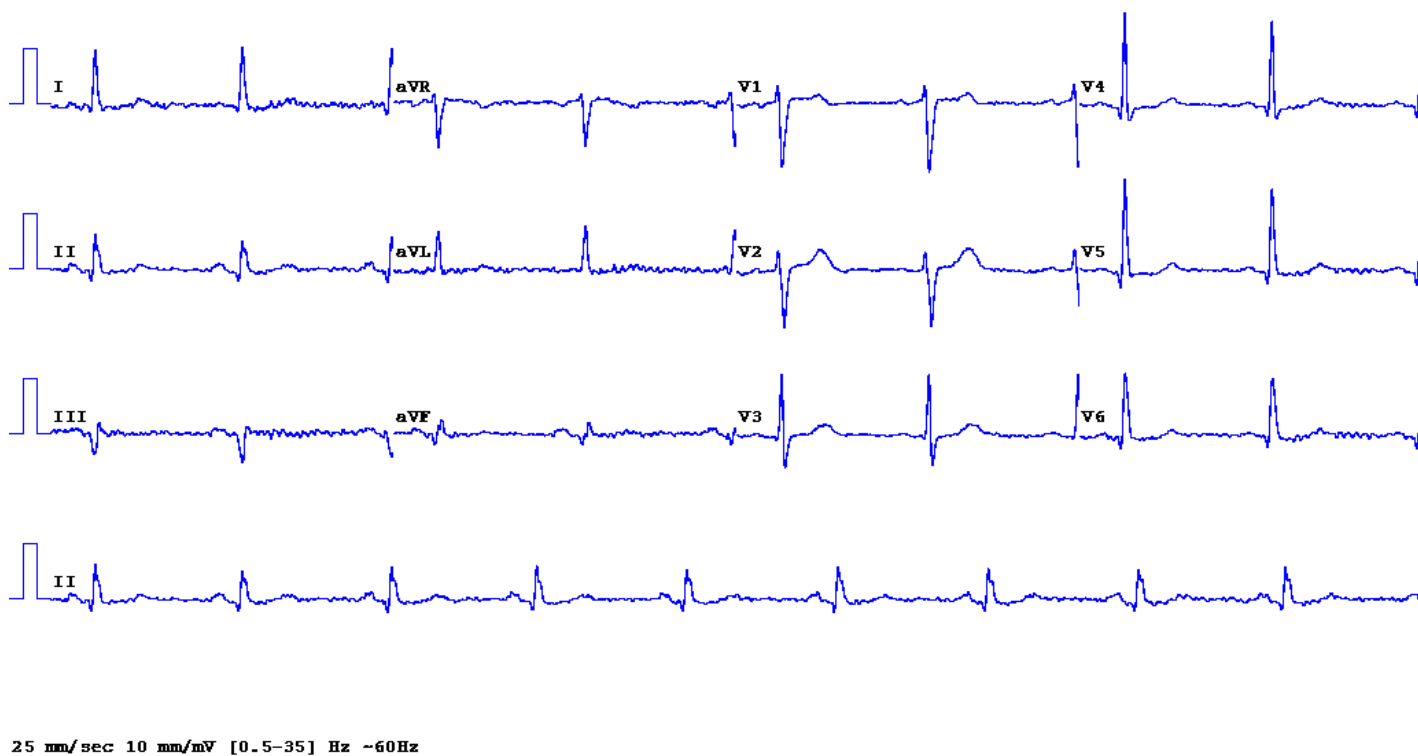
eFigure 2: Patient 01 ~ 20 year old Inferior MI; the NEP ECG is identical.



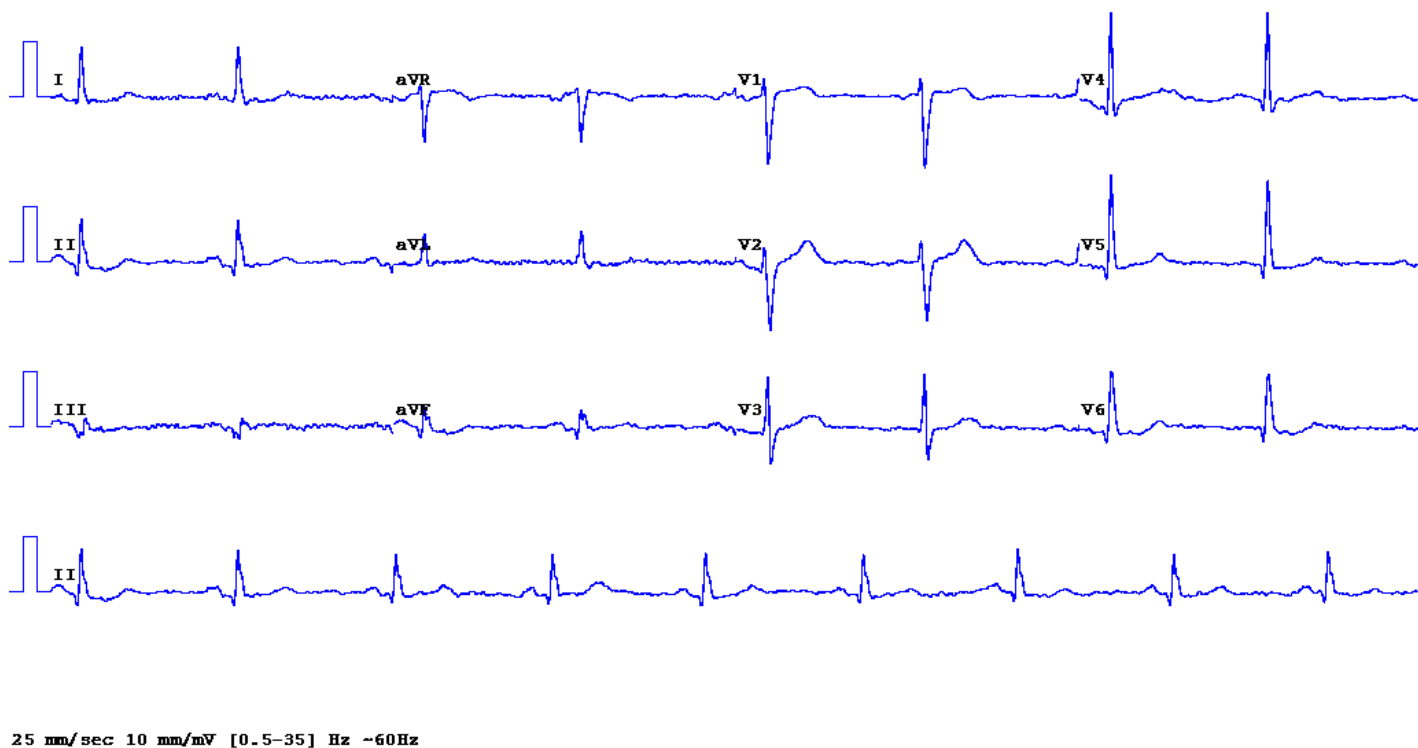
eFigure 3: Patient 02 old inferior MI STD ECG



eFigure 4: Patient 02 old inferior MI; the NEP ECG is similar.



eFigure 5: Patient 03 old inferior MI STD ECG



eFigure 6: Patient 03 old inferior MI; the NEP ECG is similar to the standard above.



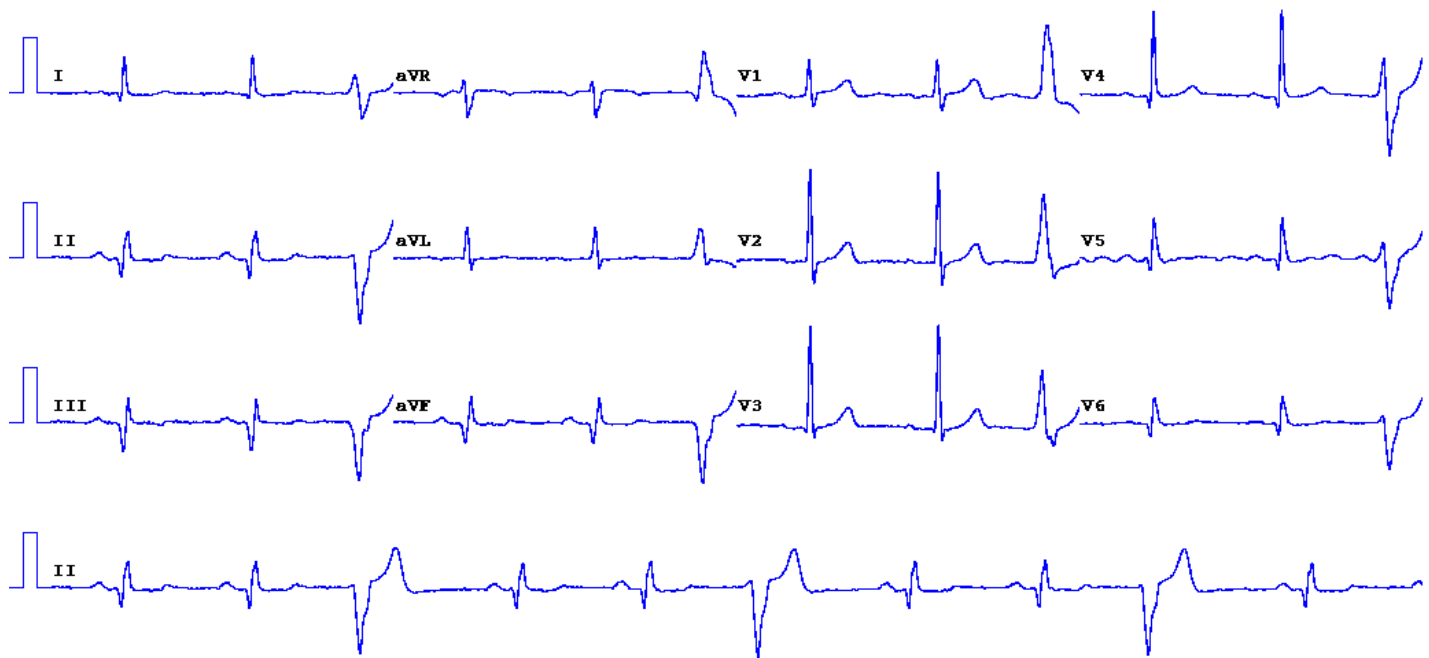
25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 7: Patient 04 old inferior and anterior MI STD ECG



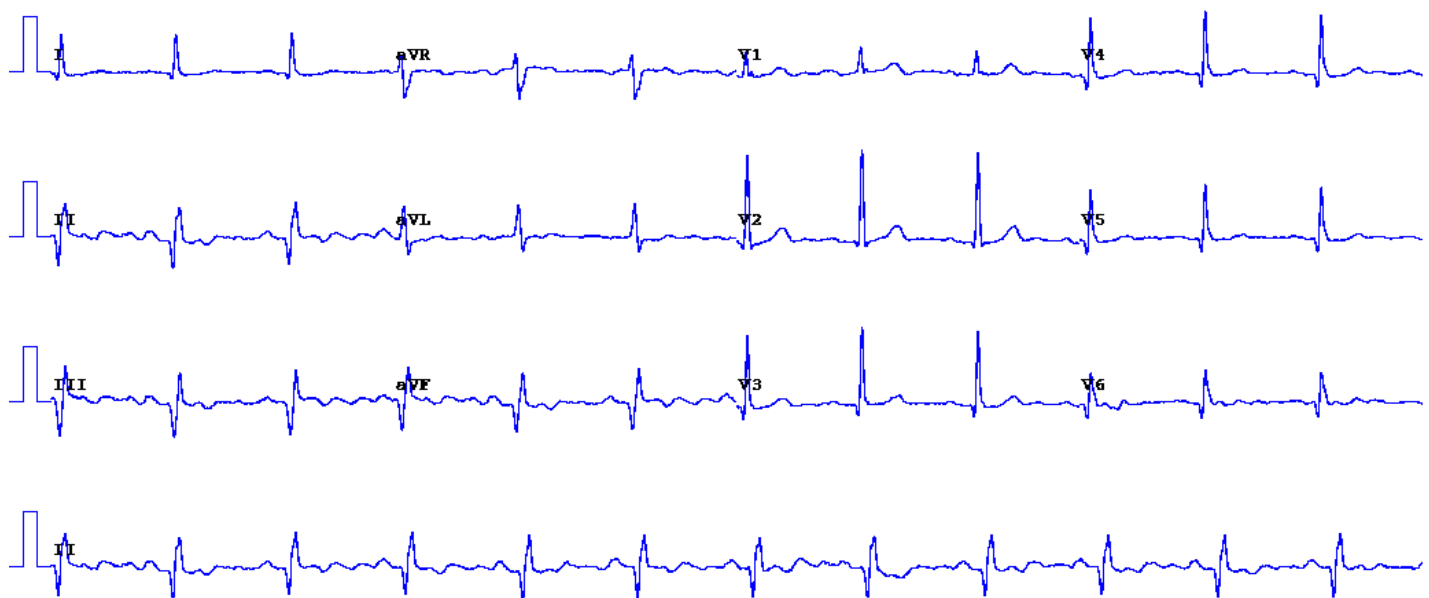
25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 8: Patient 04 old inferior MI NEP ECG is identical to standard ECG above.



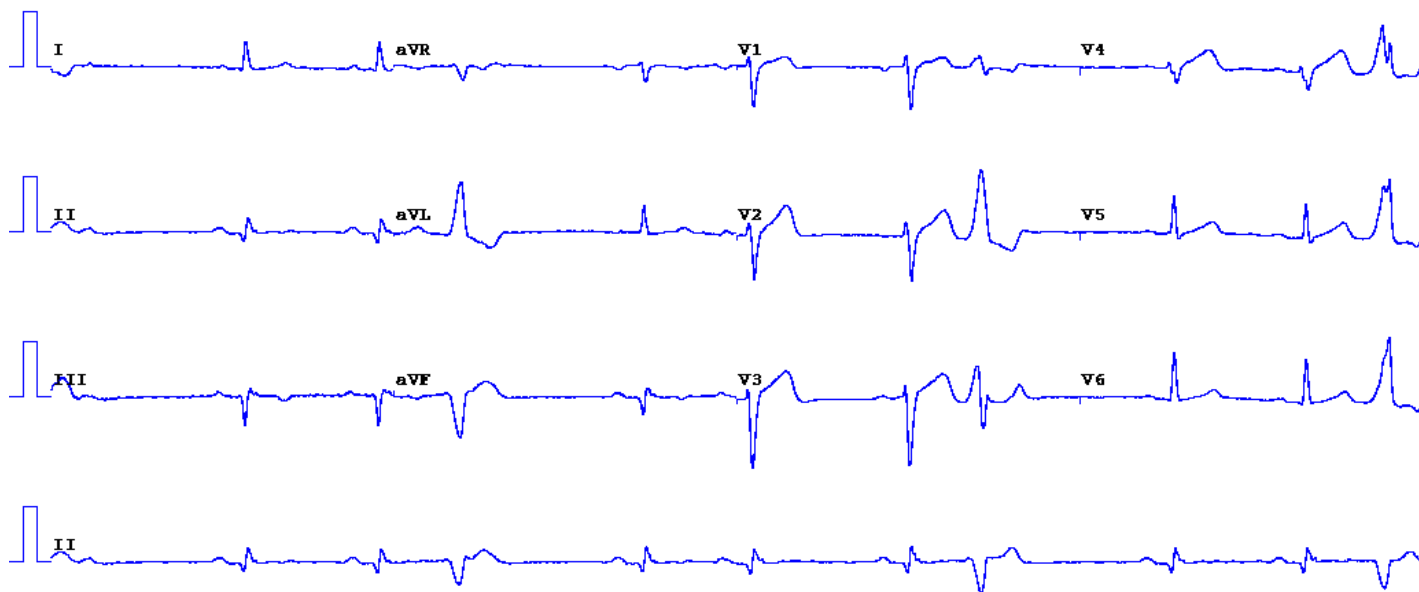
25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 9: Patient 05 old inferior MI STD ECG



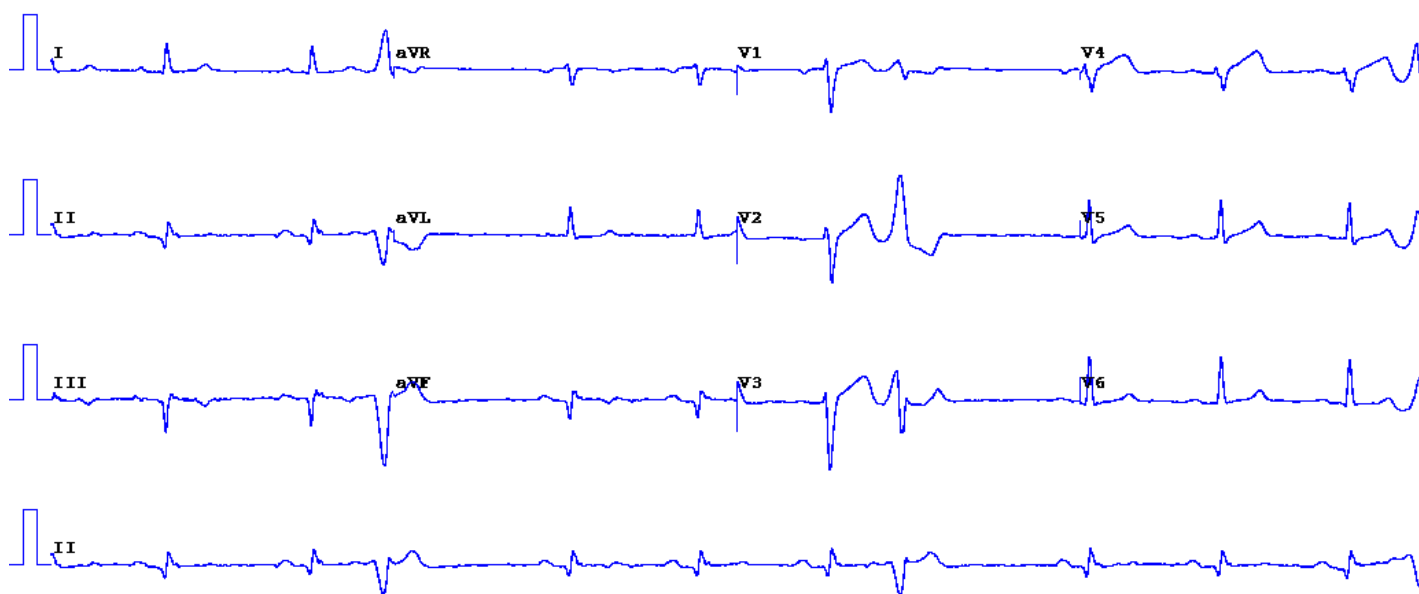
25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 10: Patient 05 old inferior MI NEP ECG is similar.



25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 11: Patient 06 old inferior MI, VPBs , STD ECG



25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 12: Patient 06 old inferior MI; the NEP ECG is identical.



25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 13a: Patient 07 old inferior MI STD ECG.



25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

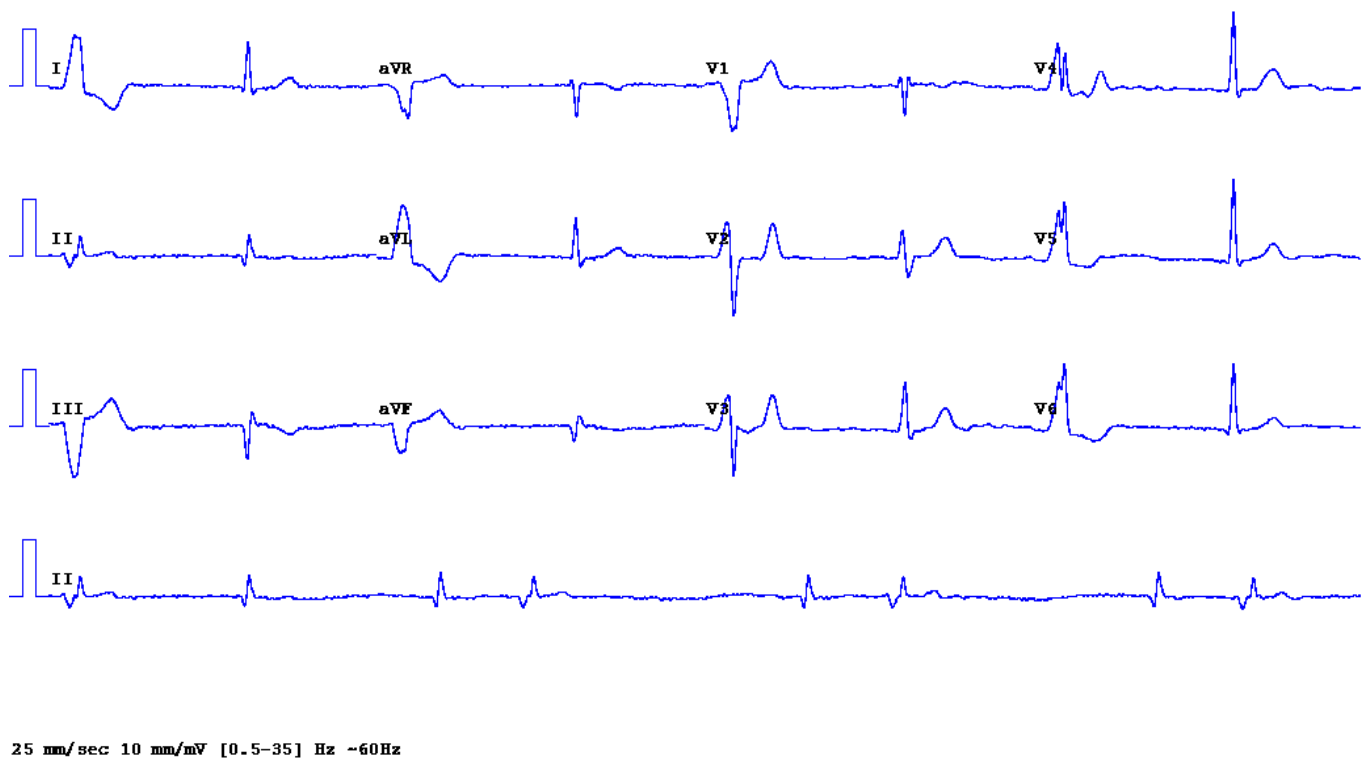
eFigure 13b: Patient 07 old inferior MI NEP ECG, similar.



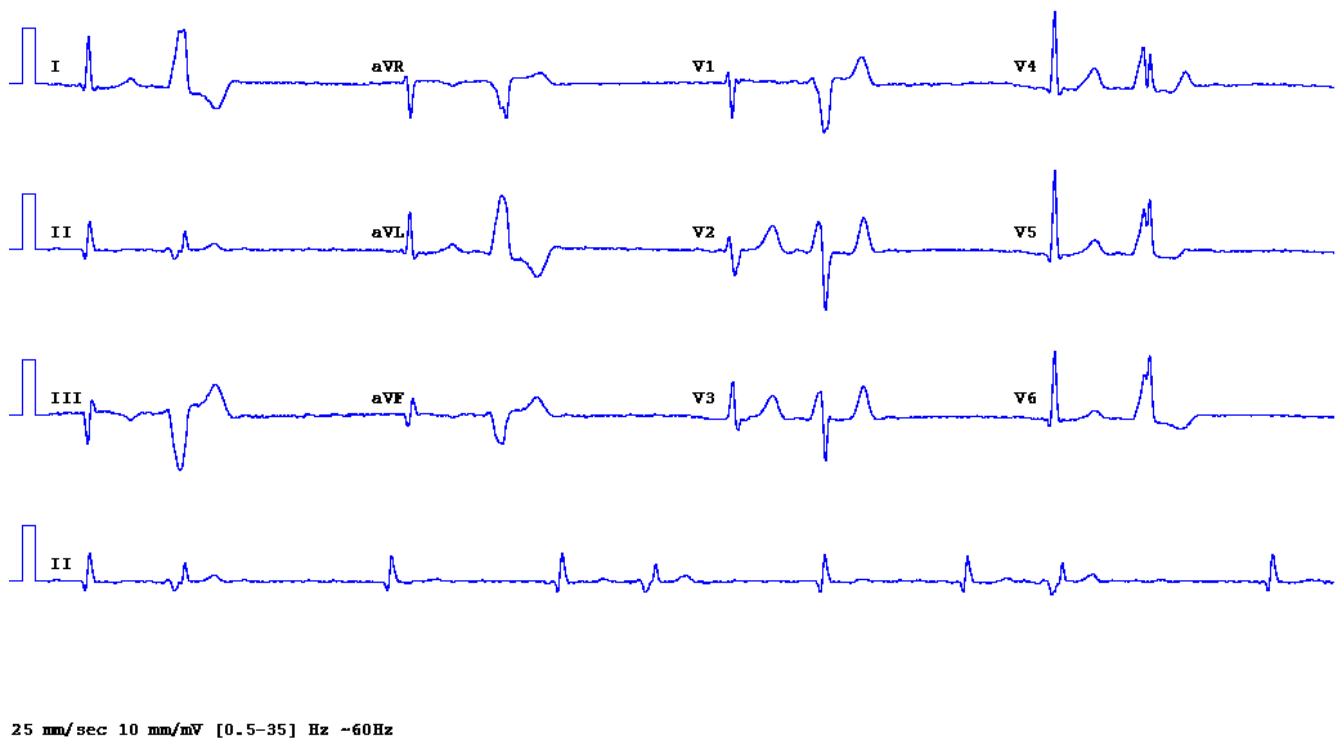
eFigure 14: Patient 08 old inferior MI STD ECG



eFigure 15: Patient 08 old inferior MI NEP ECG is similar.



eFigure 16: Patient 09 , inferior Q waves; old inferior MI STD ECG



eFigure 17: Patient 09 old inferior MI , VPBs. NEP ECG is virtually identical.



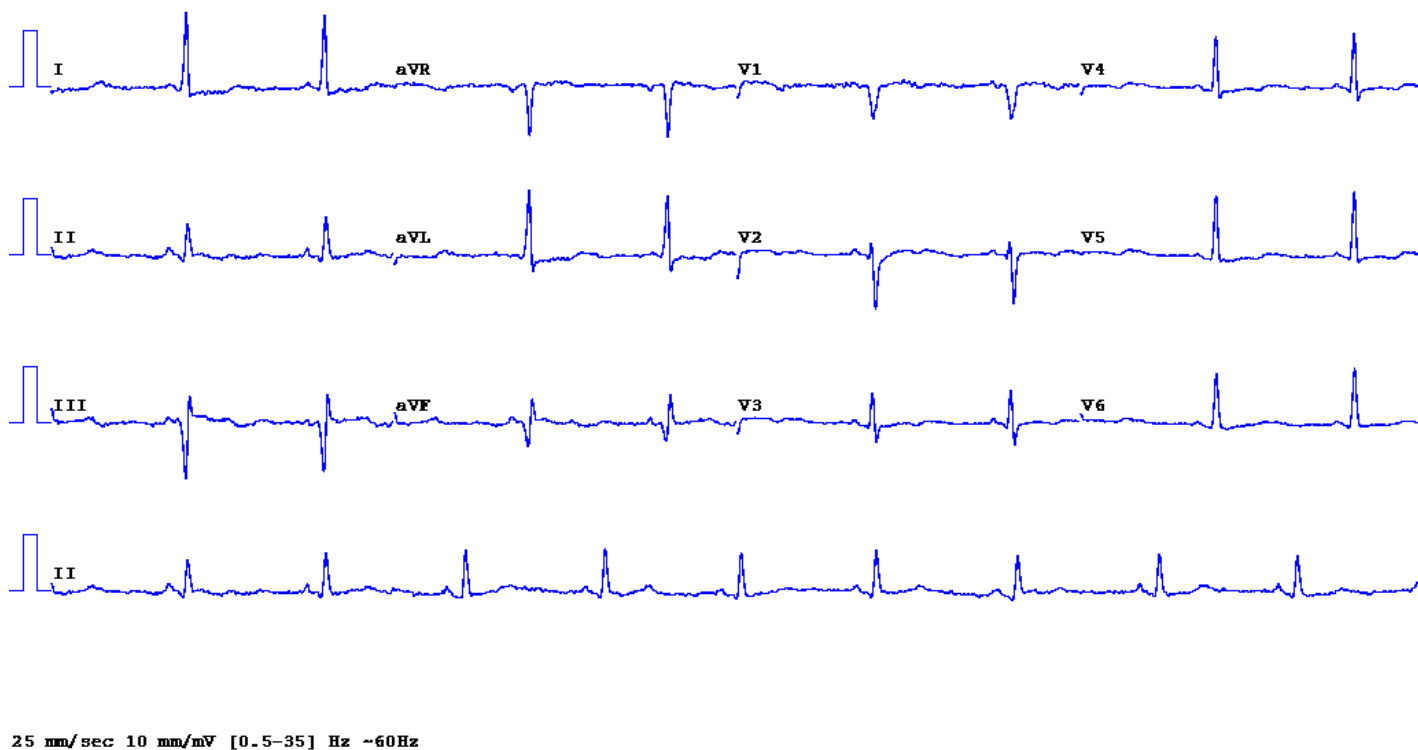
25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 18: Patient 10 old inferior MI STD ECG

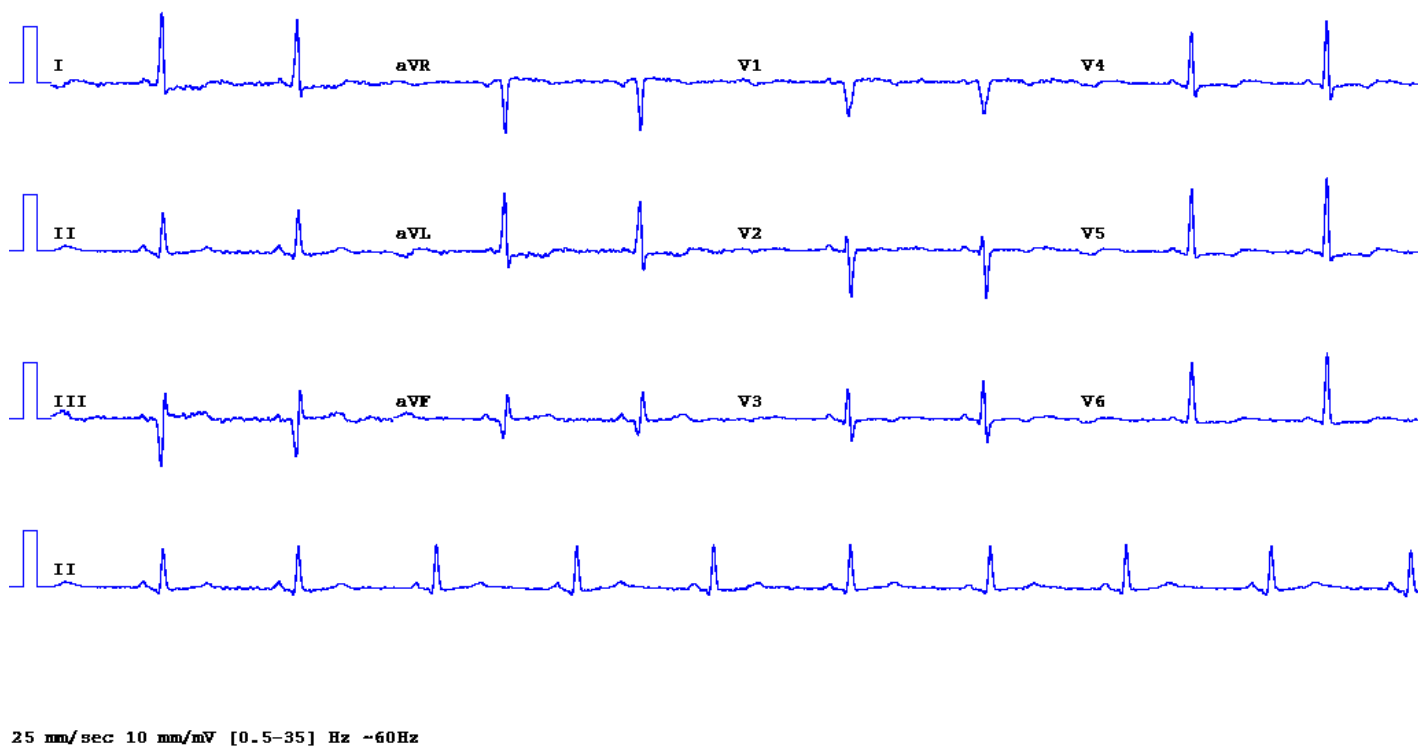


25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

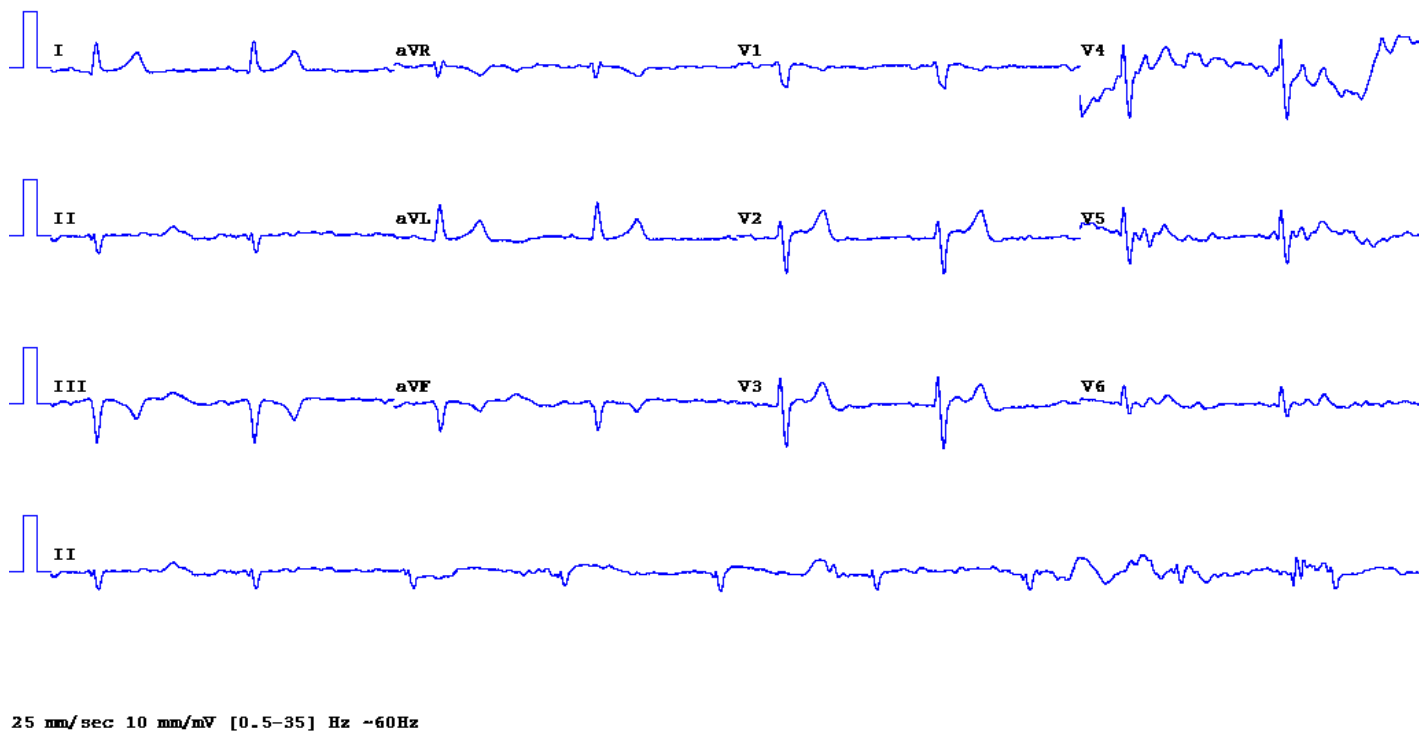
eFigure 19: Patient 10 old inferior MI NEP ECG is similar



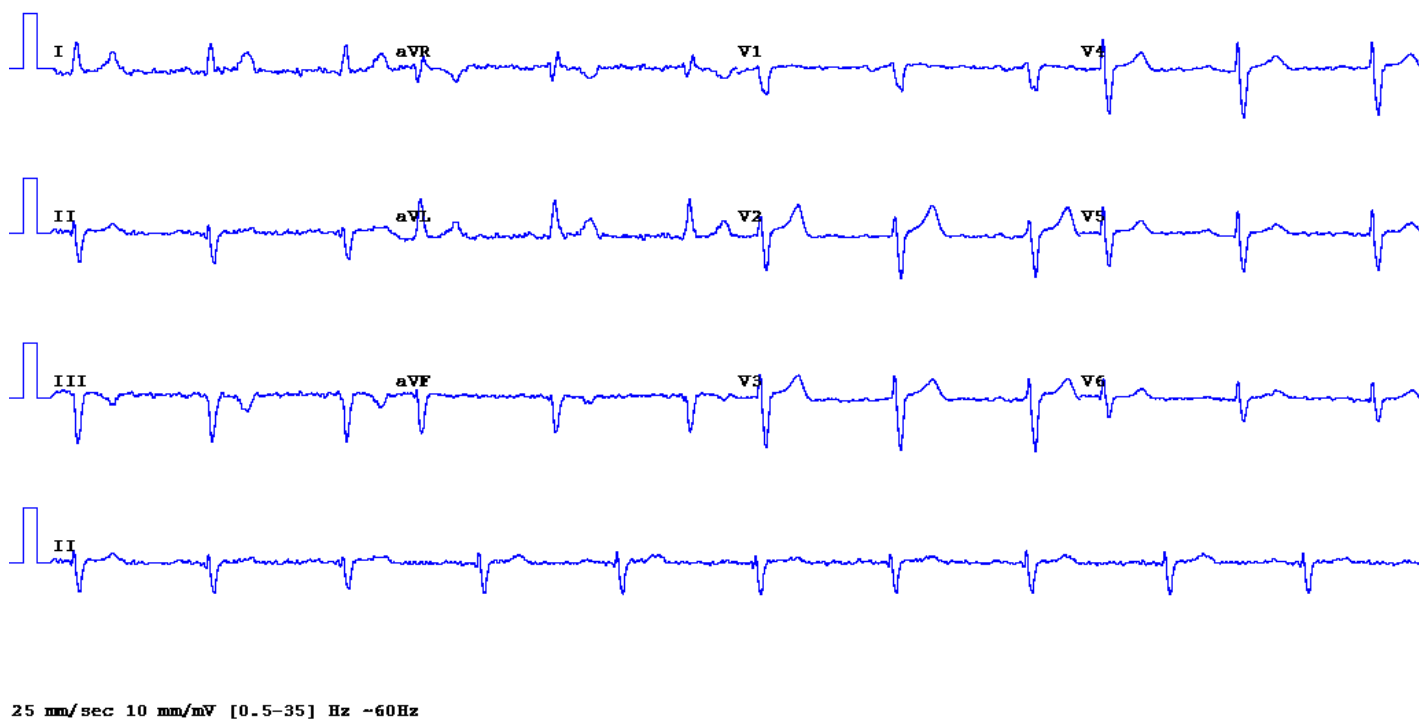
eFigure 20: Patient 11; deep inferior Q waves: old inferior MI STD ECG



eFigure 21: Patient 11; similar Q waves and wave forms: old Inferior MI NEP ECG



eFigure 22: Patient 12 old inferior MI STD ECG, note artifacts, V4 – V 6. aVF.



eFigure 23: Patient 12 old inferior MI NEP ECG shows clearing of artifacts. Better quality ECG.



eFigure 24: Patient 13 old inferior MI STD ECG



eFigure 25: Patient 13 old inferior MI; the NEP ECG is virtually identical.



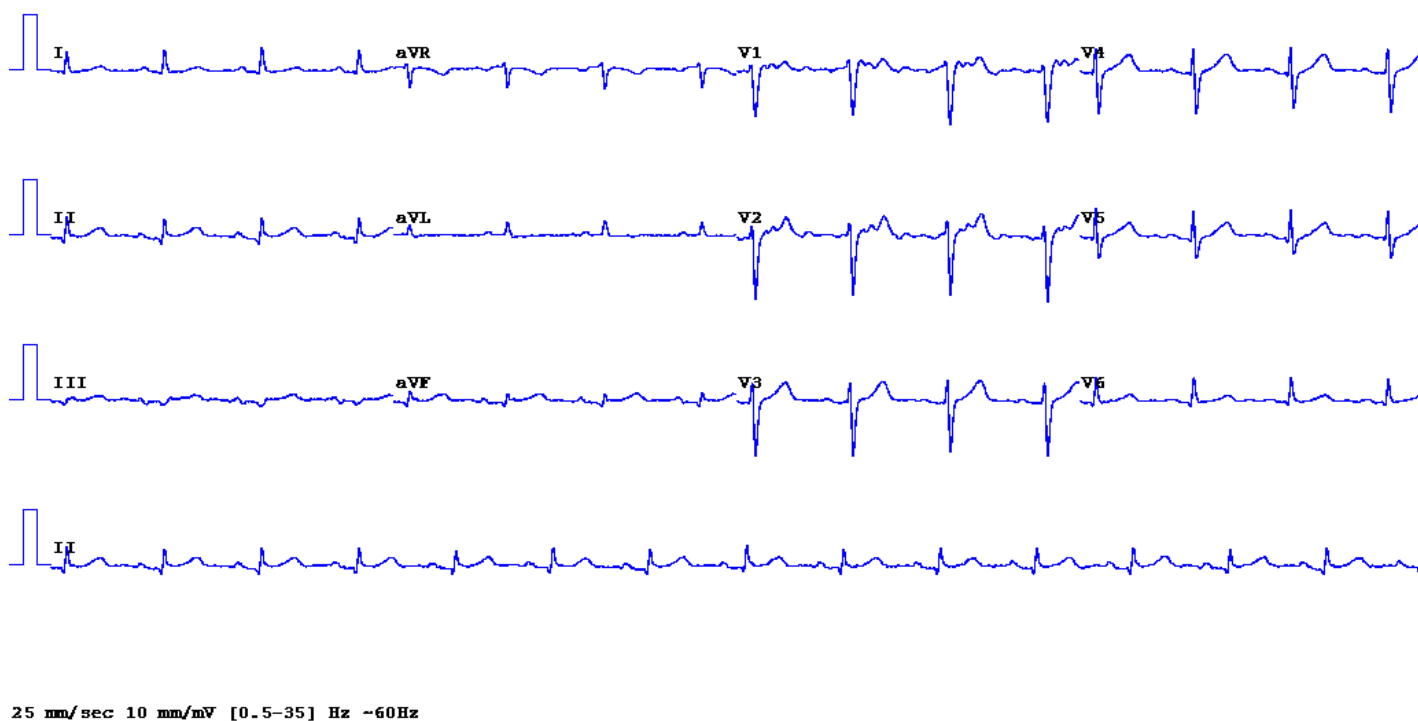
eFigure 26: Patient 14; deep wide Q waves,II,III, aVF: old inferior MI STD ECG



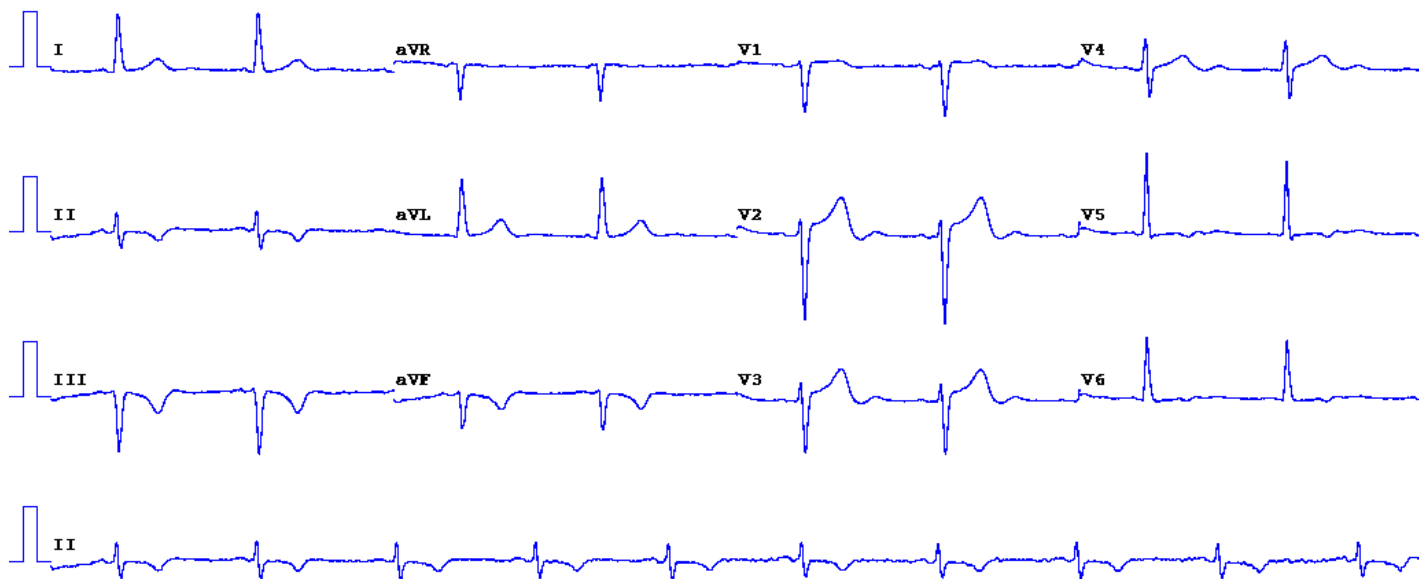
eFigure 27: Patient 14 old inferior MI;NEP ECG is not exempt from minor artifacts.



eFigure 30: Patient 16 old inferior MI STD ECG

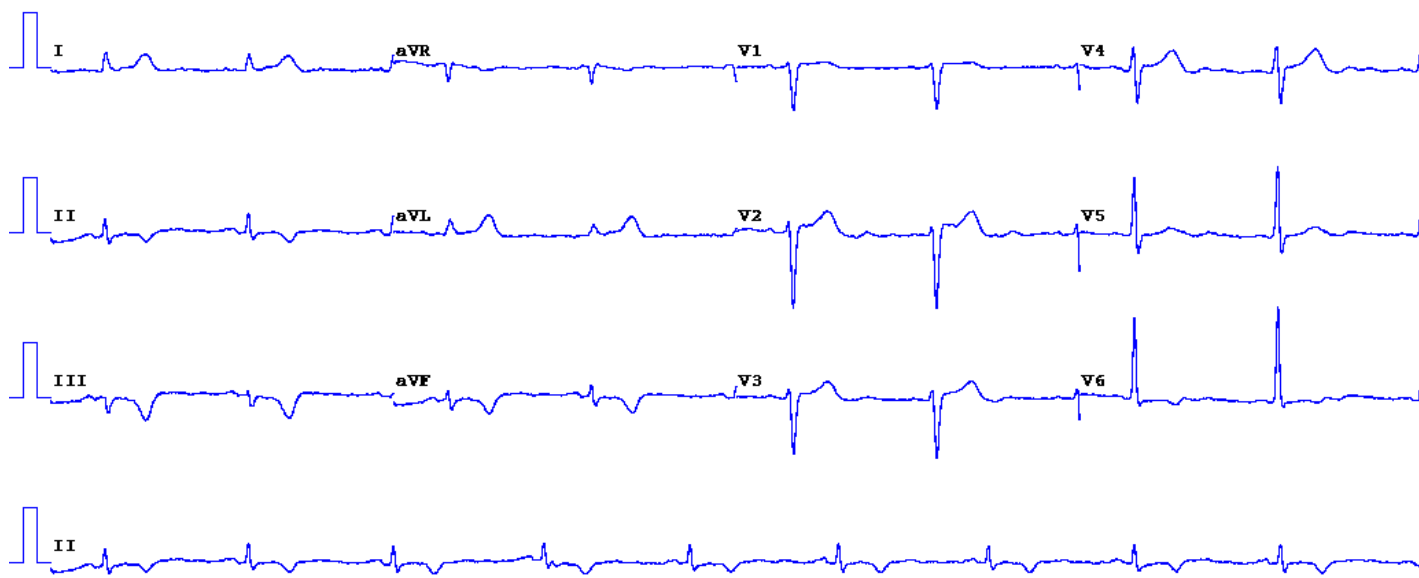


eFigure 31: Patient 16 old inferior MI; the NEP ECG is virtually identical.



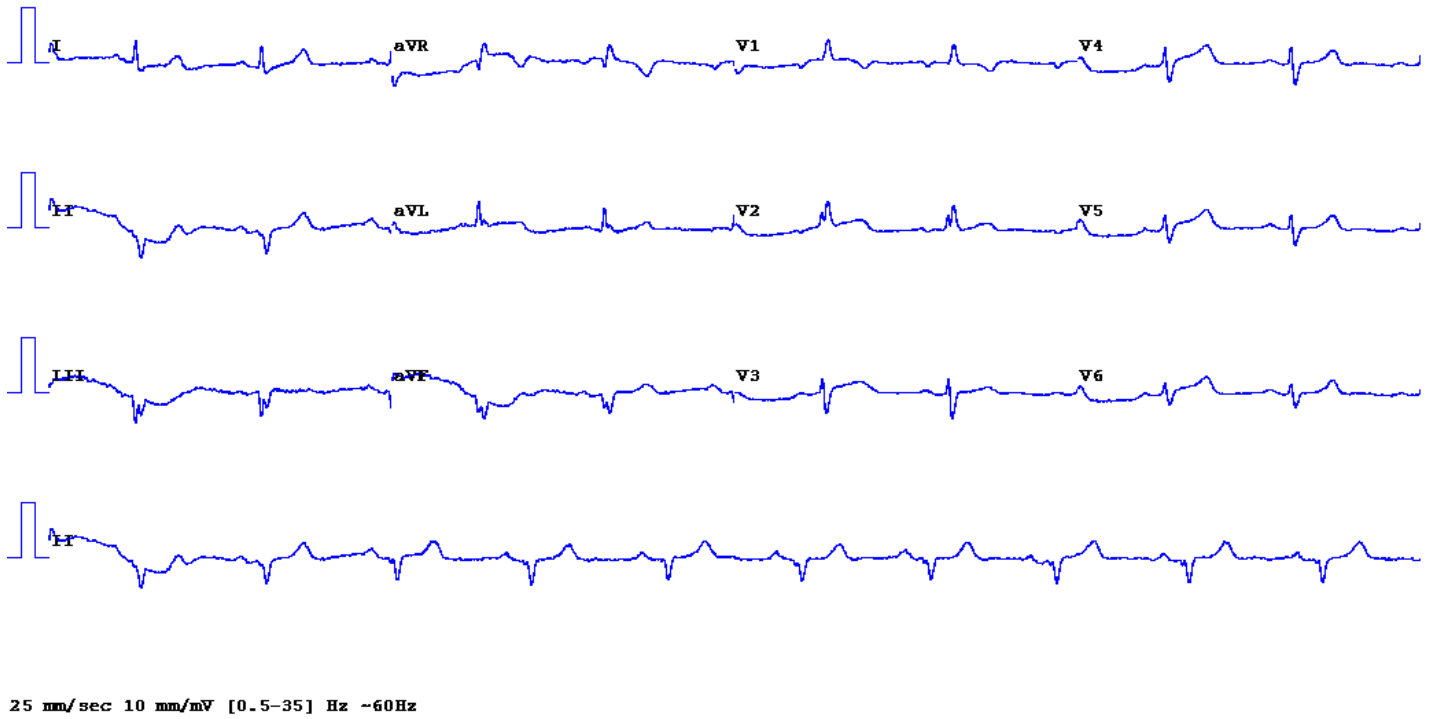
25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 32: Patient 17 old inferior MI NEP ECG

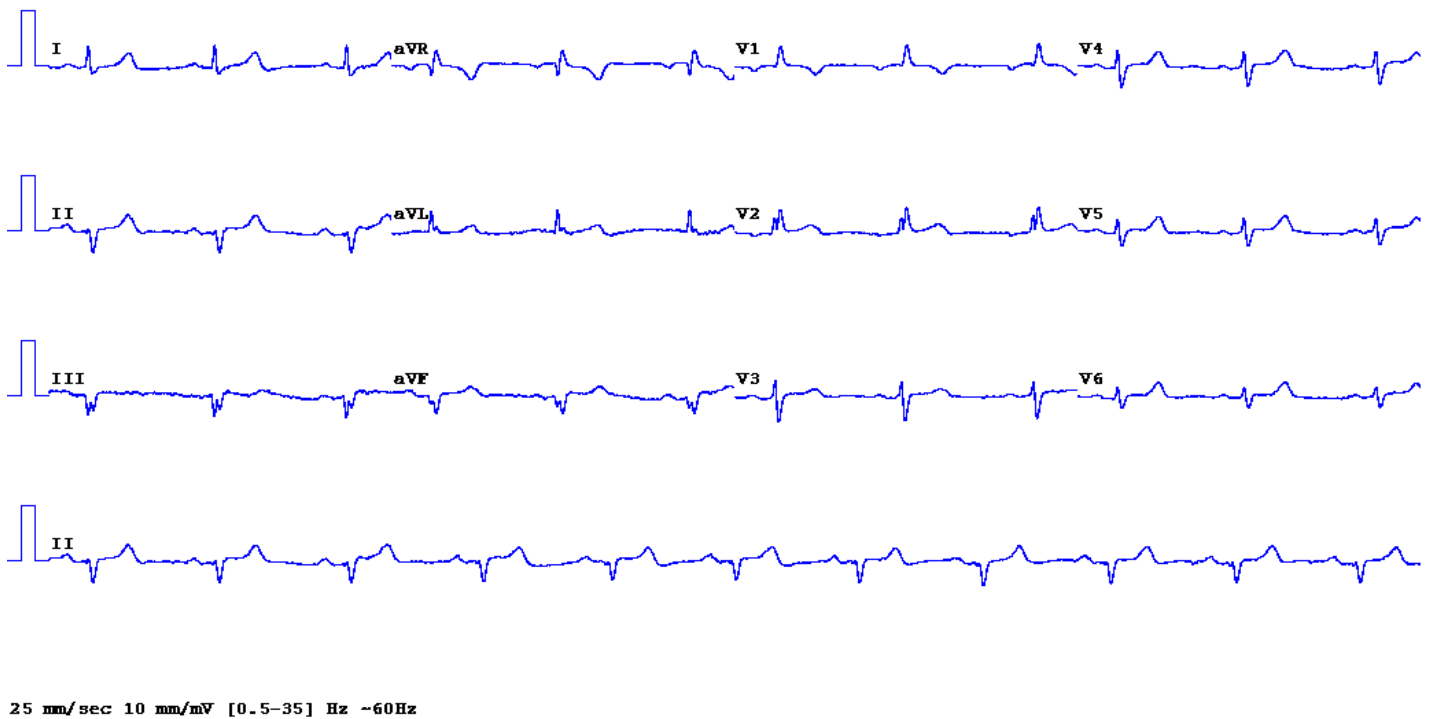


25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

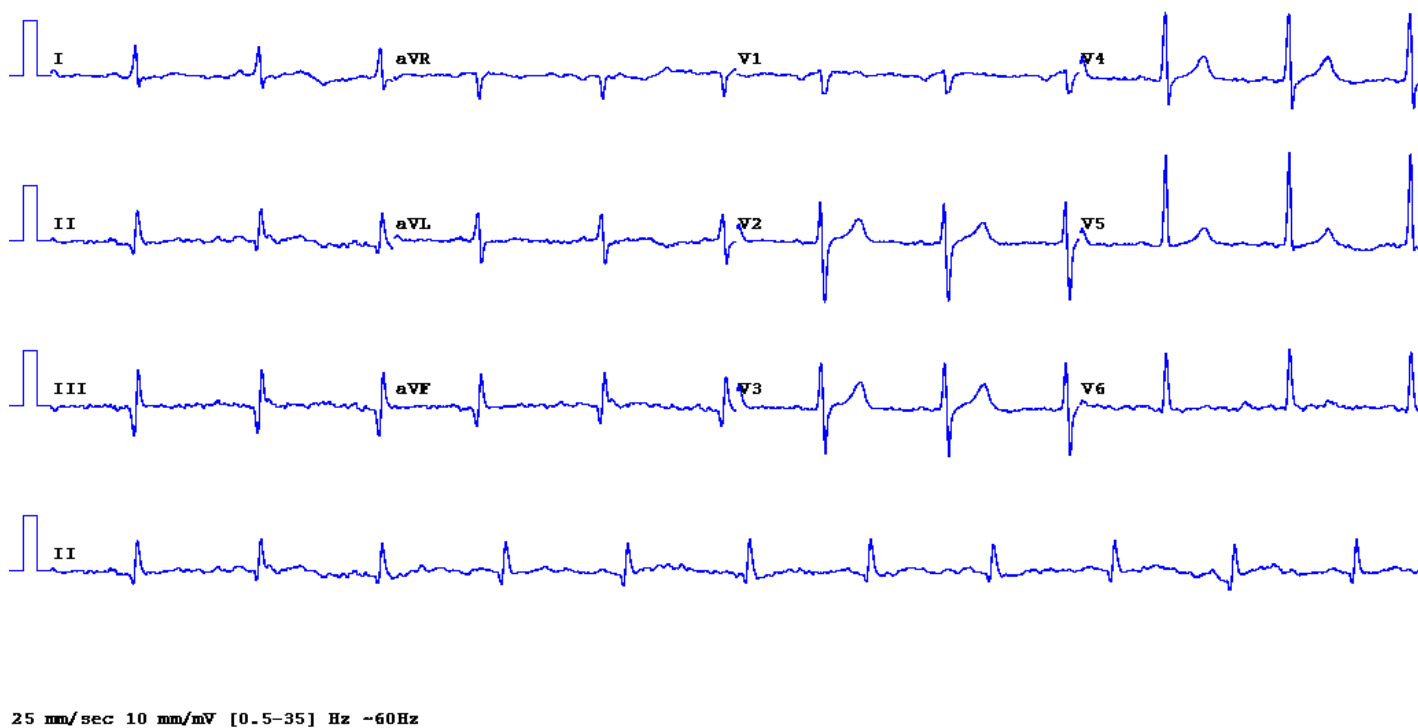
eFigure 33: Patient 17 old inferior MI; the STD ECG is similar.



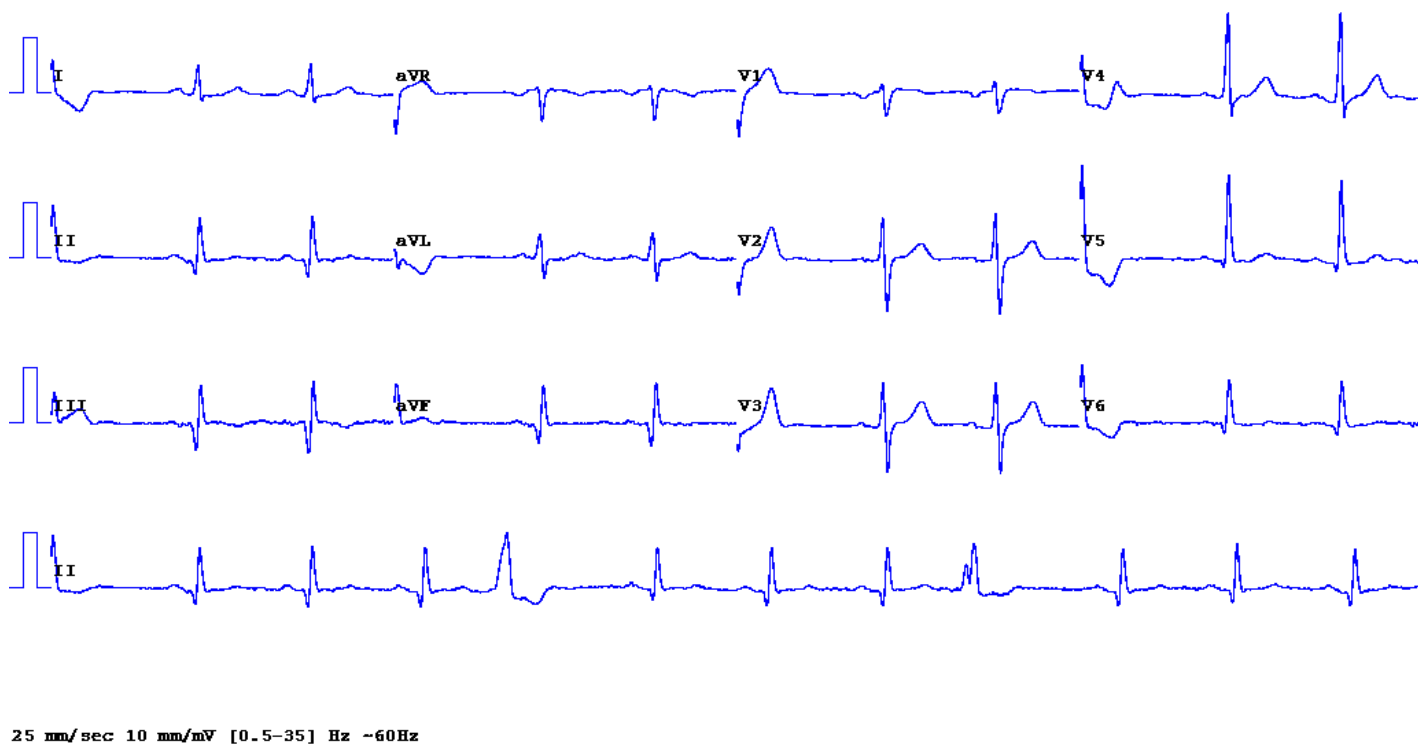
eFigure 34: Patient 18 old inferior MI;STD ECG



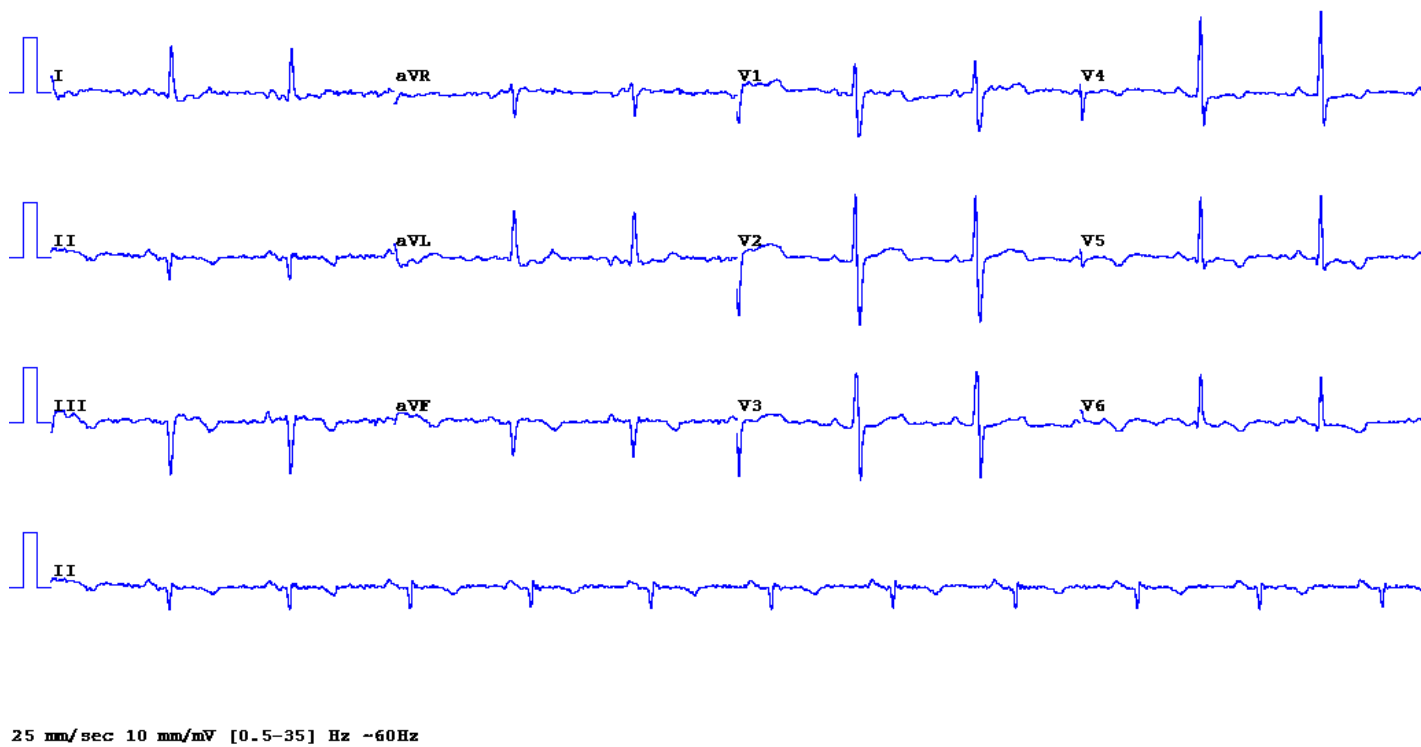
eFigure 35: Patient 18 old inferior MI;NEP ECG



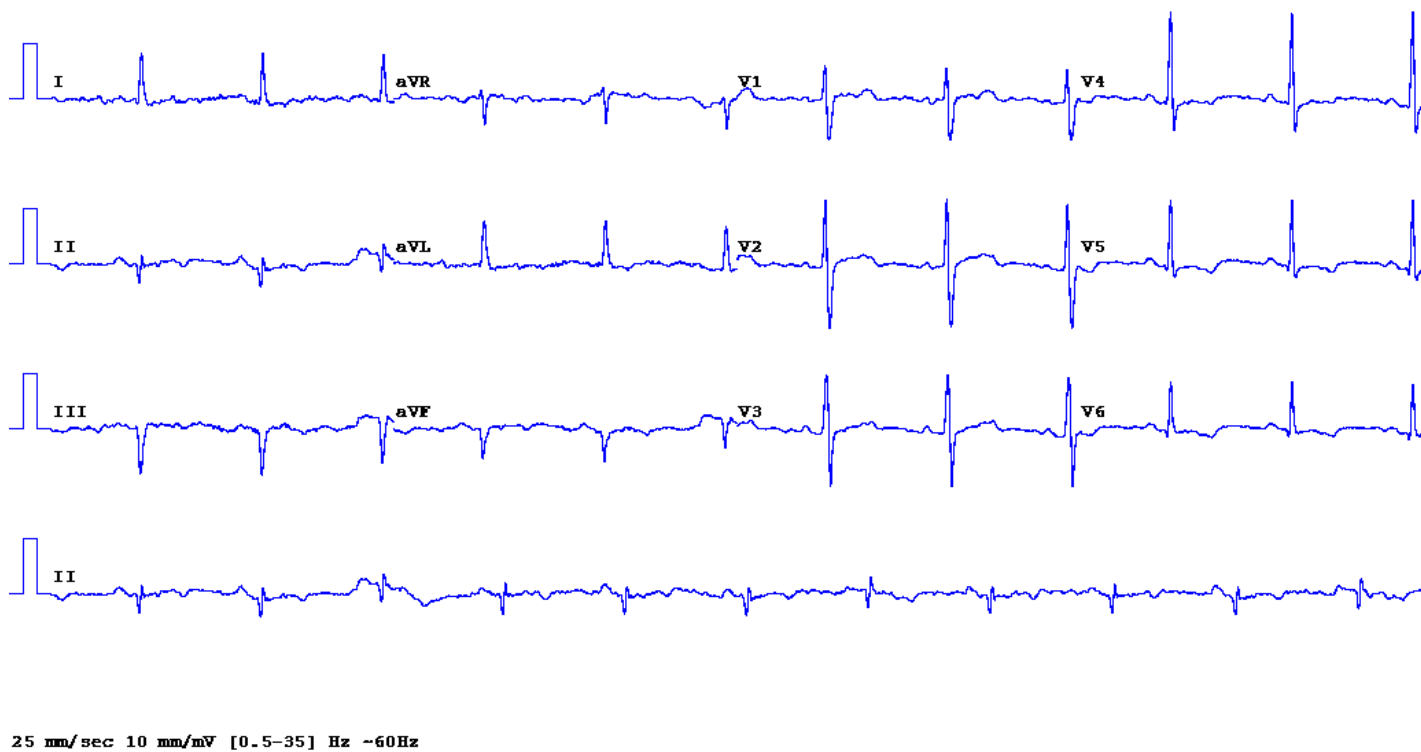
eFigure 36: Patient 19 old inferior MI:STD ECG



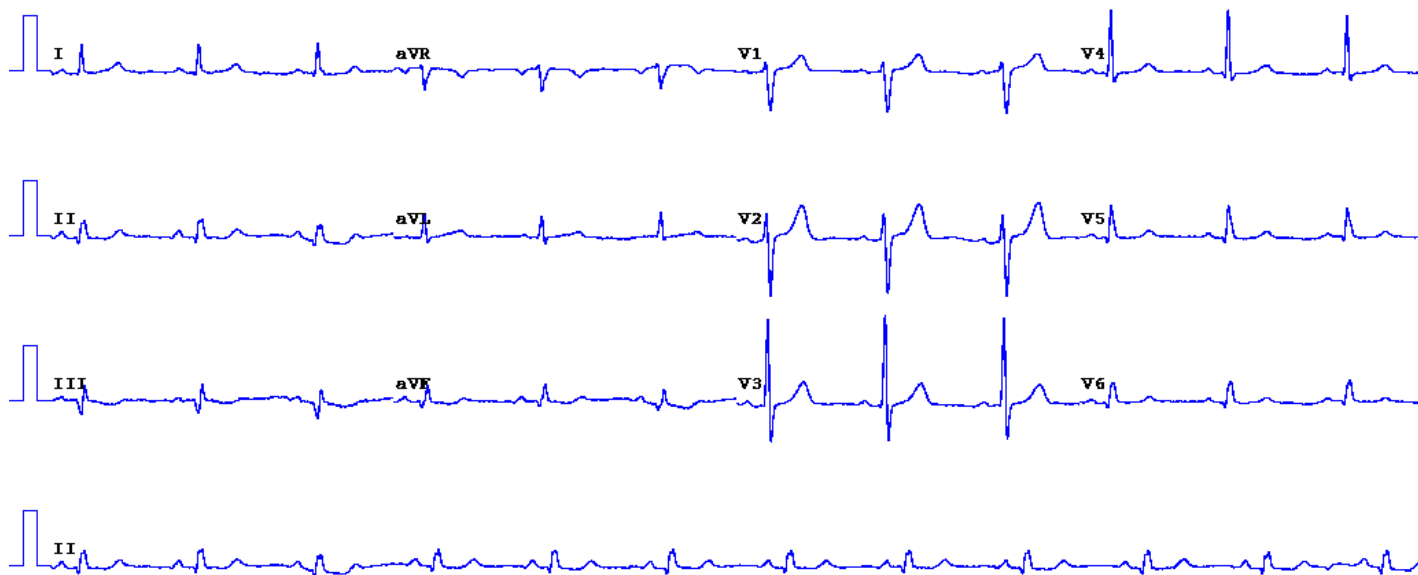
eFigure 37: Patient 19 old inferior MI: the NEP ECG is virtually identical.



eFigure 38: Patient 20 old inferior MI;STD ECG



eFigure 39: Patient 20 old inferior MI: the NEP ECG is similar.



25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 40: Patient 21 old inferior MI STD ECG

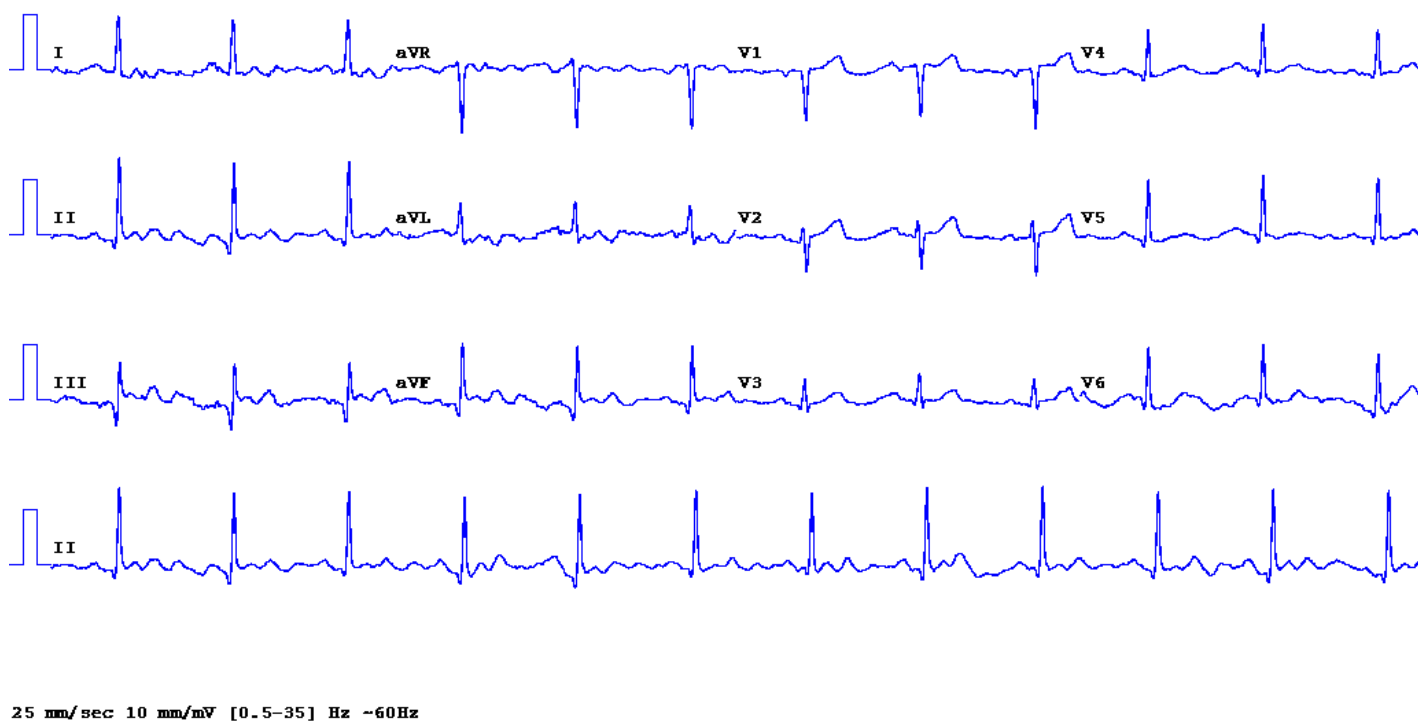


25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 41: Patient 21 old inferior MI: the NEP ECG is similar.



eFigure 42: Patient 22 old inferior MI STD ECG



eFigure 43: Patient 22 old inferior MI the NEP ECG is similar.



25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 44: Patient 23 old inferior MI STD ECG



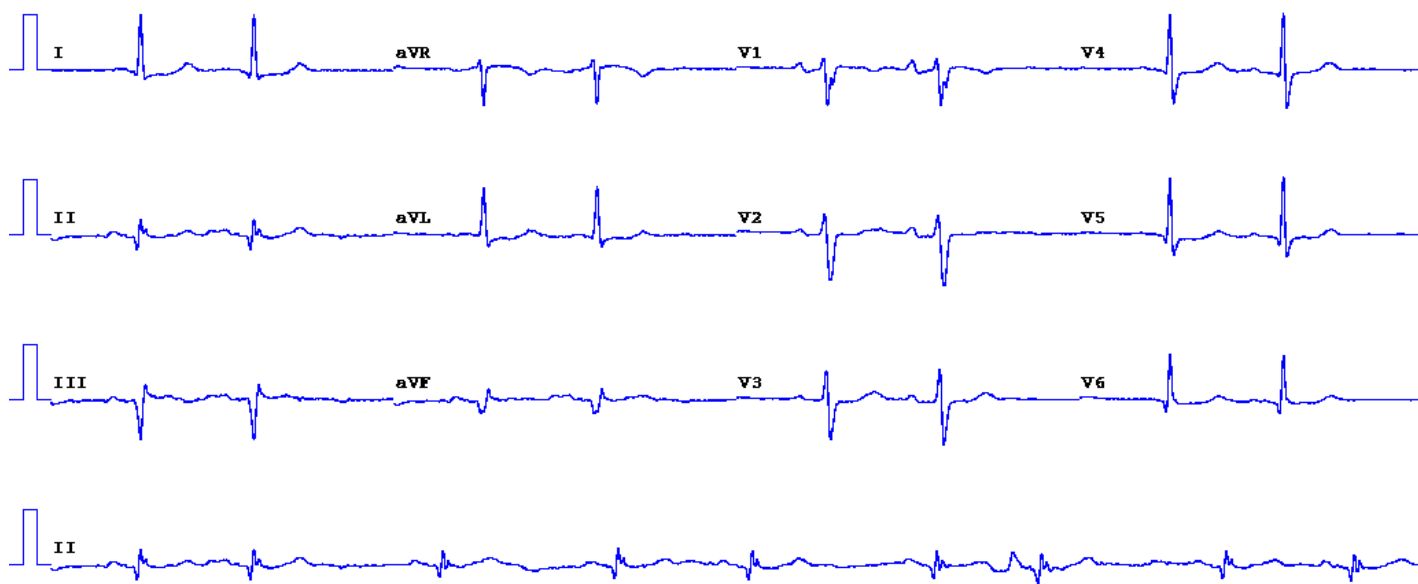
25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 45: Patient 23 old inferior MI; the NEP ECG is virtually identical.



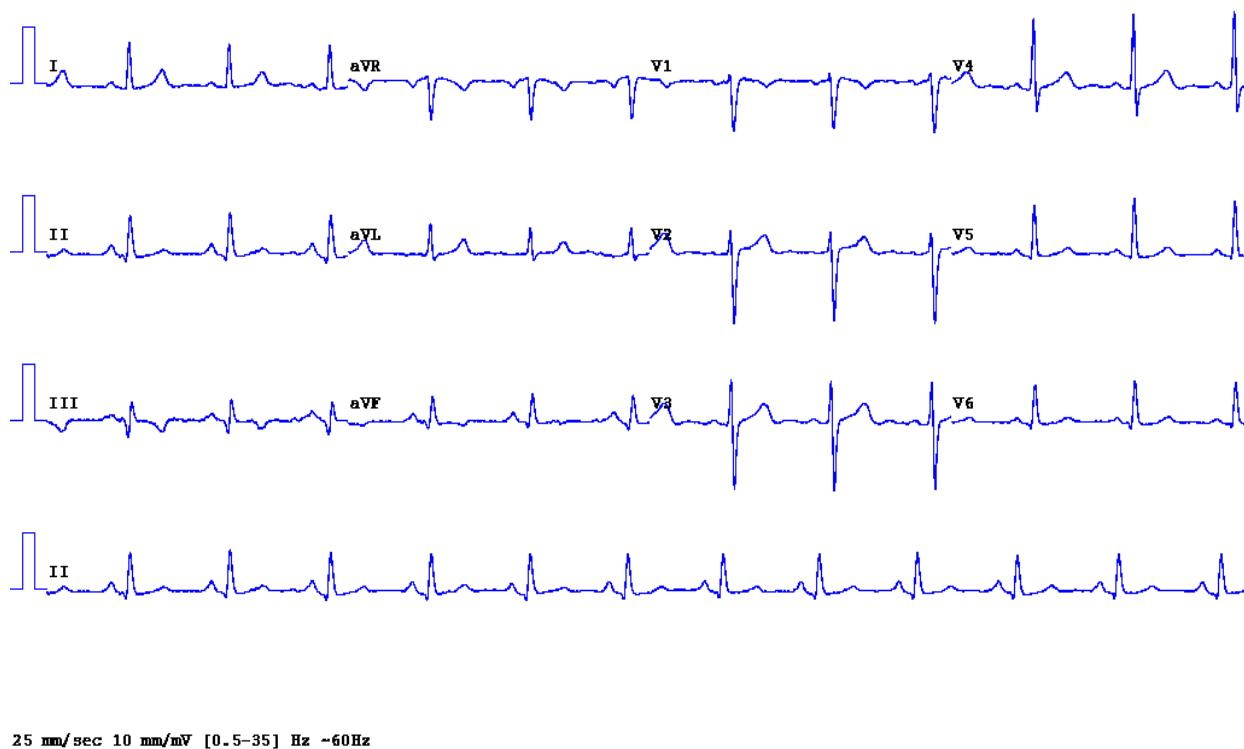
25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 46: Patient 24 old inferior MI STD ECG

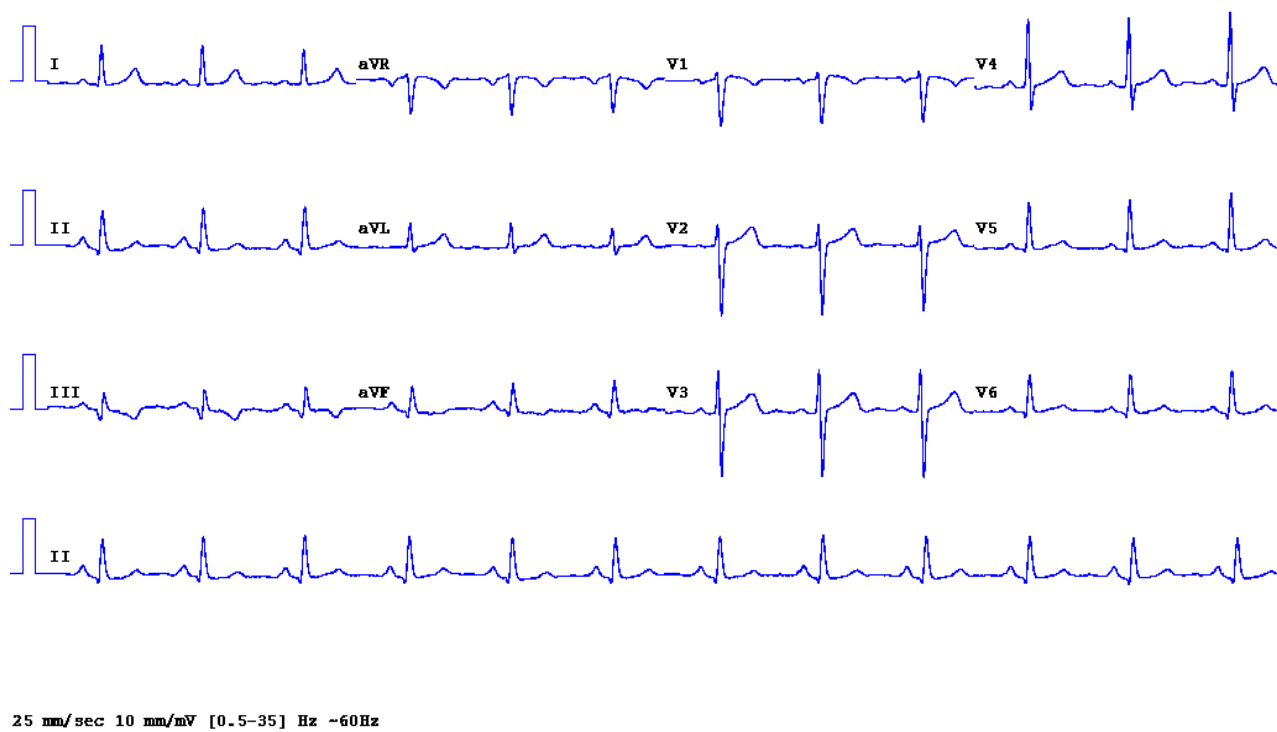


25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

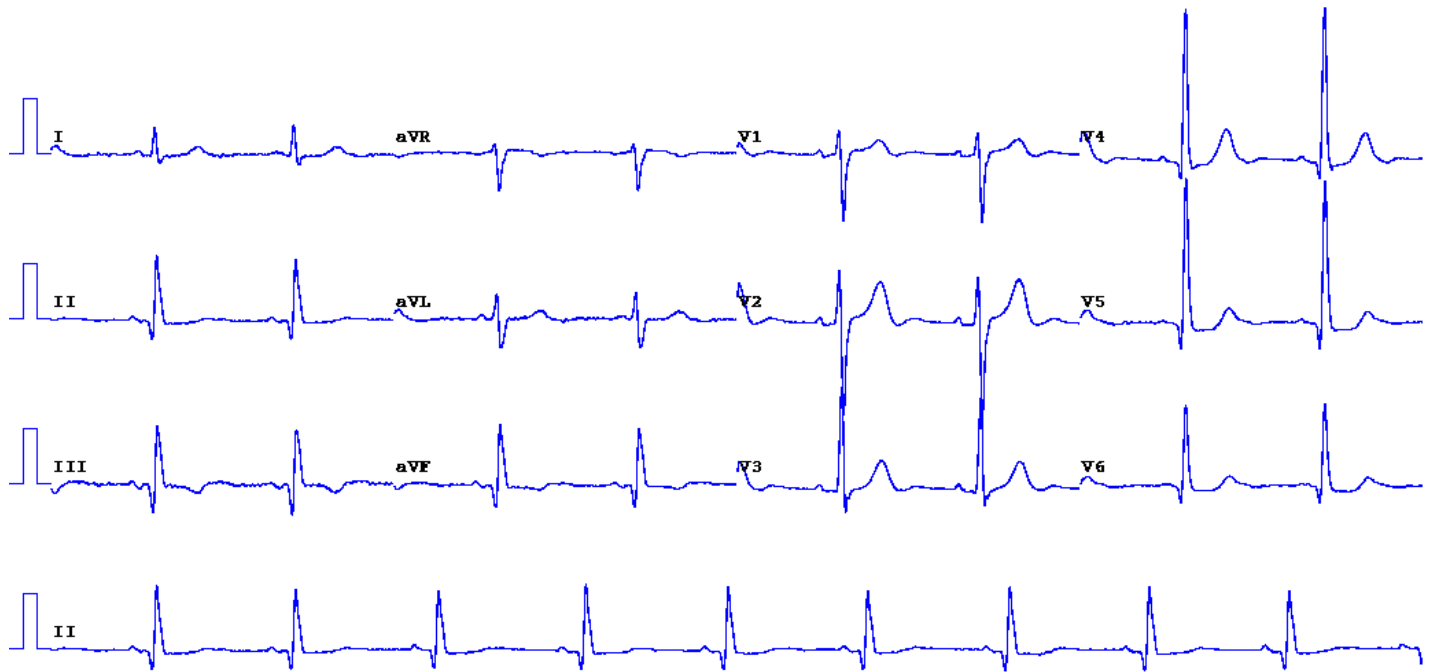
eFigure 47: Patient 24 old inferior MI; the NEP ECG is similar



eFigure 48: Patient 25 inferior MI NEP ECG similar to STD

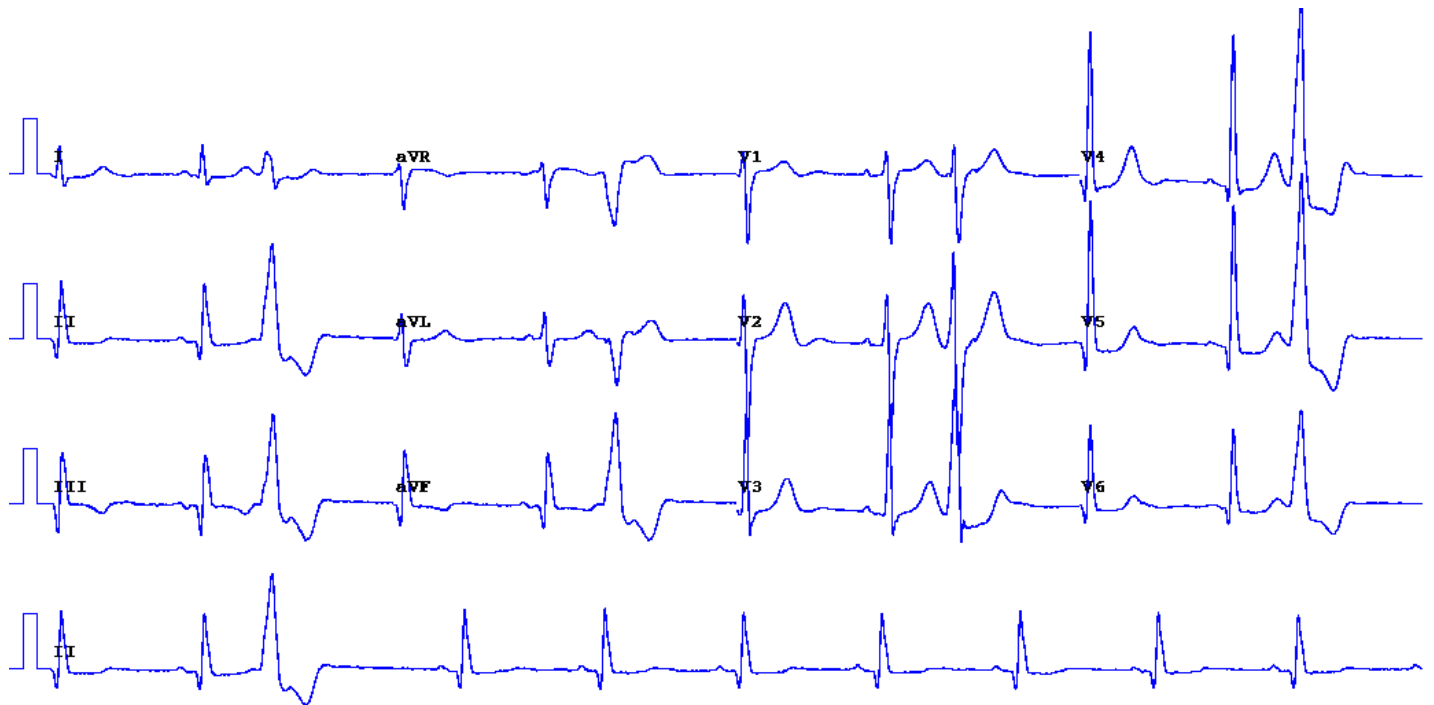


eFigure 49: Patient 25 proven inferior MI STD ECG



25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 50: Patient 26 inferior MI NEP ECG similar to STD



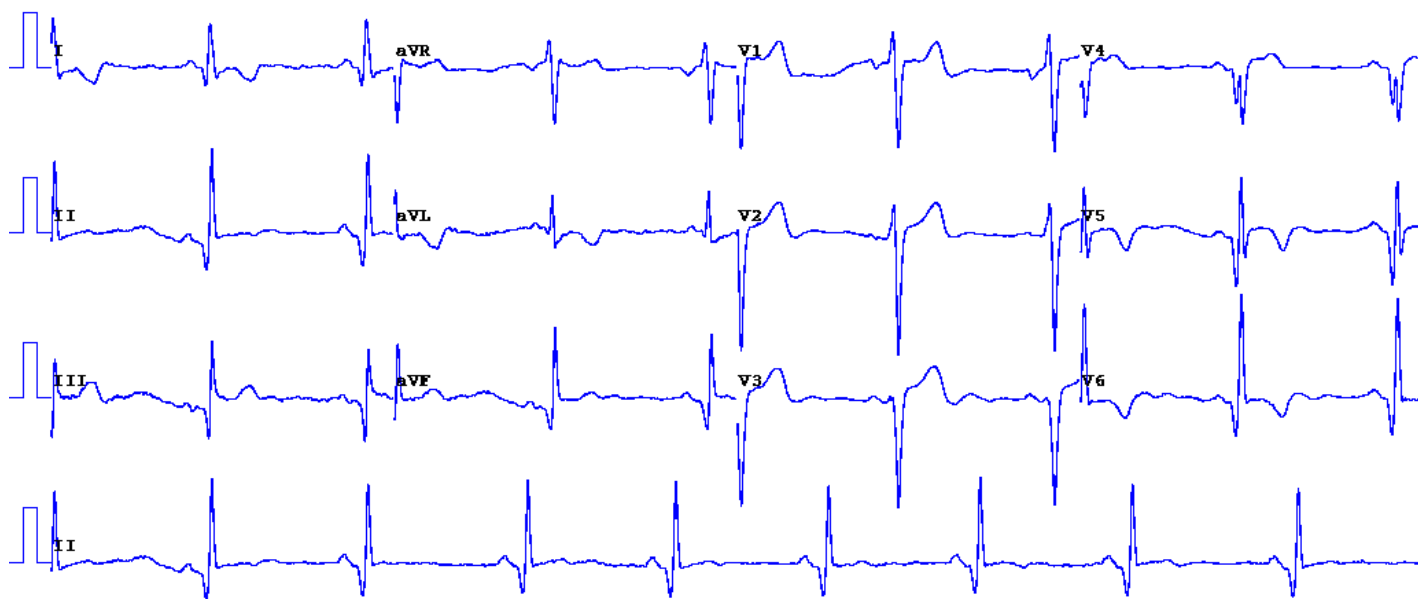
25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 51: Patient 26 proven inferior MI STD ECG



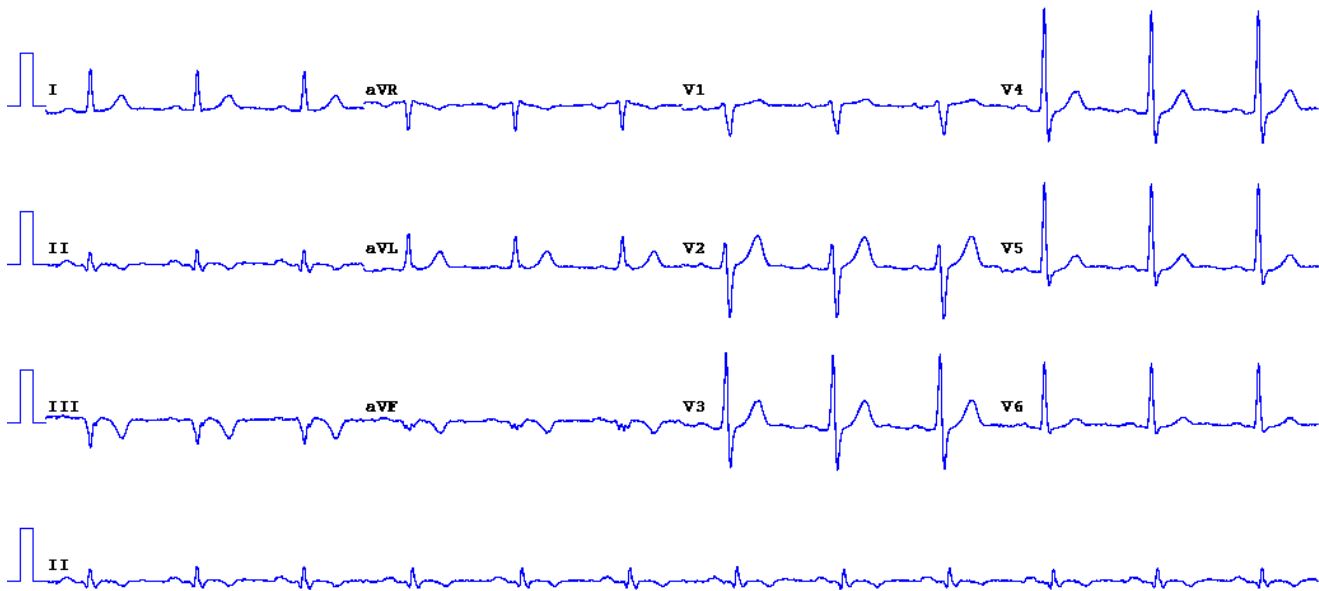
25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 52: Patient 27 old inferior MI STD ECG, note artifacts.



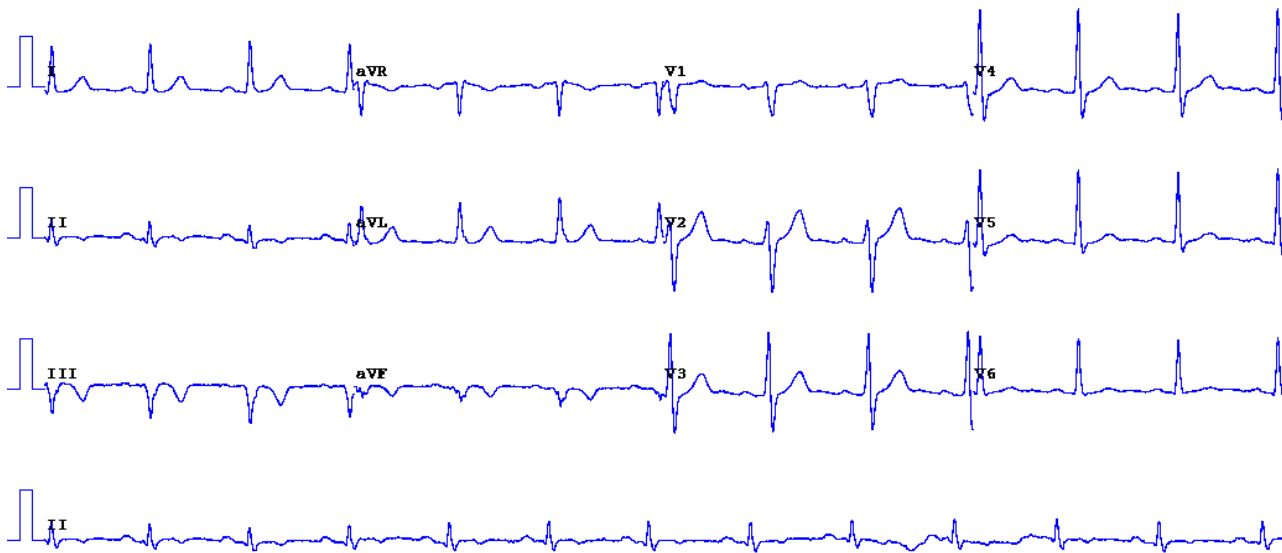
25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 53: Patient 27 old inferior MI NEP ECG , clearing of artifacts.



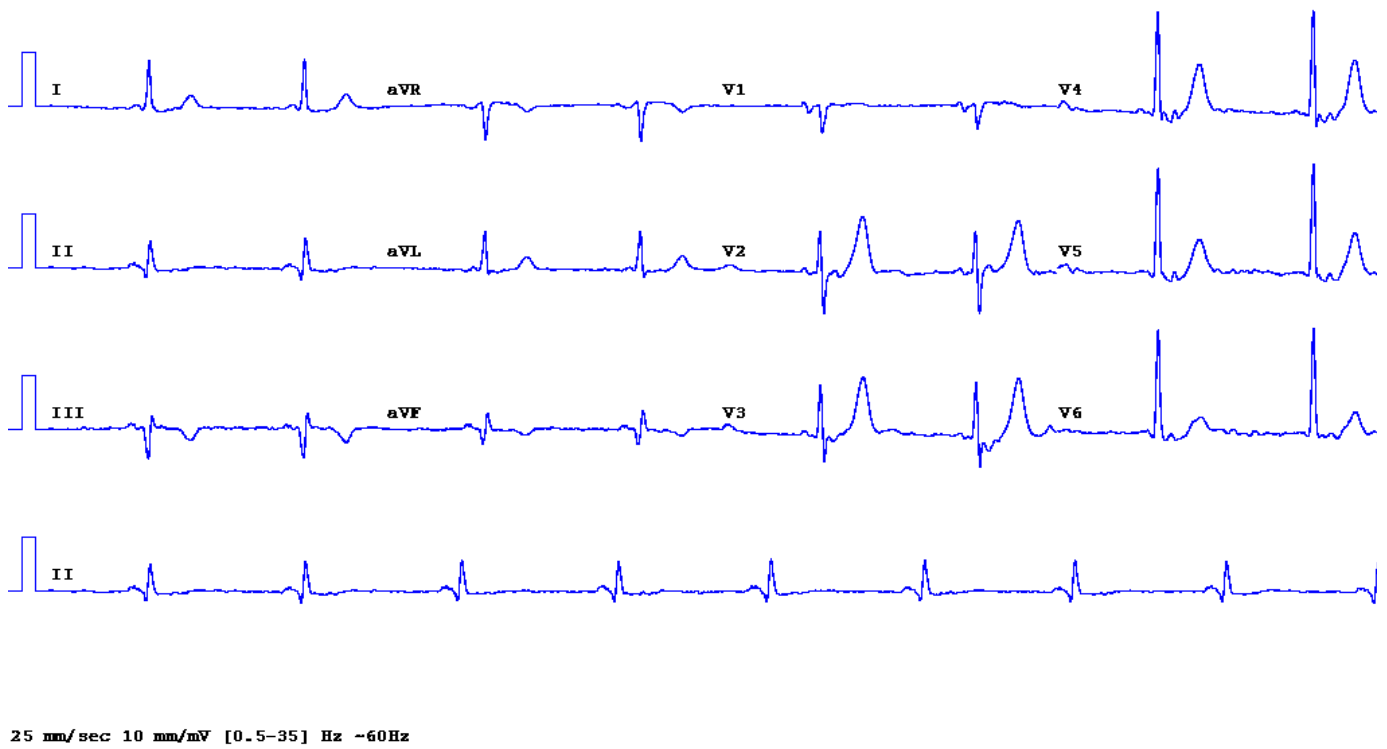
25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 54: Patient 28 proven inferior MI STD ECG

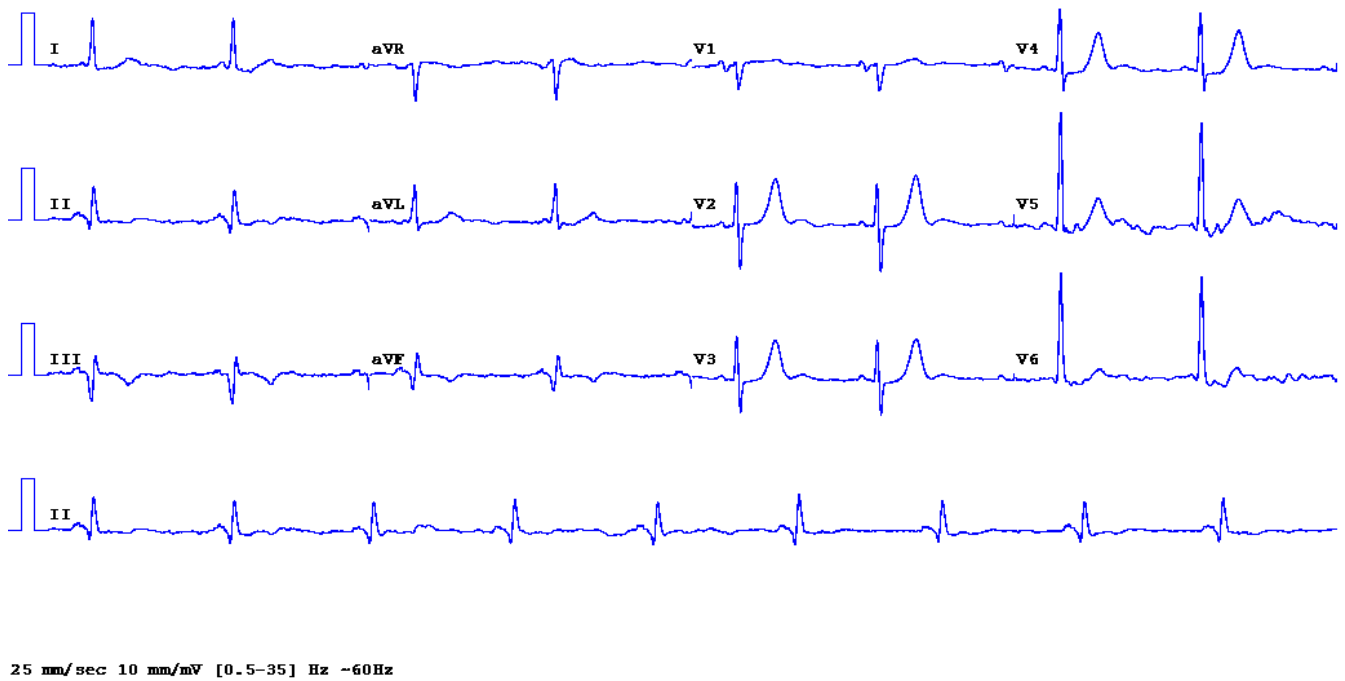


25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

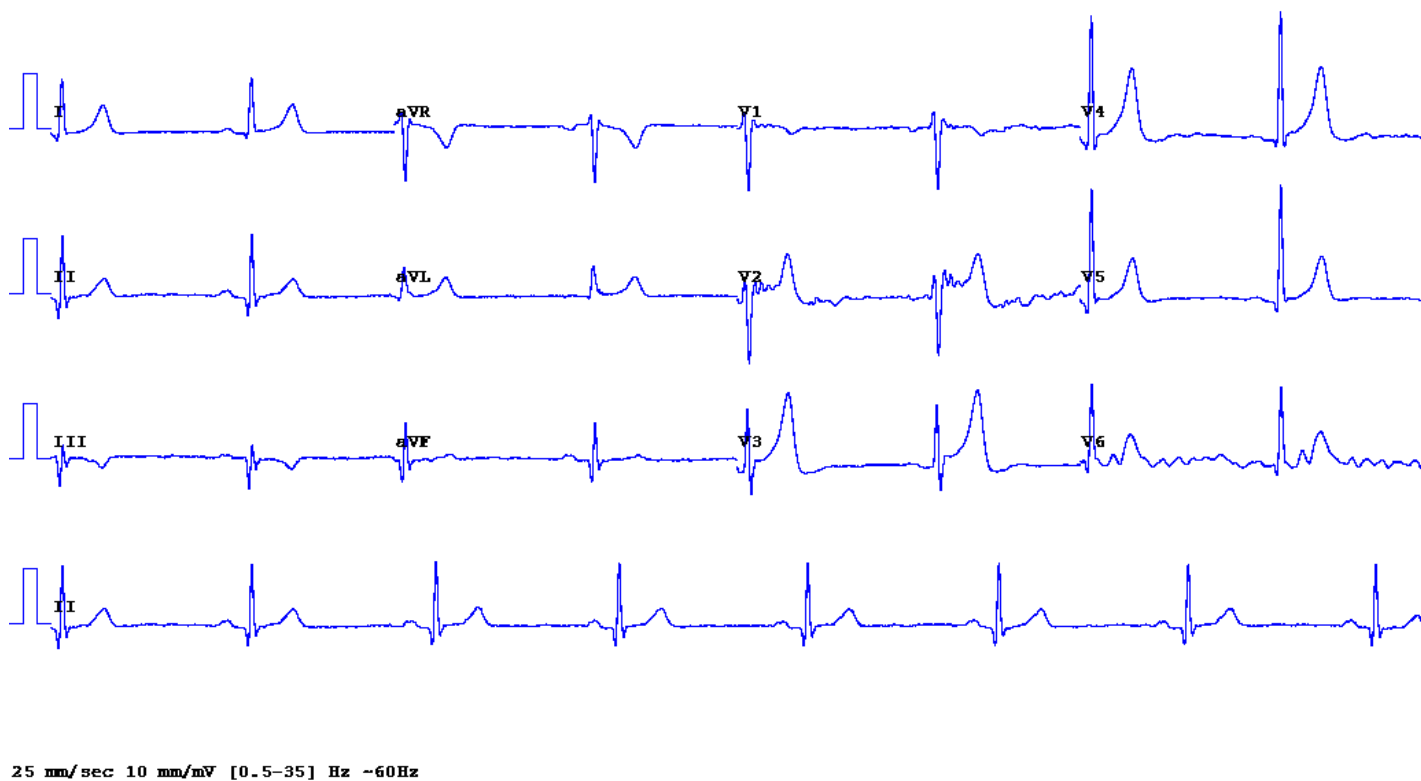
eFigure 55: Patient 28 inferior MI NEP ECG similar to STD



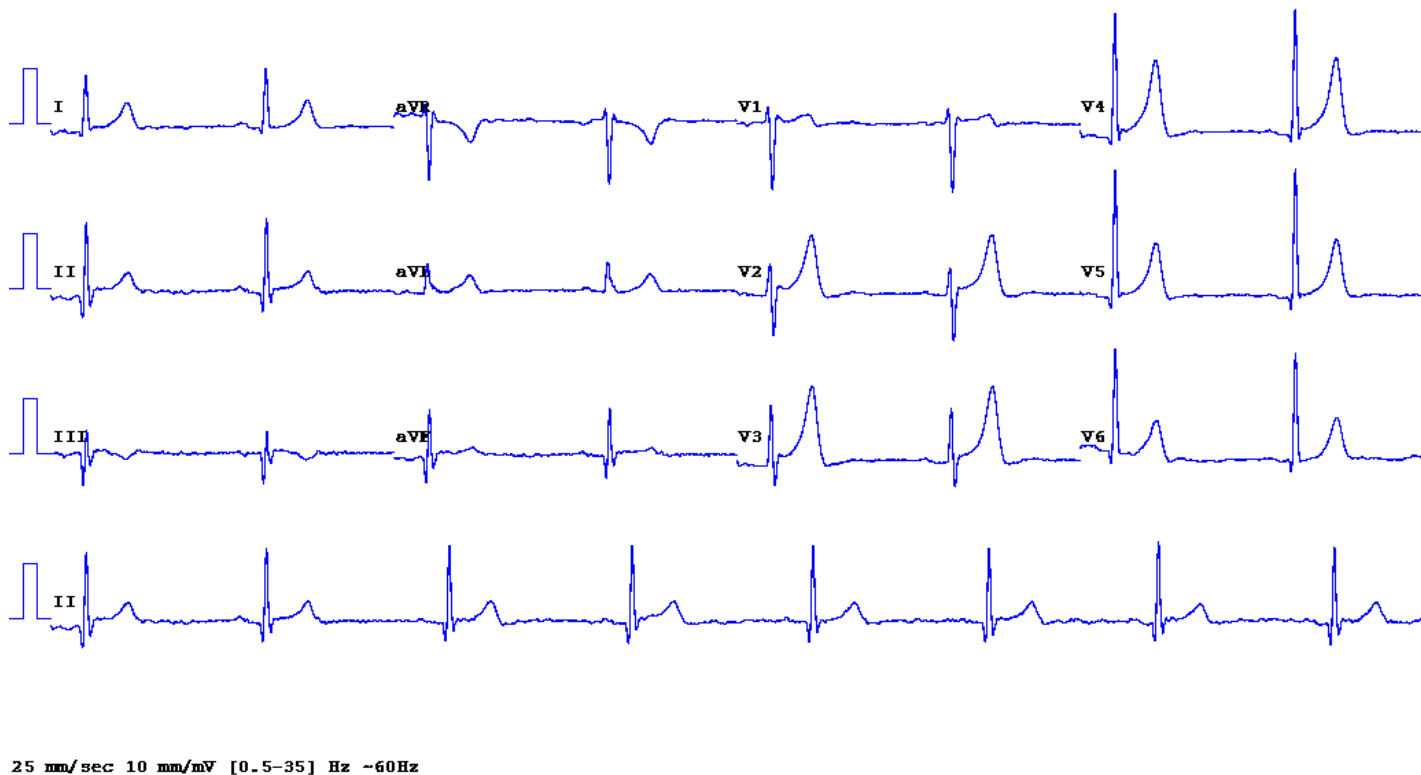
eFigure 56: Patient 29 old inferior MI STD ECG



eFigure 57: Patient 29 old inferior MI; the NEP ECG is virtually identical



eFigure 58: Patient 30 old inferior MI STD ECG; artifacts

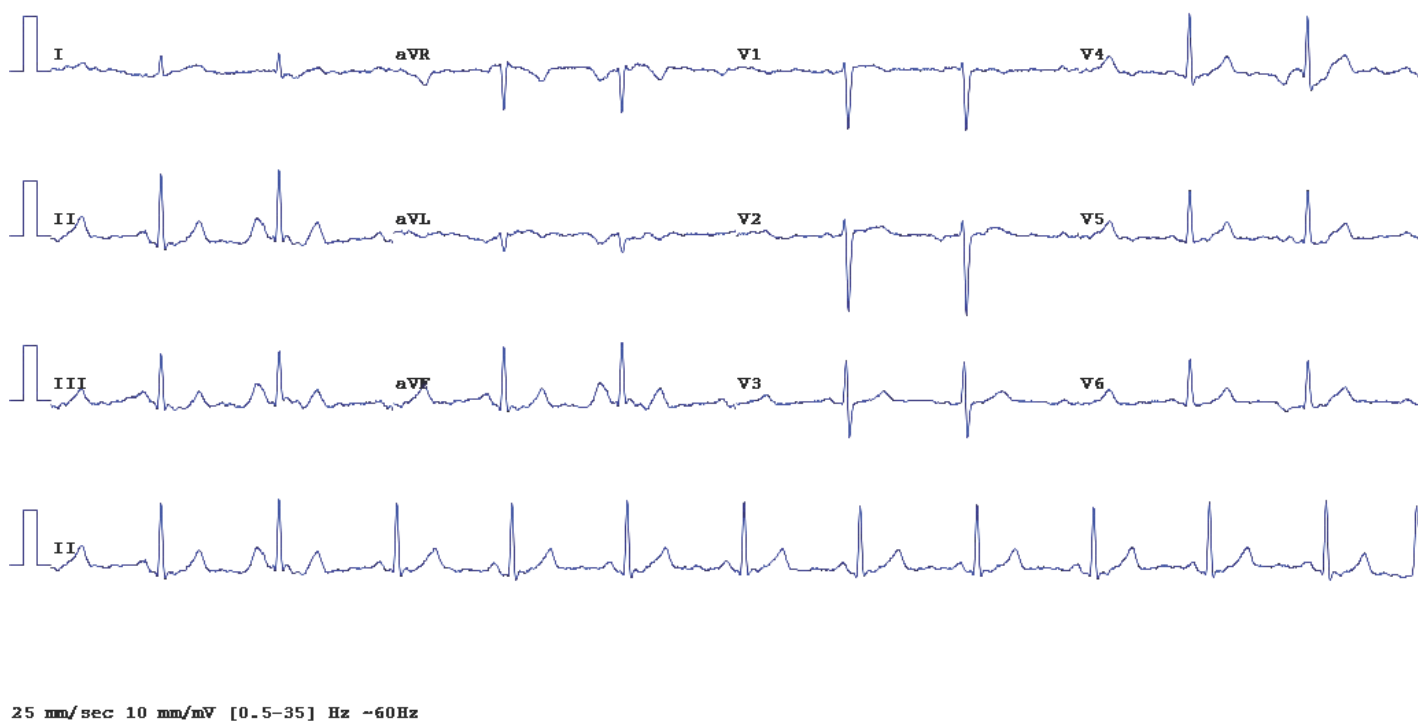


eFigure 59: Patient 30 old inferior MI NEP ECG artifacts V2 , V6 on standard ECG above cleared

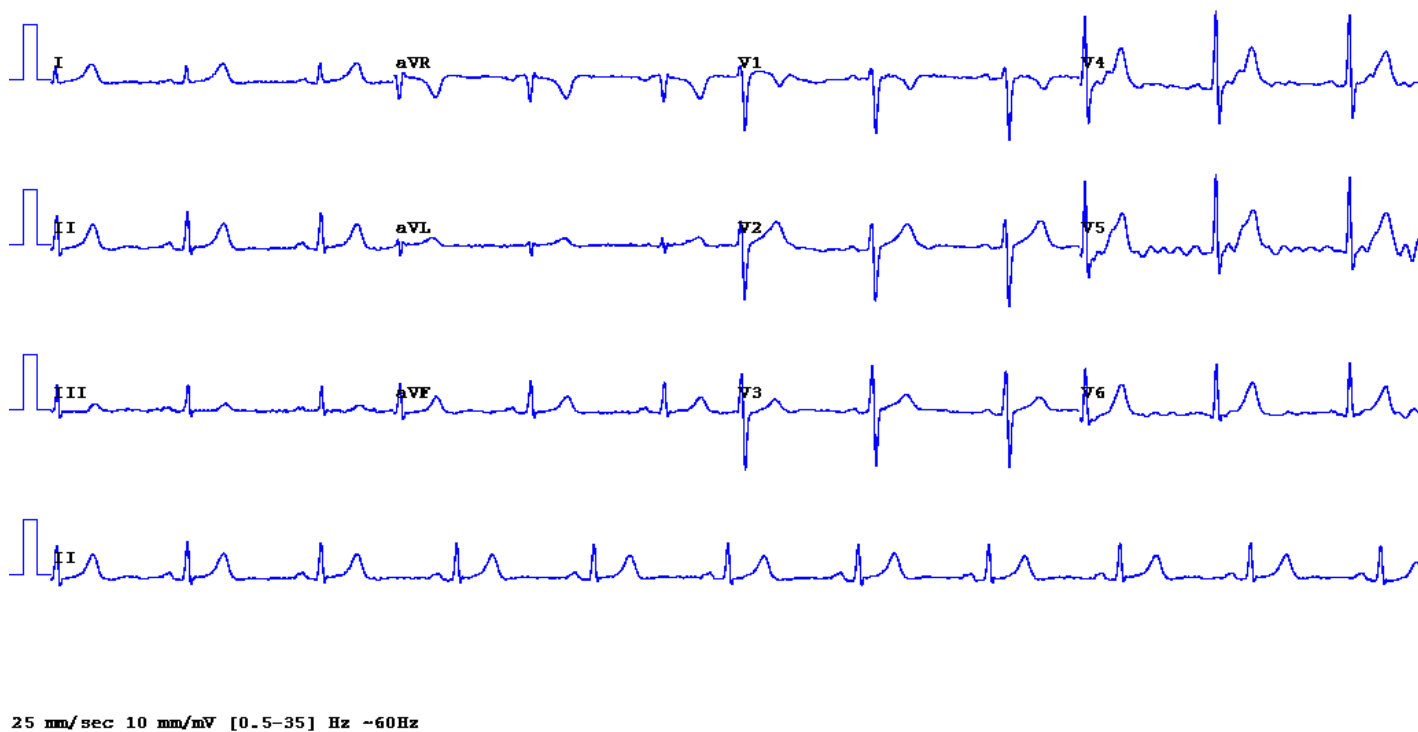
eAppendix 2



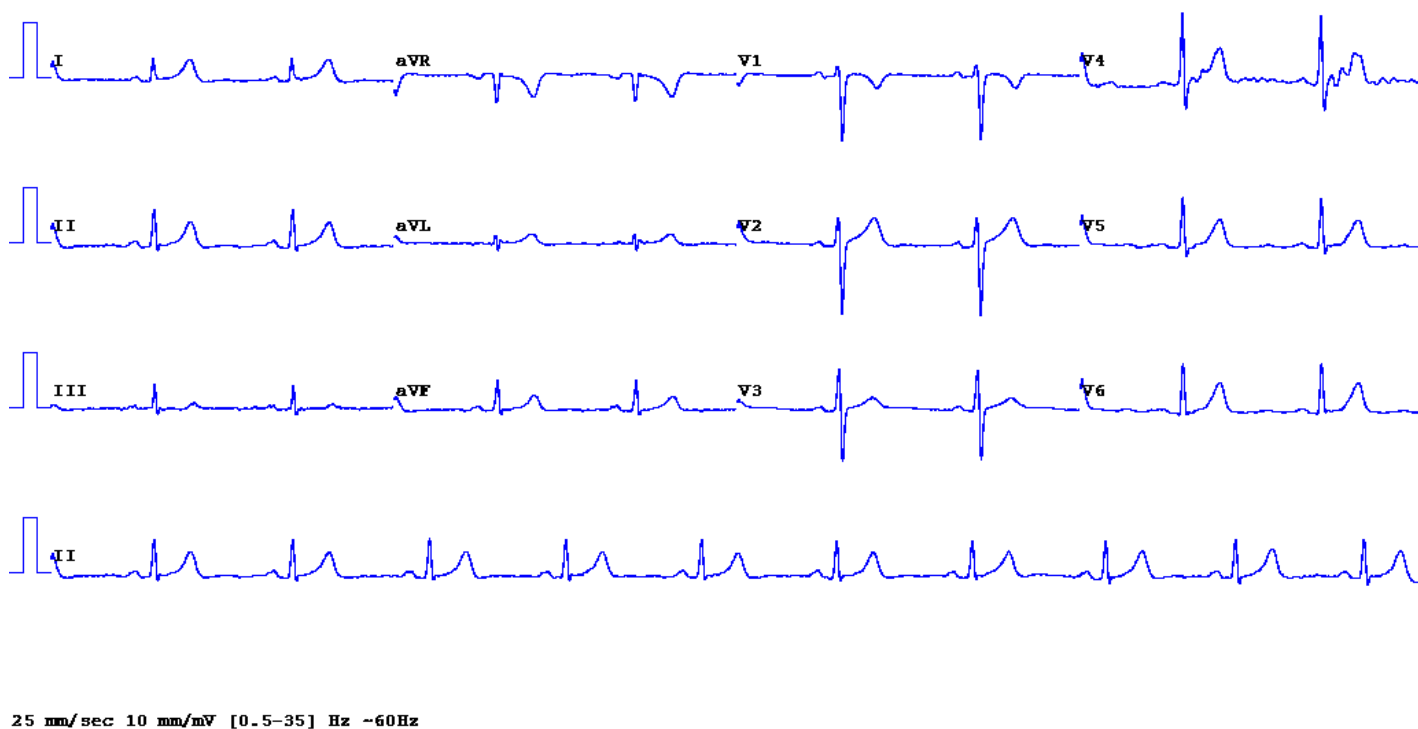
eFigure 1: Patient 01 low R wave amplitude, LEAD 1 AVL; STD ECG



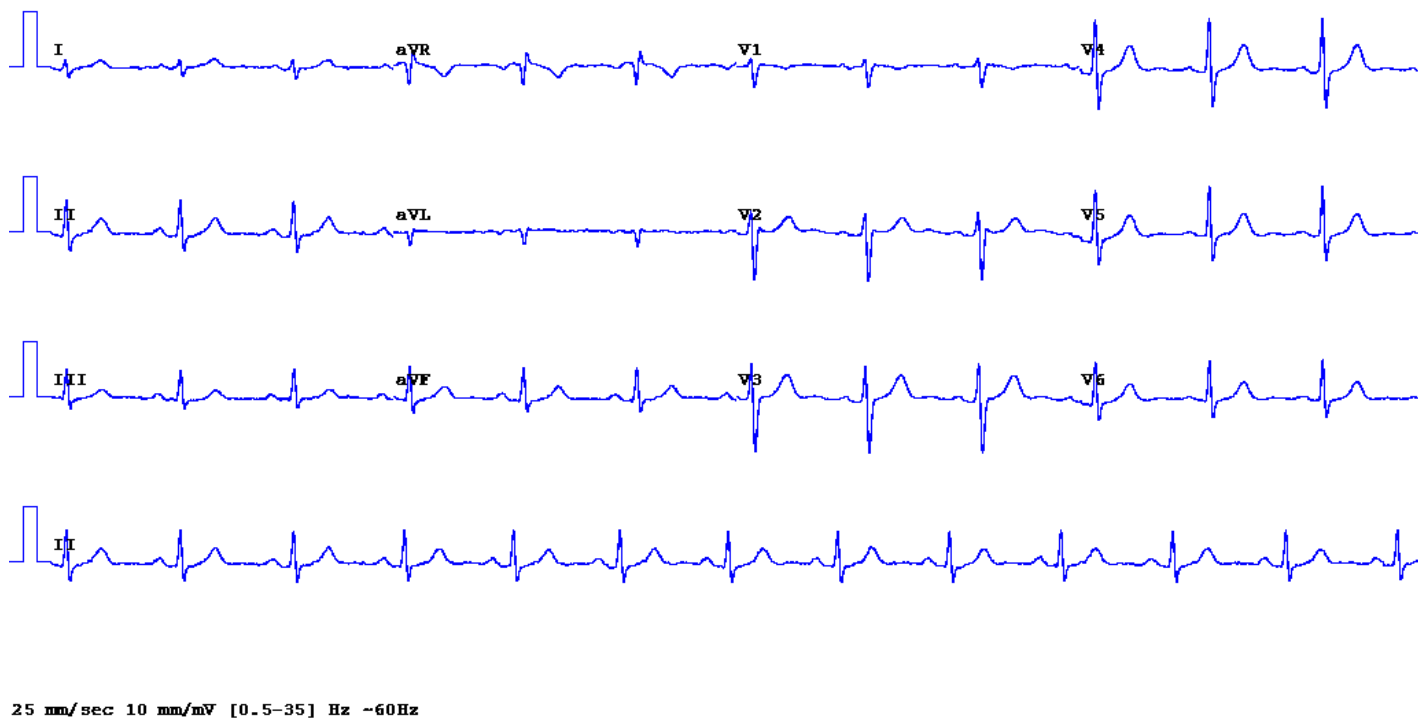
eFigure 2: Patient 01 LEAD 1 AVL NEP ECG R wave amplitude is similar to STD ECG



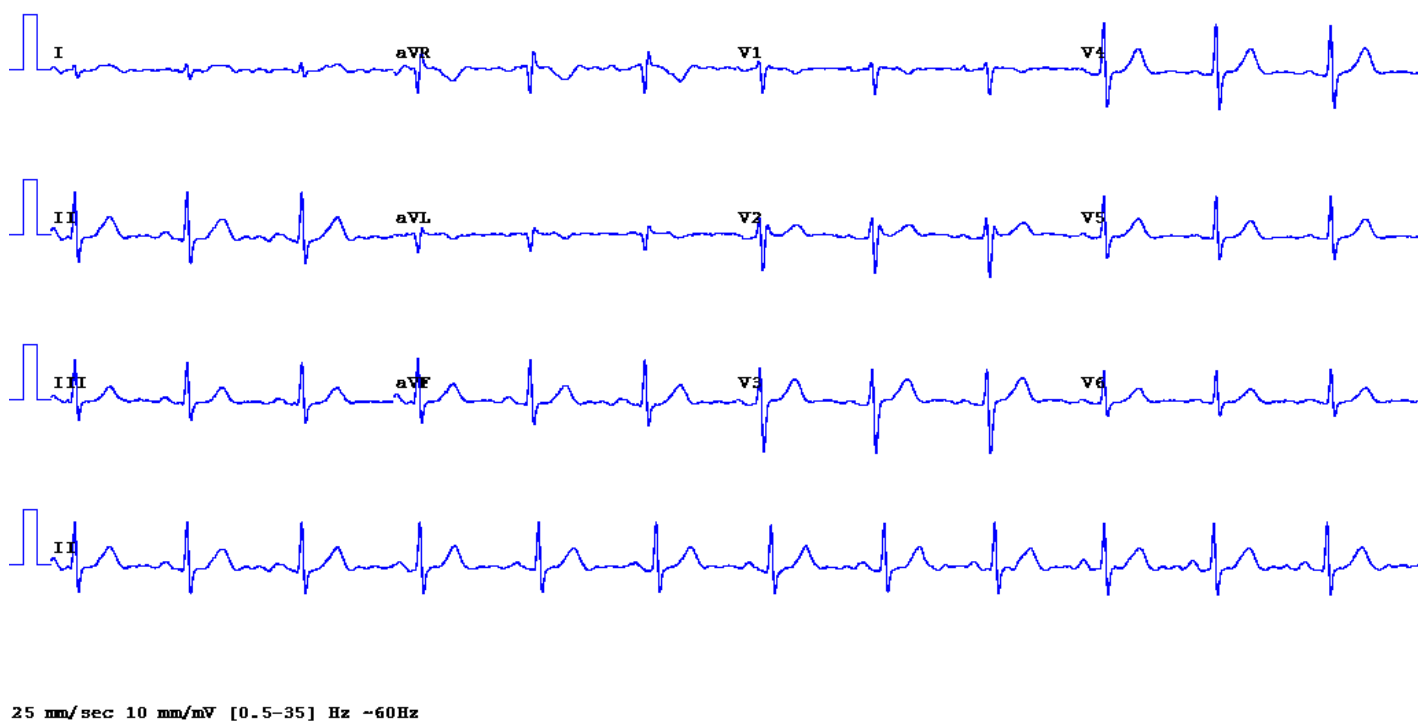
eFigure 3: Patient 02; Low R wave amplitude, lead 1 AVL; STD ECG.



eFigure 4: Patient 02 LEAD 1 AVL NEP ECG, R wave amplitude in leads 1, aVL and other leads is similar to the STD ECG



eFigure 5: Patient 03 STD ECG: very low R wave amplitude leads 1 avl

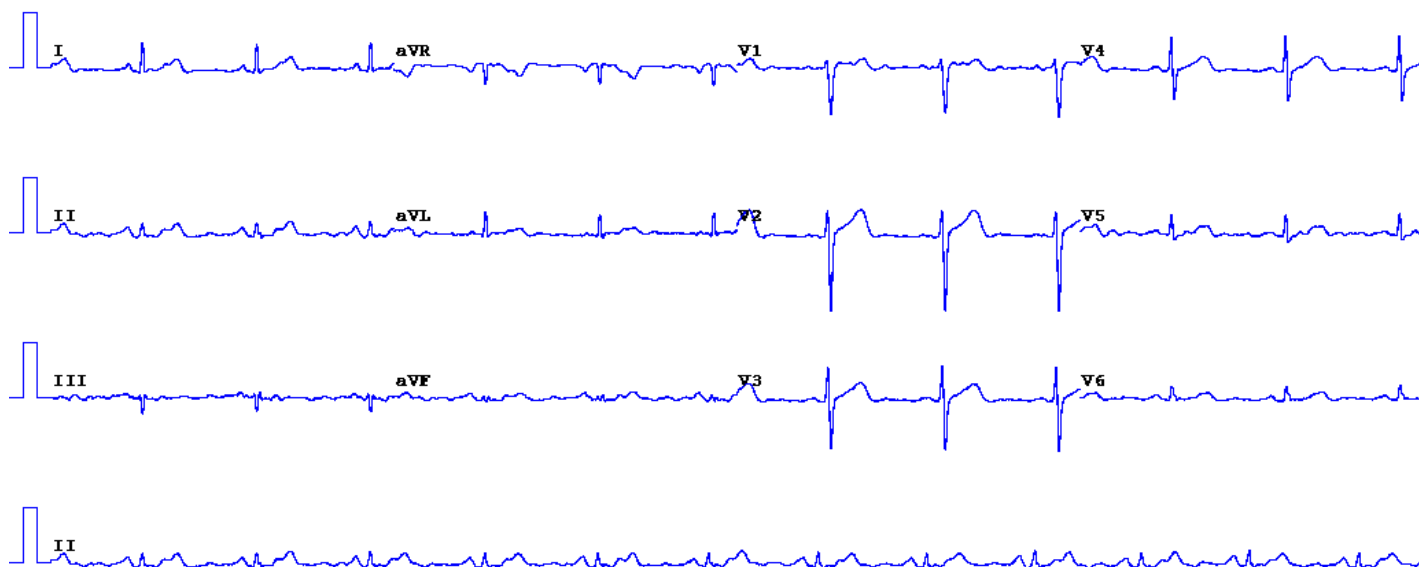


eFigure 6: Patient 03 Lead 1 AVL NEP ECG no change in very low R Wave amplitude compared with STD; no conversion to QS pattern.



25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 7: Patient 04 LEAD 1 AVL STD ECG



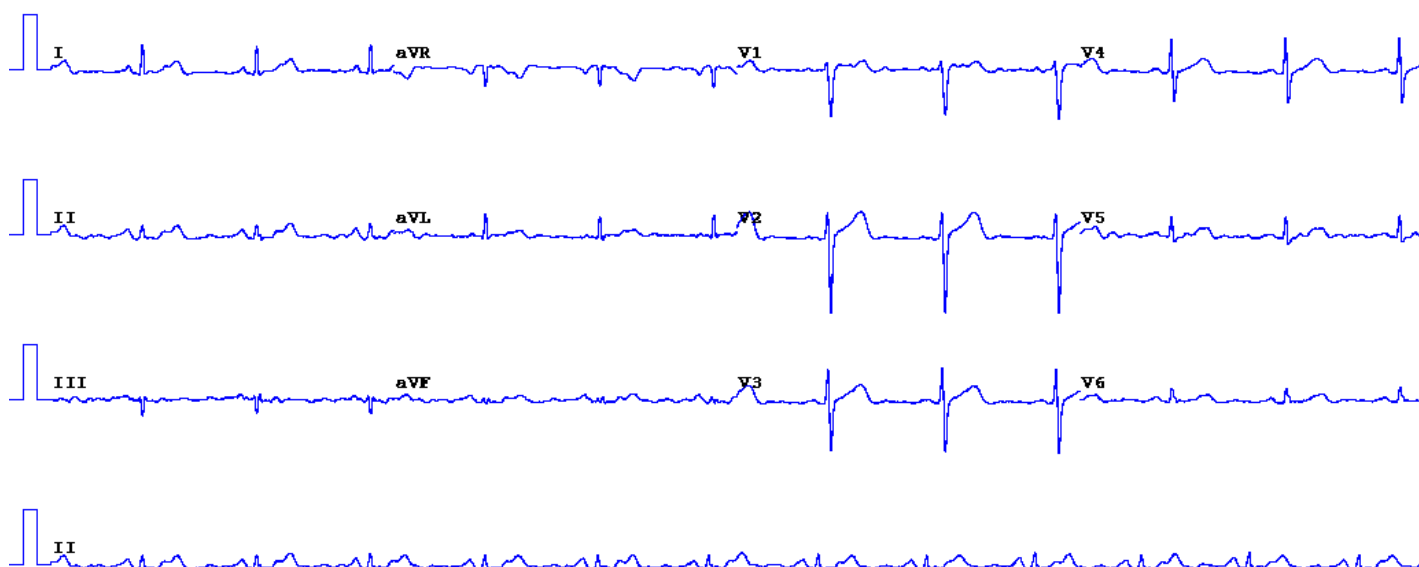
25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 8: Patient 04 LEAD 1 AVL NEP ECG similar



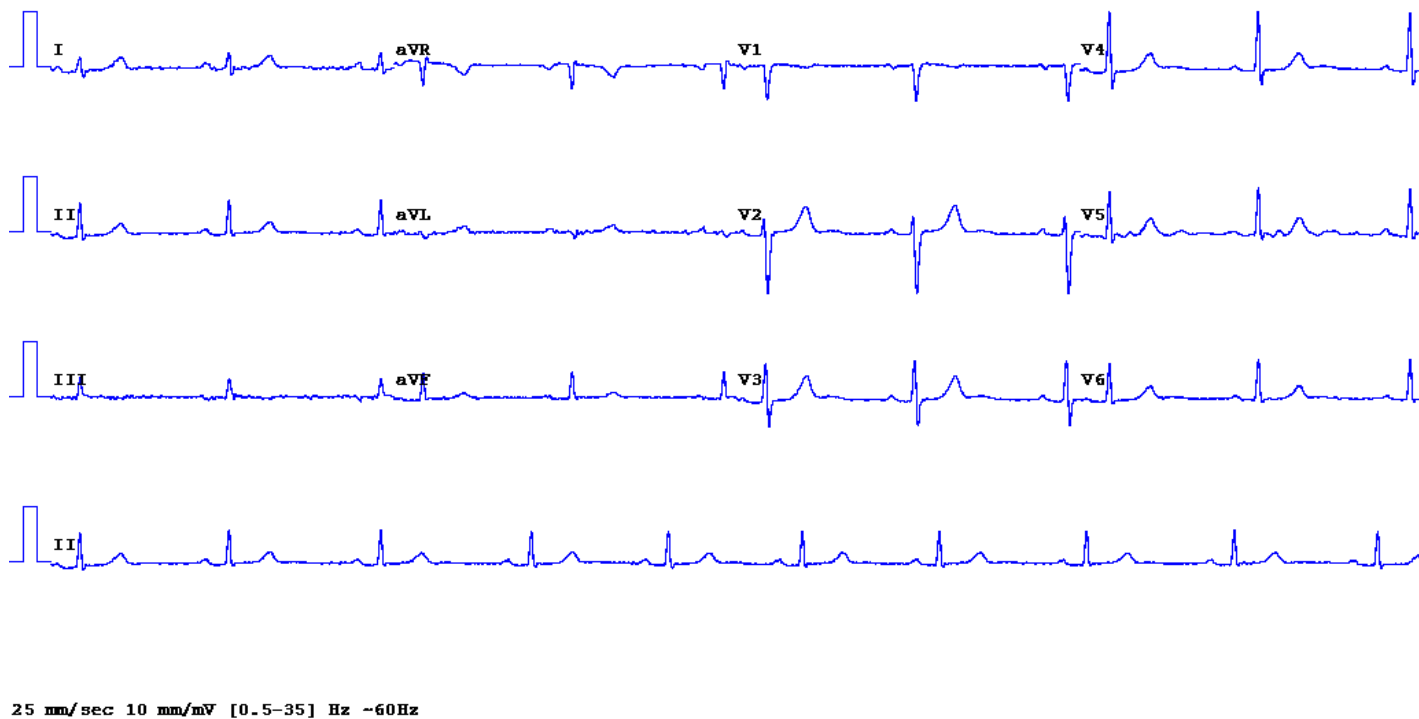
25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 9: Patient 05 LEAD 1 AVL STD ECG

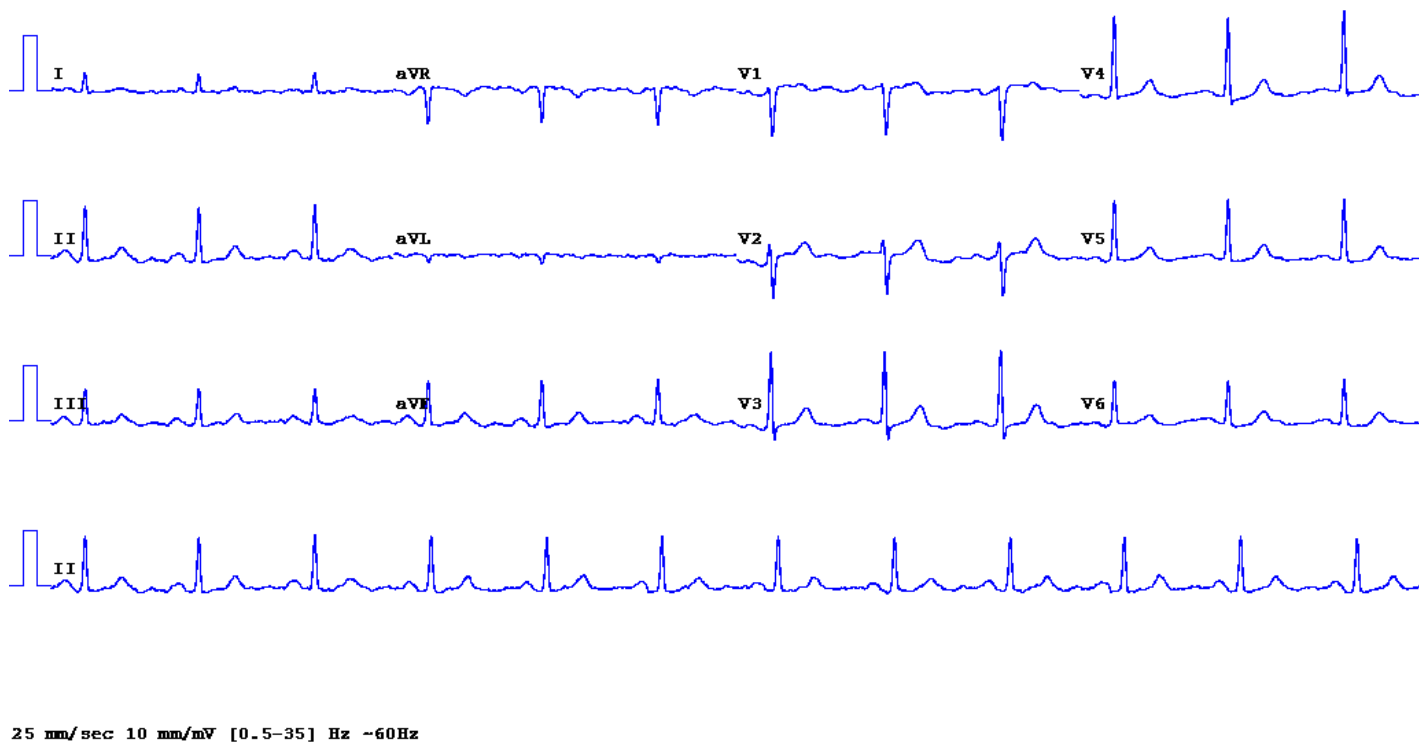


25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

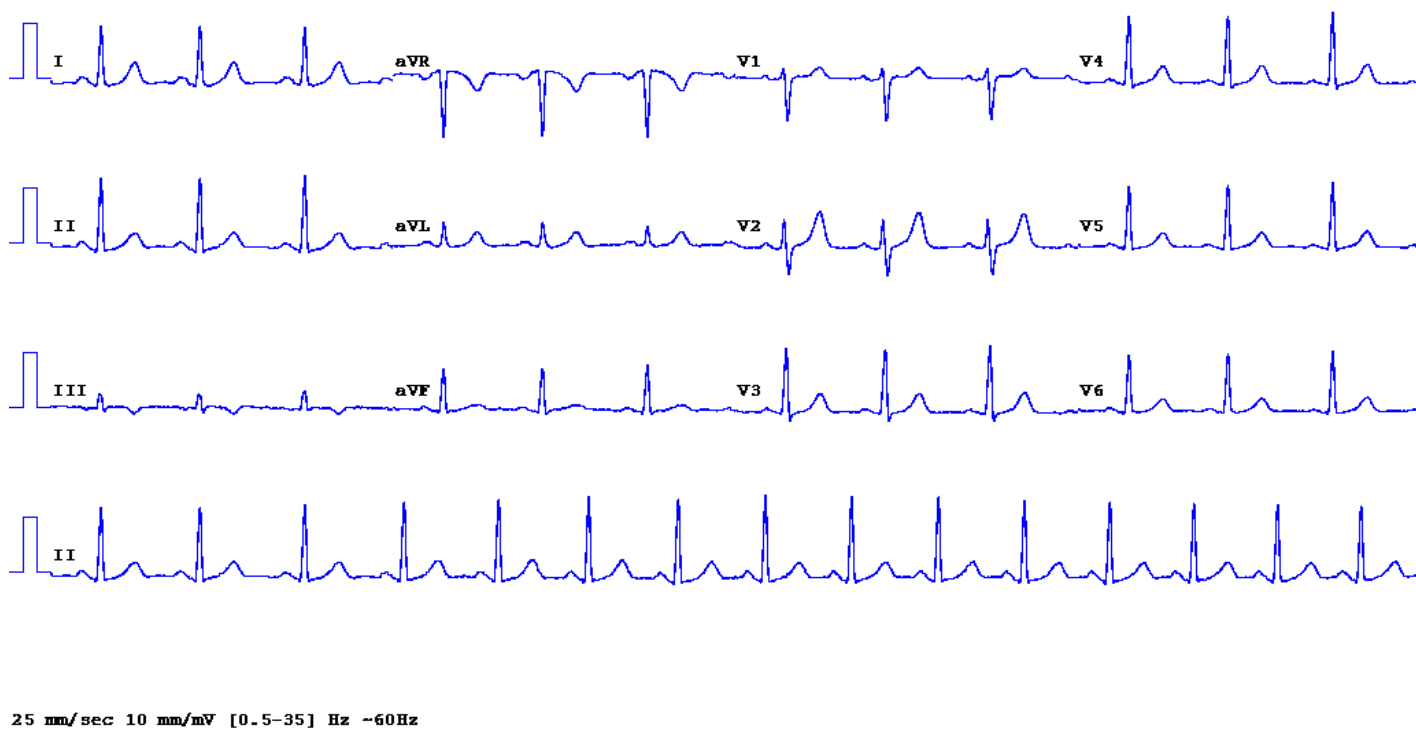
eFigure 10: Patient 05 LEAD 1 AVL NEP ECG R wave amplitude in all leads are similar to STD



eFigure 11: Patient 06 LEAD 1 AVL STD ECG; very low amplitude R waves 1 and aVL



eFigure 12: Patient 06 LEAD 1 AVL NEP ECG R wave amplitude in all 12 leads similar to STD



eFigure 13: Patient 07 LEAD 1 AVL NEP ECG all R waves similar to STD ECG



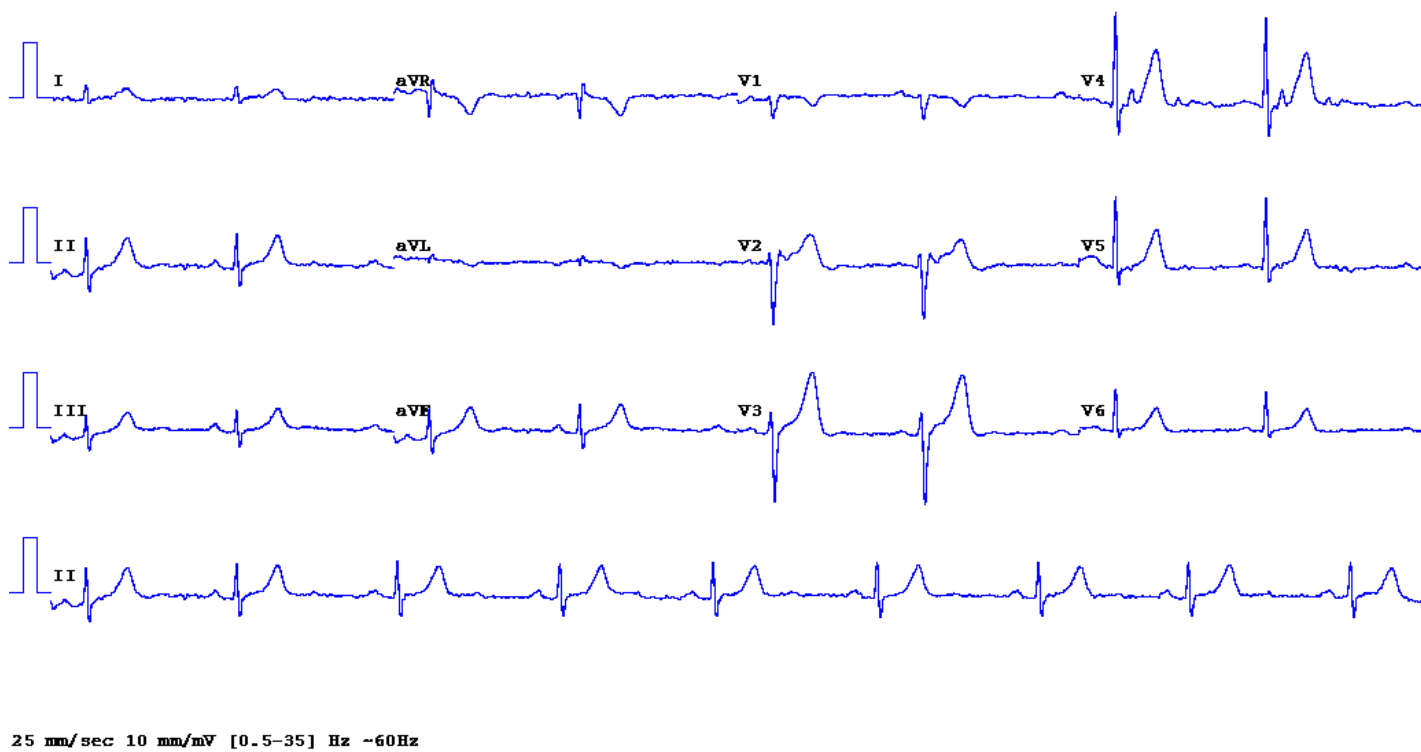
eFigure 14: Patient 07 LEAD 1 AVL STD ECG



eFigure 15: Patient 08 LEAD 1 AVL STD ECG



eFigure 16: Patient 08 LEAD 1 AVL NEP ECG , R waves similar to STD



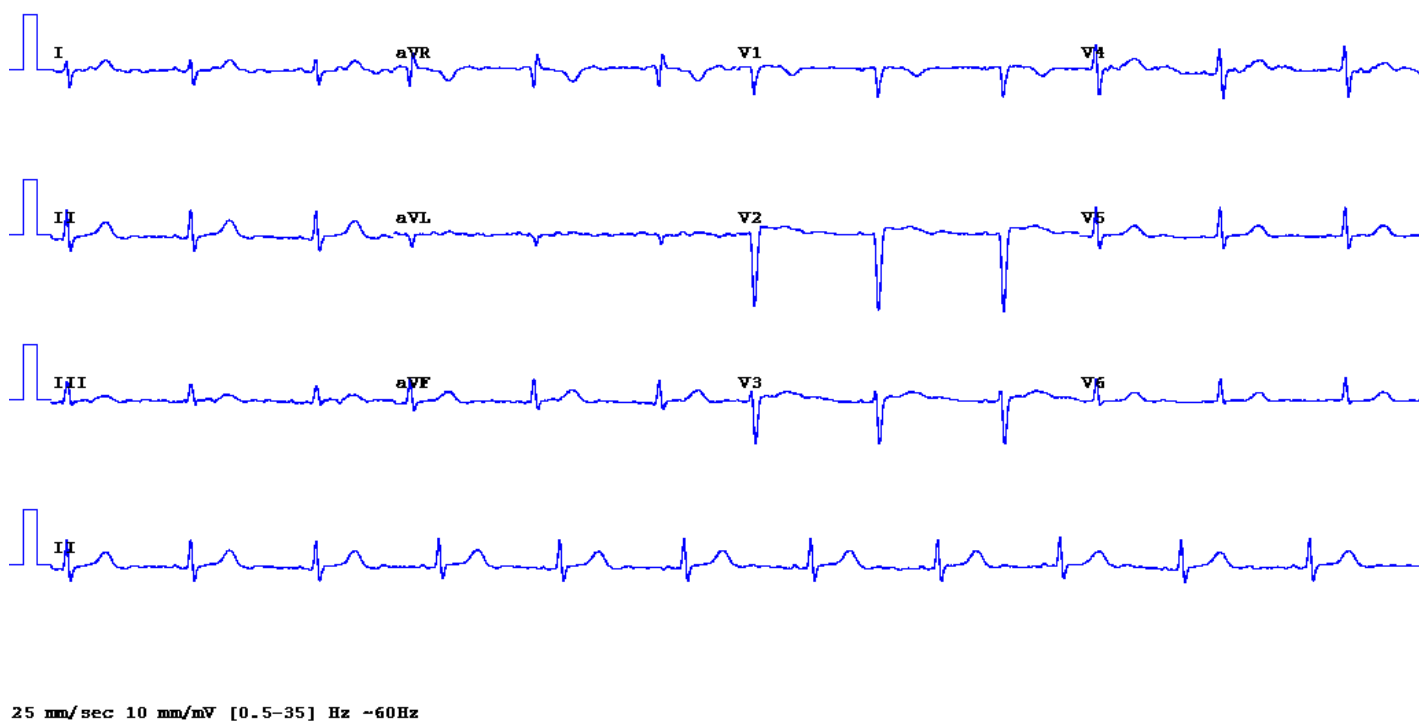
eFigure 17: Patient 09 LEAD 1 AVL STD ECG



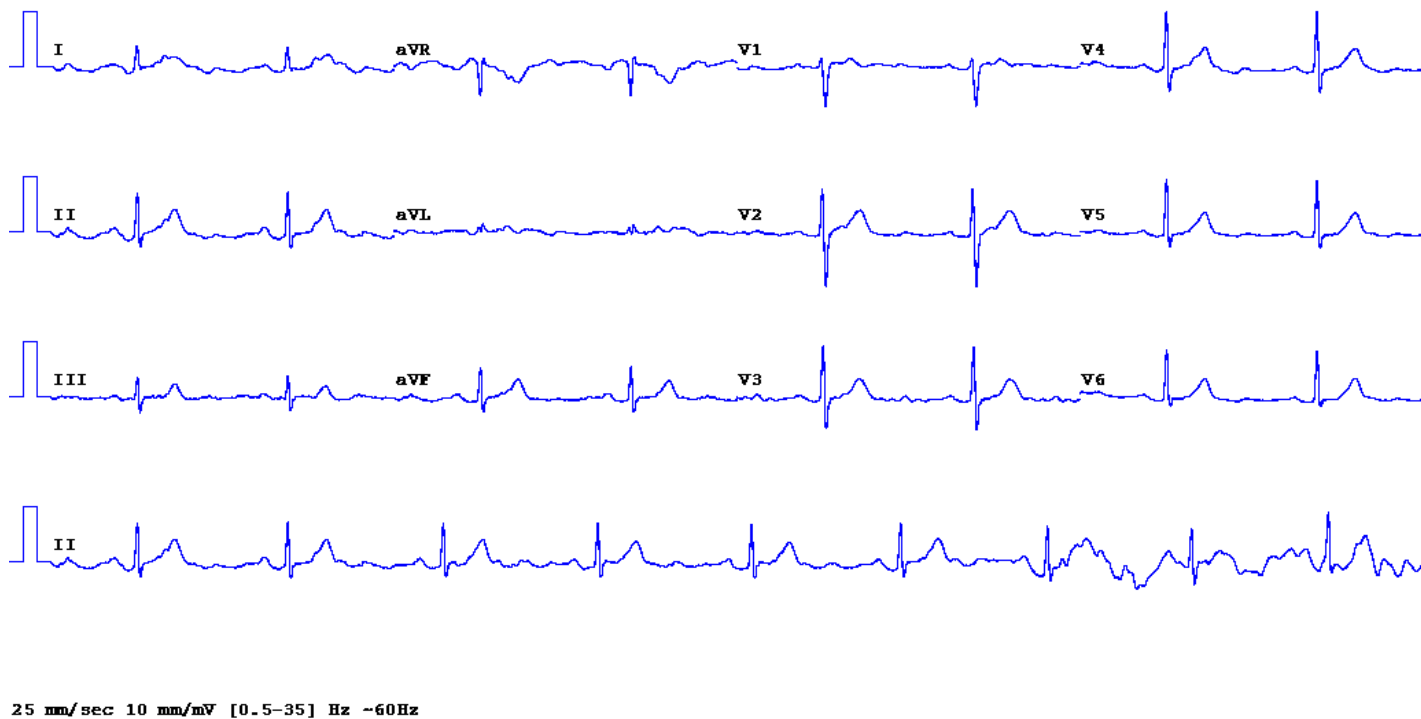
eFigure 18: Patient 09 LEAD 1 AVL NEP ECG similar



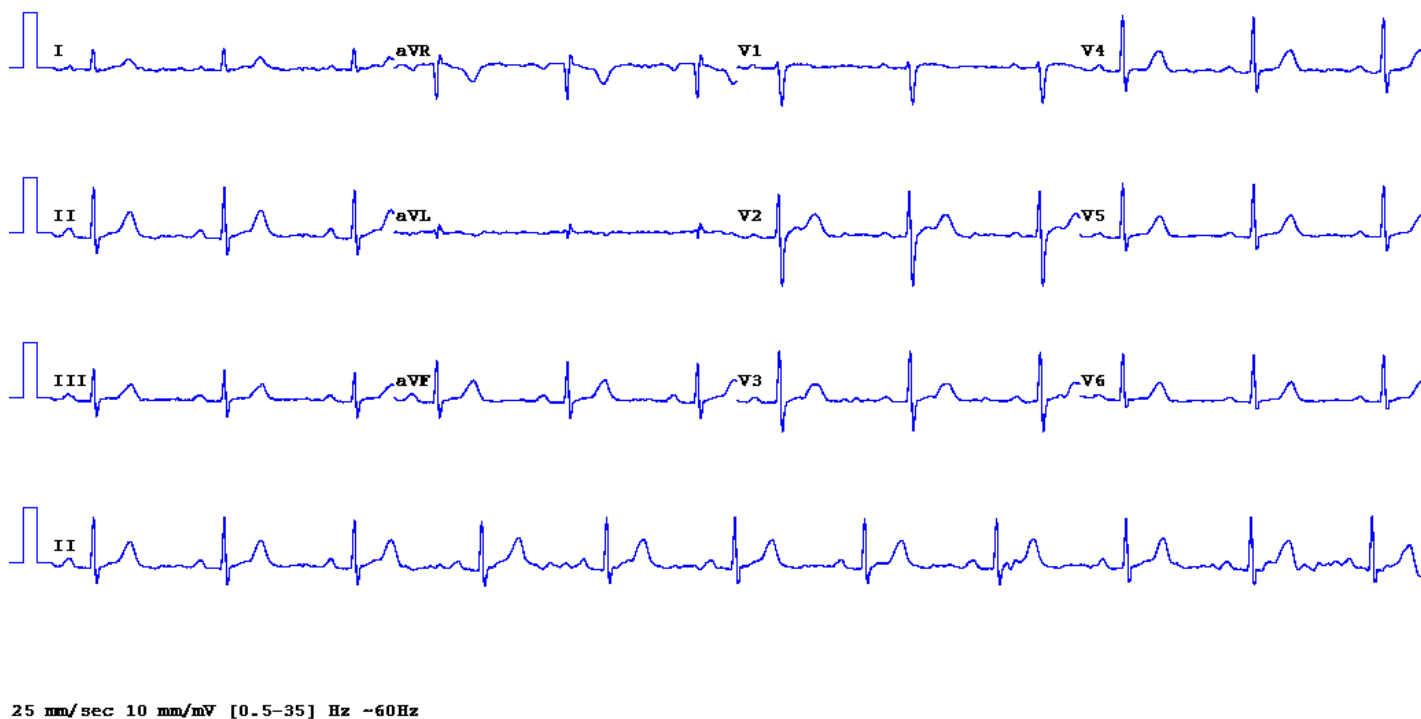
eFigure 19: Patient 10 LEAD 1 AVL STD ECG



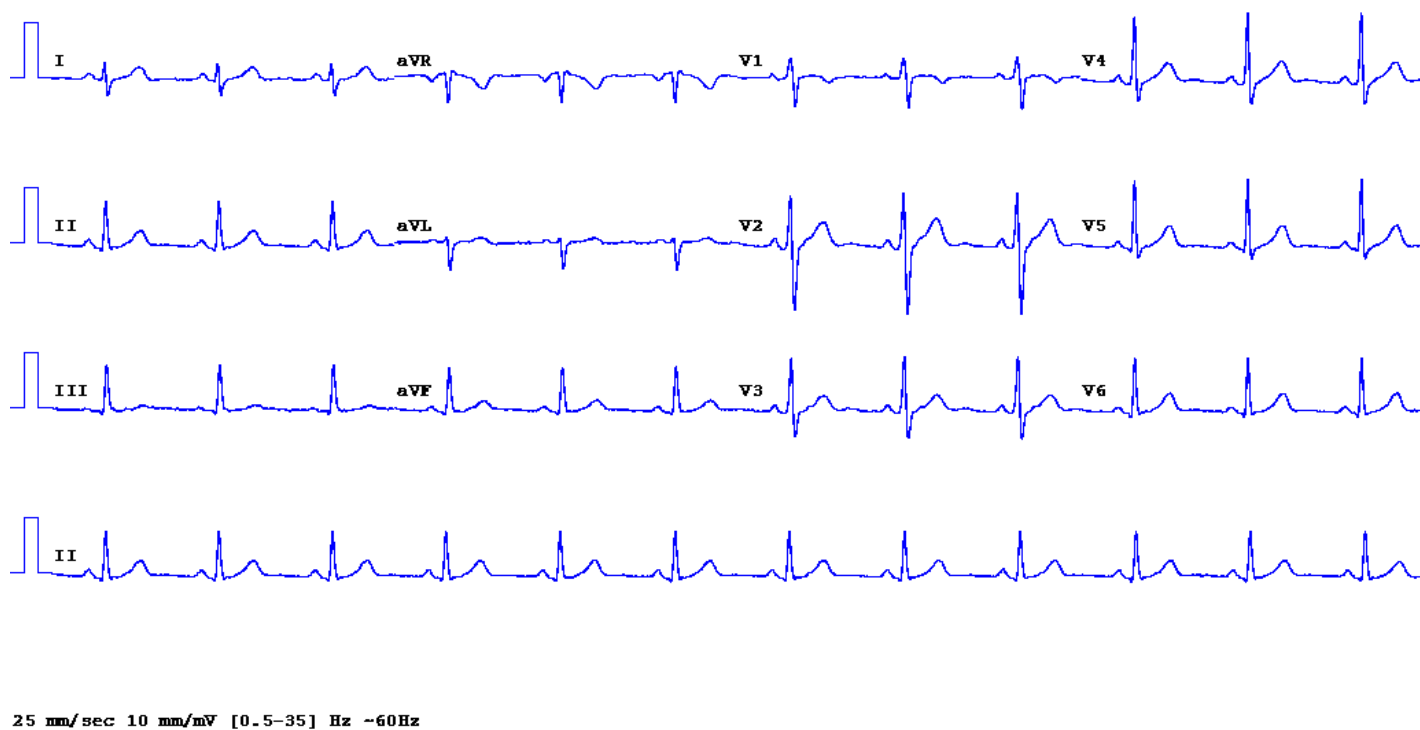
eFigure 20: Patient 10 LEAD 1 AVL NEP ECG similar R waves



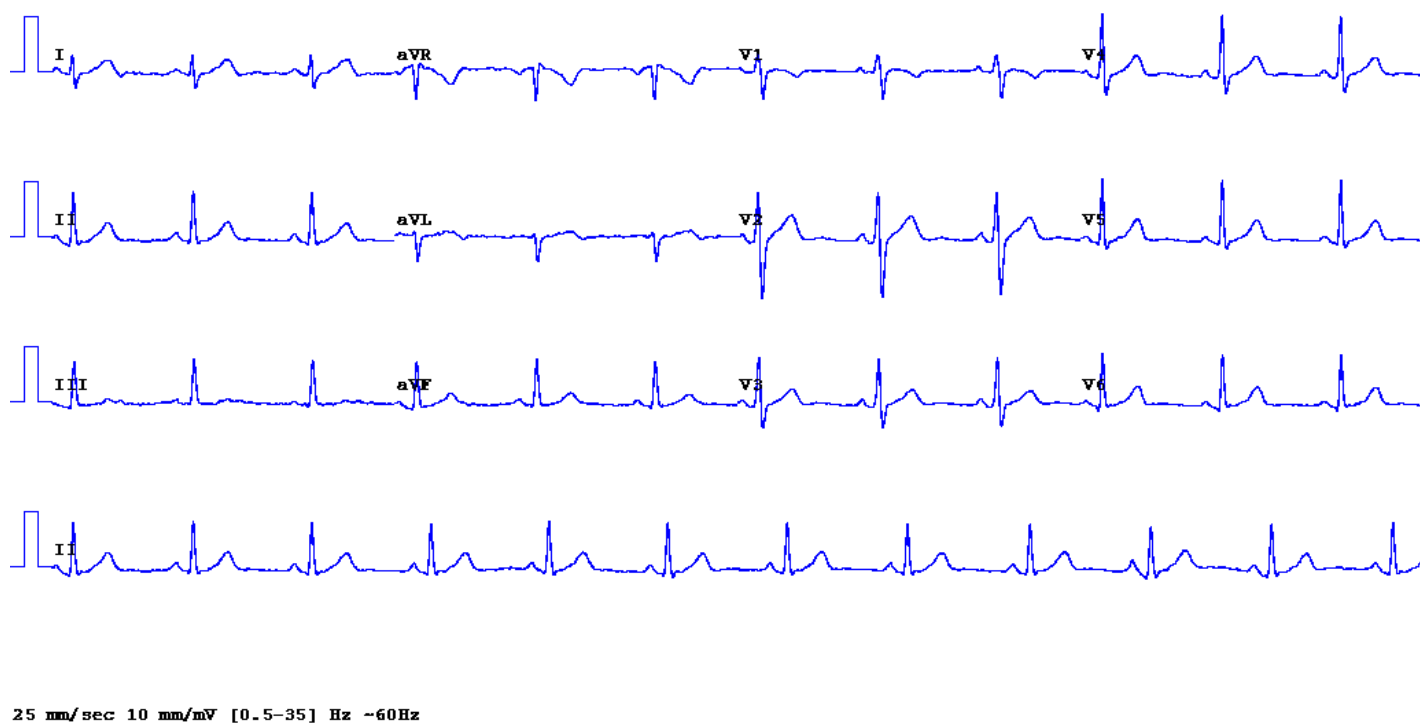
eFigure 21: Patient 11 LEAD 1 AVL STD ECG



eFigure 22: Patient 11 LEAD 1 AVL NEP ECG all R waves amplitude similar to STD



eFigure 23: Patient 12 LEAD 1 AVL STD ECG



eFigure 24: Patient 12 LEAD 1 AVL NEP ECG virtually identical.



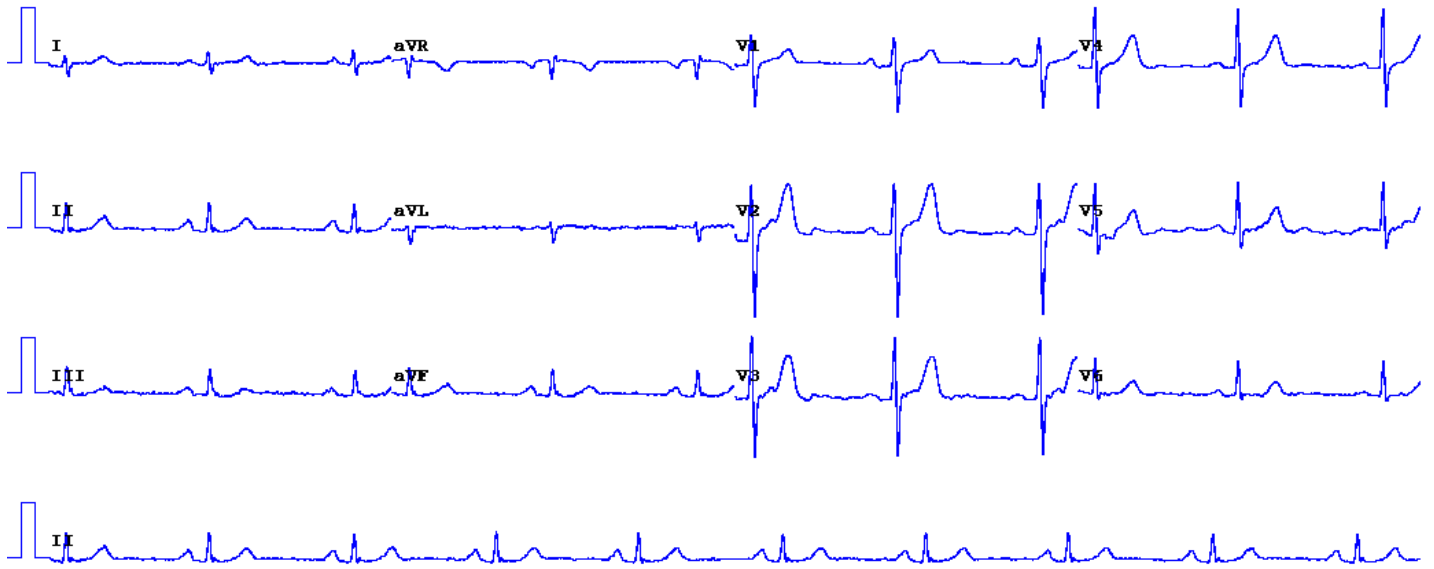
25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 25: Patient 13 LEAD 1 AVL STD ECG



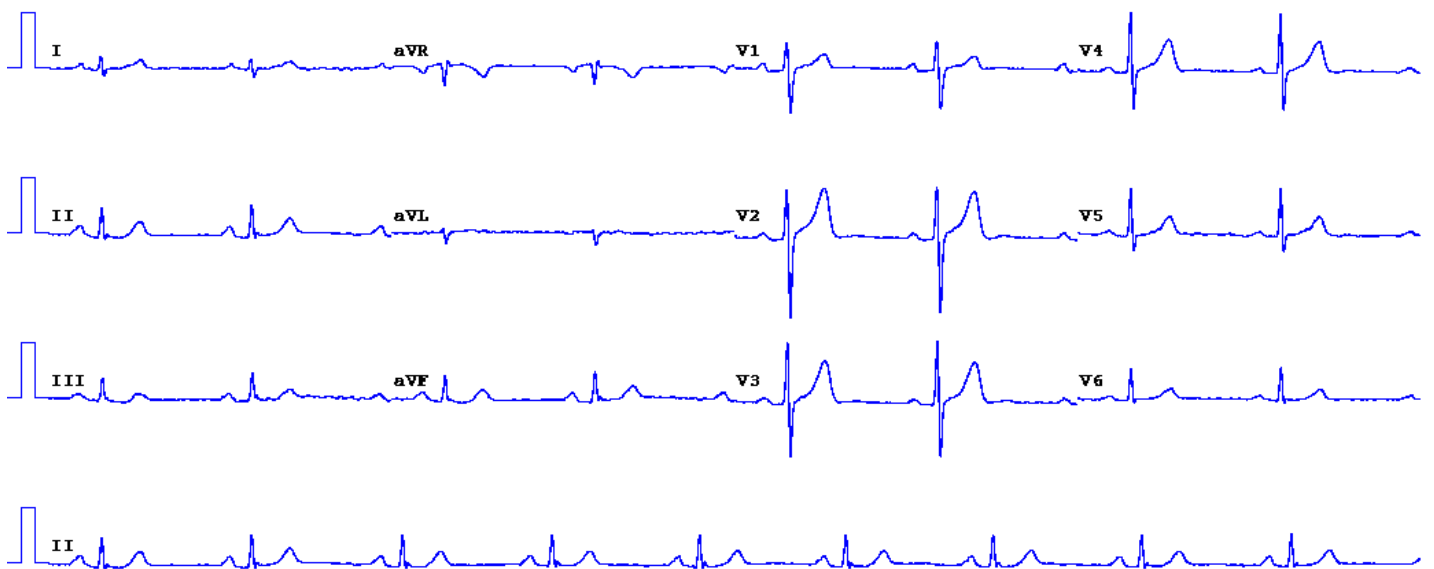
25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 26: Patient 13 LEAD 1 AVL NEP ECG R wave amplitude in inferior and other leads similar to STD



25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 27: Patient 14 LEAD 1 AVL STD ECG; very low R waves.



25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 28: Patient 14 LEAD 1 AVL NEP ECG similar; no QS emerged.



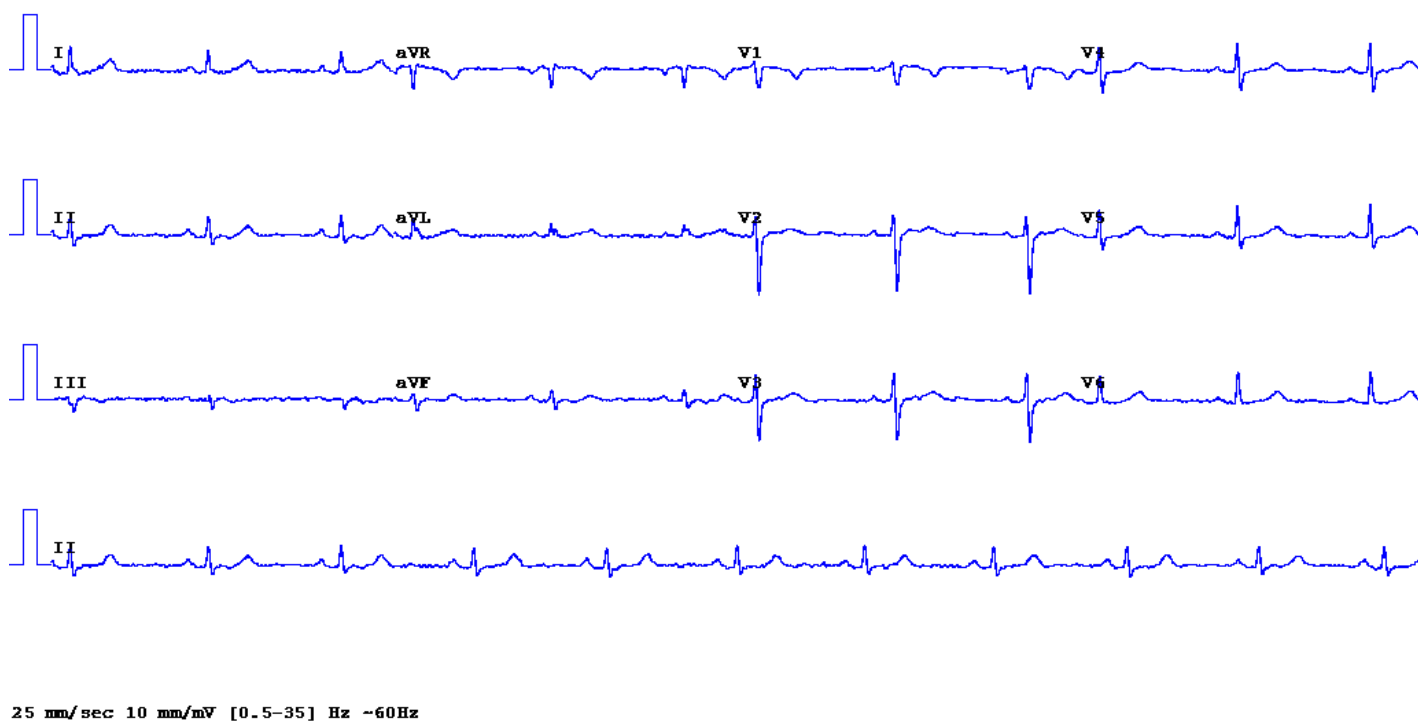
eFigure 29: Patient 15 LEAD 1 AVL STD ECG



eFigure 30: Patient 15 LEAD 1 AVL NEP ECG virtually identical R wave amplitude all leads.



eFigure 31: Patient 16 R lead 1 aVL STD ECG



eFigure 32: Patient 16 R WAVE AMP NEP ECG NO INCREASE IN R WAVE AMPLITUDE IN 11 111 AVF AND NO DECREASE IN LEAD 1 AVL

eAppendix 3



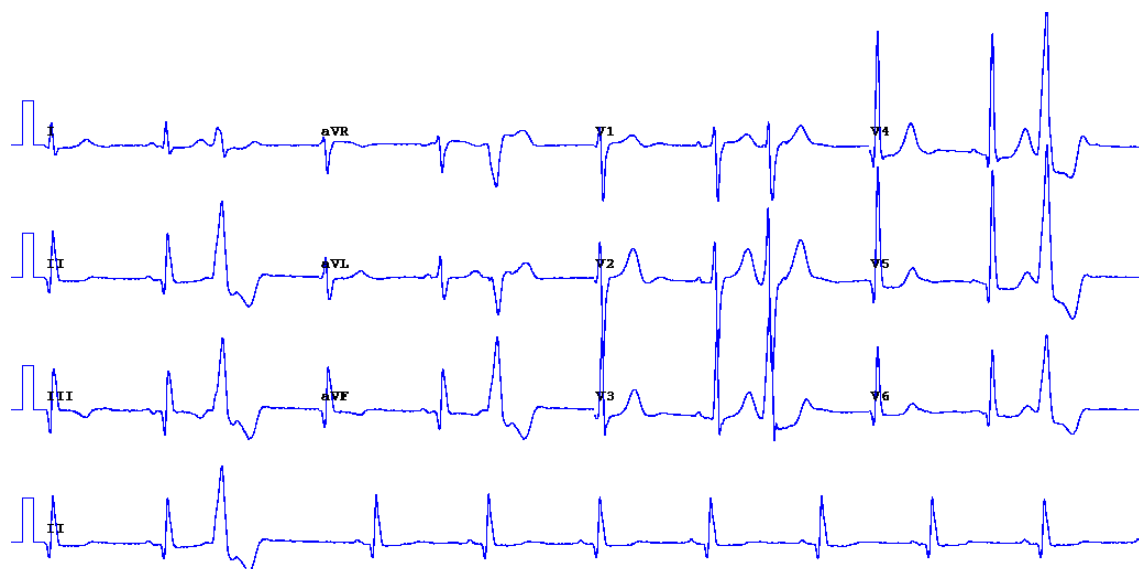
25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 1. 2014/05/30 Standard ECG, deep, wide inferior Q waves; old inferior infarct, QRS axis 19.



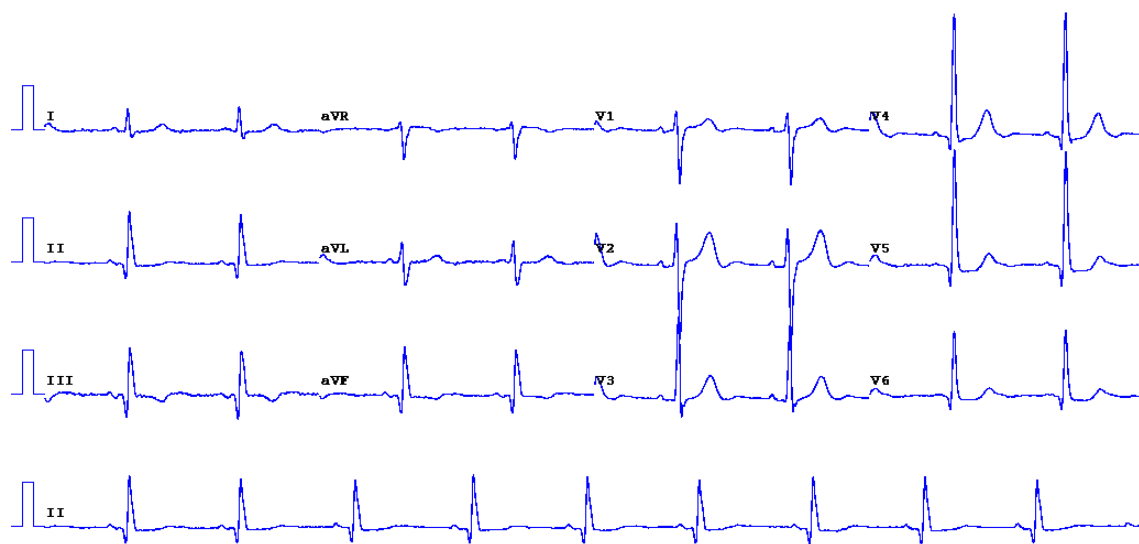
25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 2. NEP ECG shows virtually the same findings, deep, wide inferior Q waves: old inferior MI; QRS axis 25.



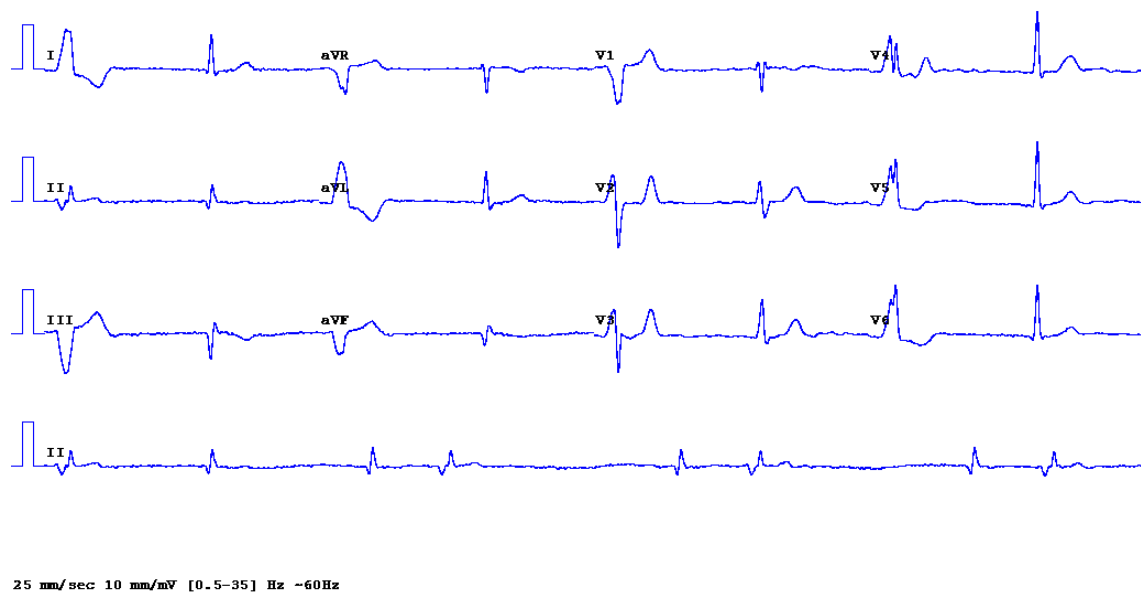
25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 3. 2014/ 05/09; standard ECG old inferior MI, QRS axis 74. VPBs.

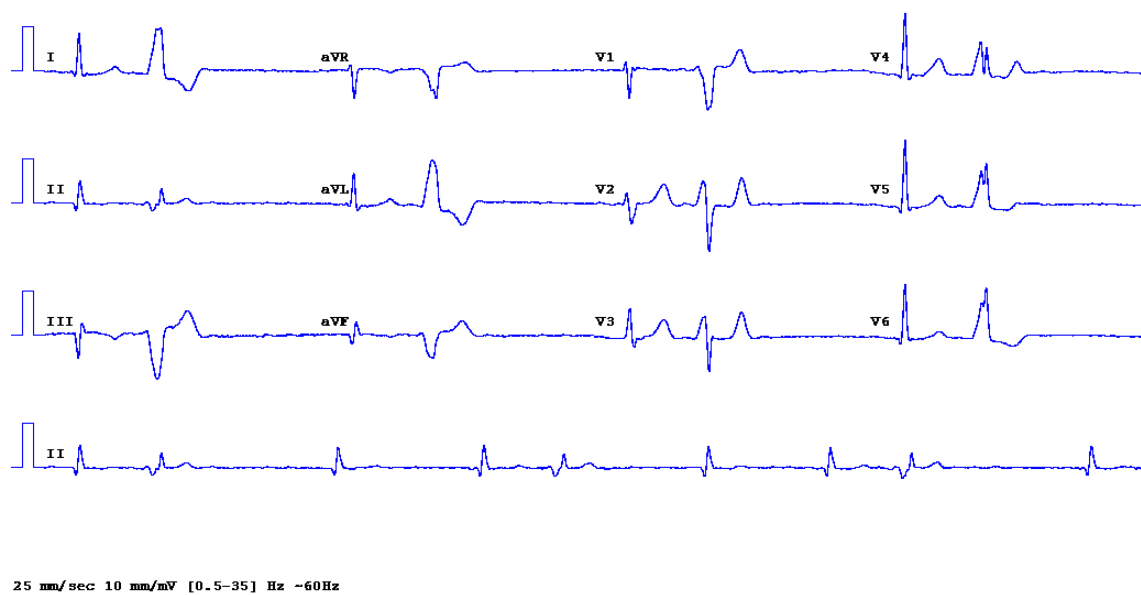


25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

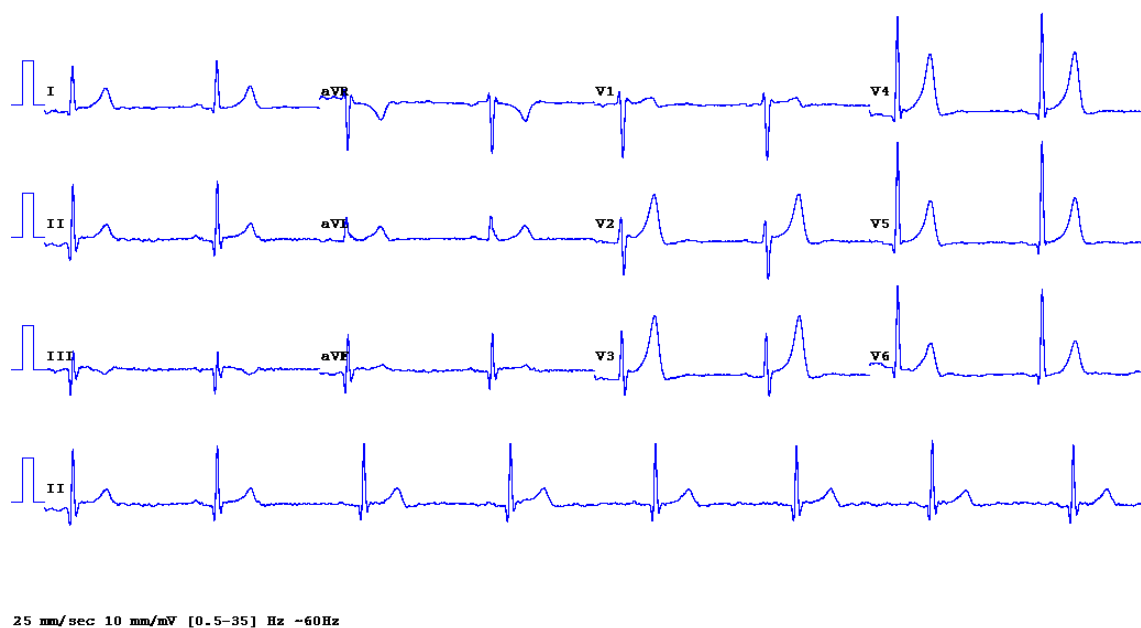
eFigure 4. new electrode placement ECG, similar Q waves in inferior leads, axis 69.



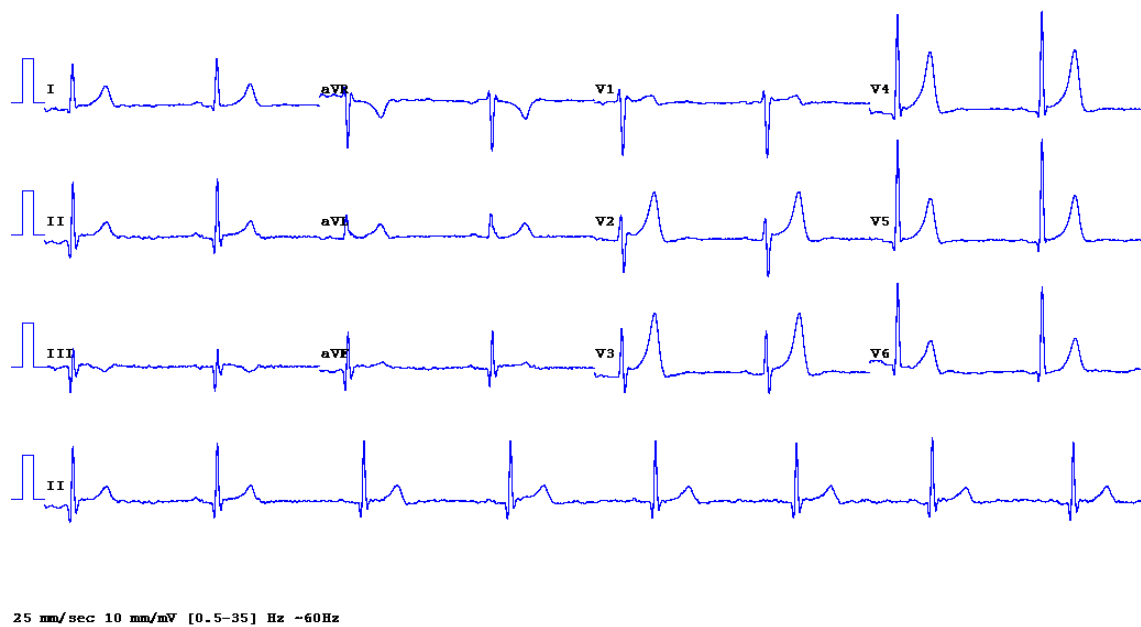
eFigure 5. standard ECG, 2014/05/23; Q waves 11,111, aVF: old inferior infarct, VPBs.



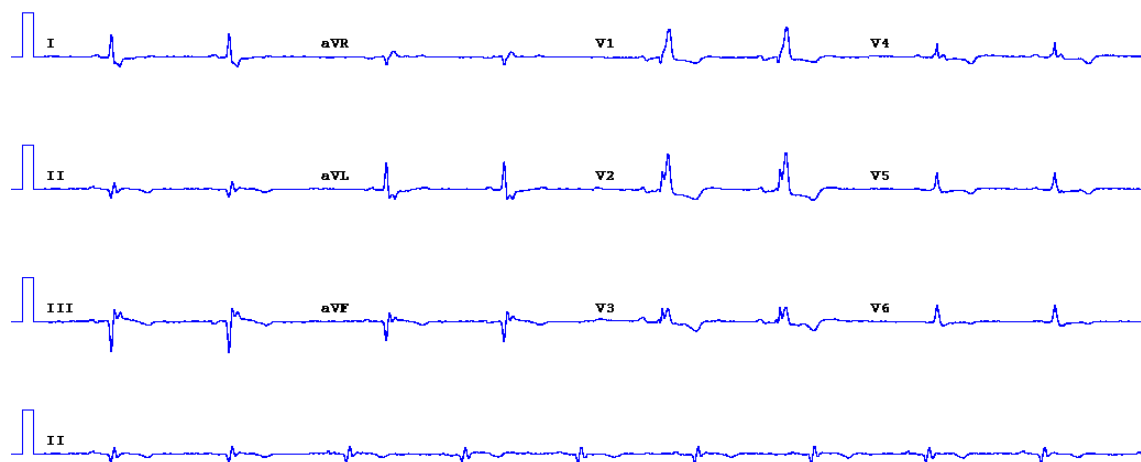
eFigure 6. NEP ECG reveals virtually the same, Q waves 11, 111, aVF, old inferior MI, VPBs.



eFigure 7. 2014 /05 /16 Standard 12 – lead ECG, Q waves 11, 111, aVF, old inferior MI



eFigure 8. New electrode placement ECG, similar wave form and inferior Q waves.



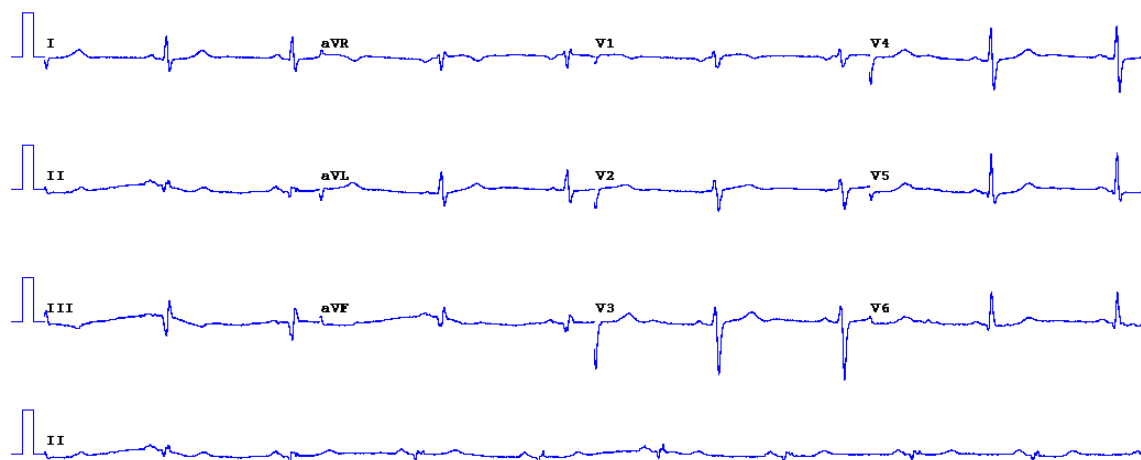
25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 9. 14/05/23 Standard ECG; old inferior MI, QRS axis _40. RBBB



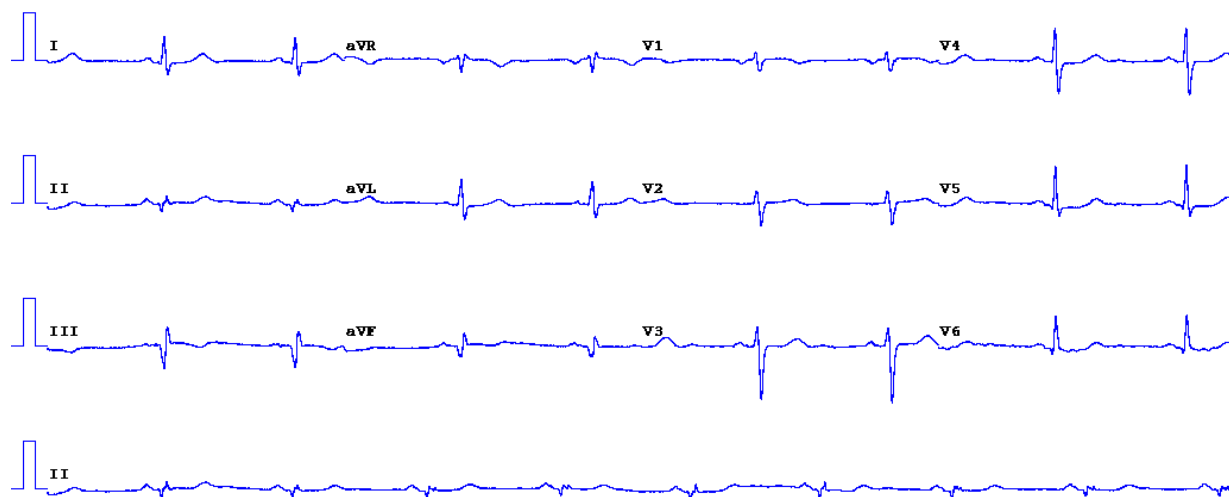
25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 10. NEP ECG similar wave form, inferior Q waves, axis _35, RBBB. Virtually the same ST –T wave changes.



25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 11. 14/05/27; standard ECG; Q waves 11, 111 aVF; old inferior MI, axis -30



25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

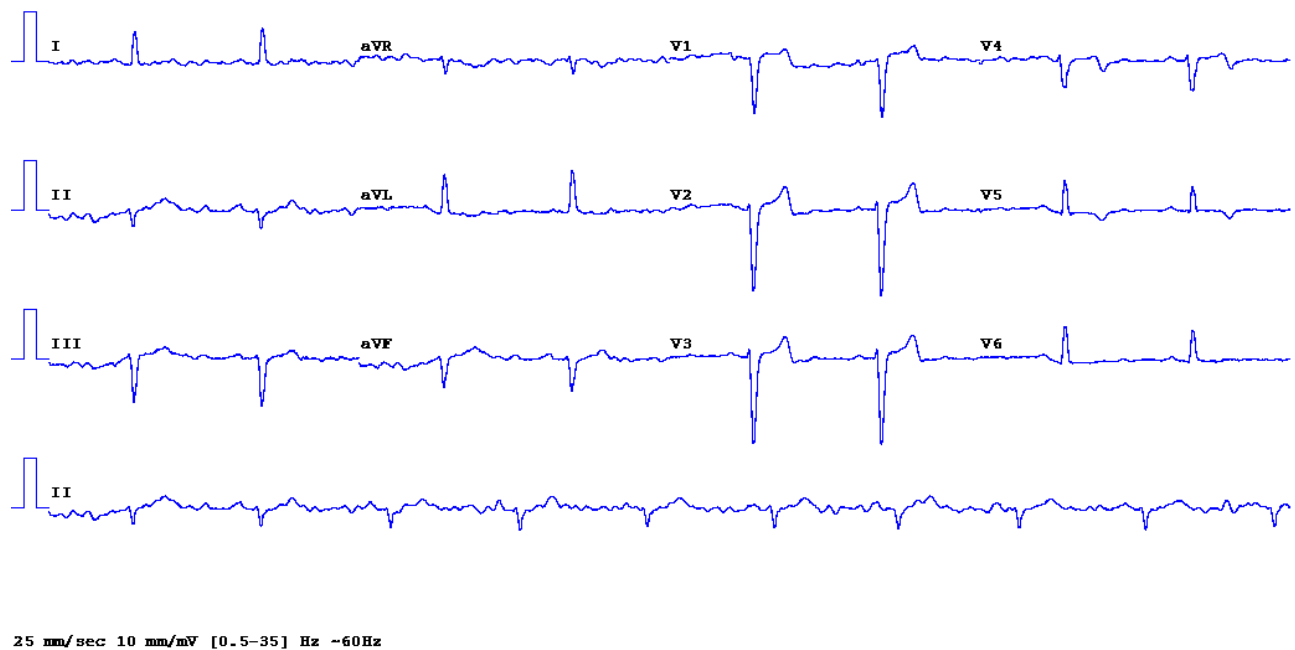
eFigure 12. NEP ECG similar inferior Q waves, axis -30; R wave amplitude in lead 1 aVL unchanged



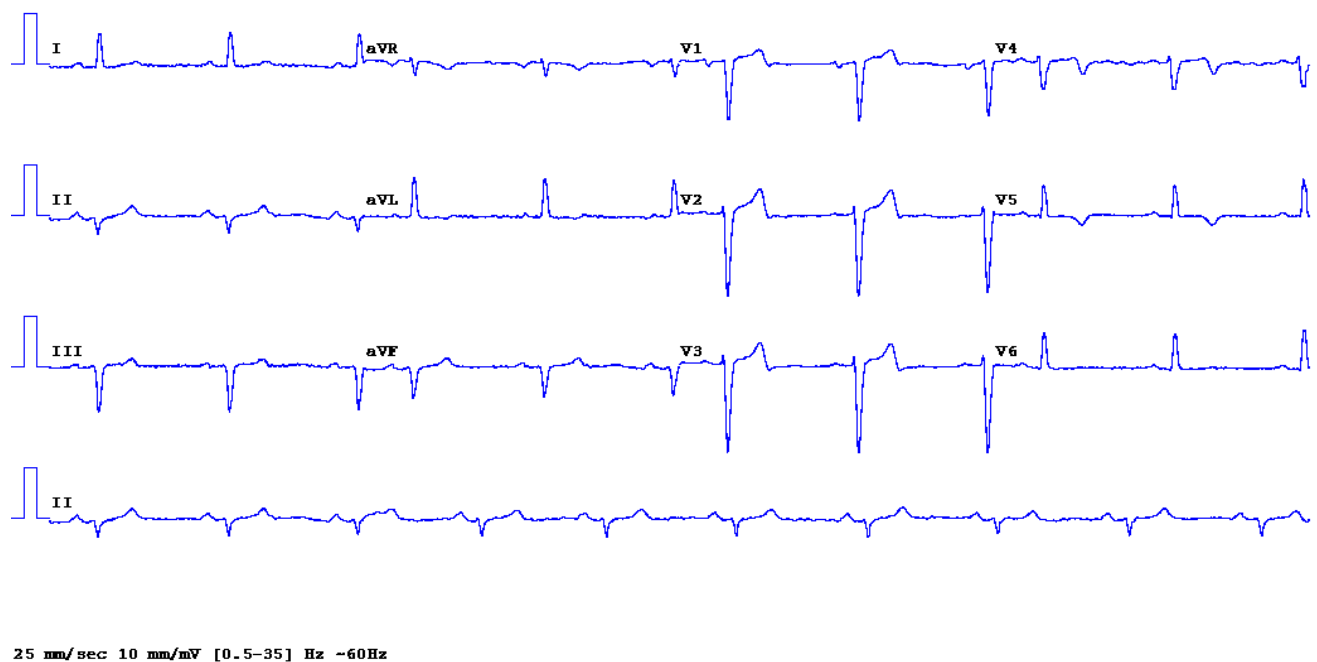
eFigure 13. standard ECG, old inferior MI, axis -57 virtually the same wave form as NEP ECG shown below



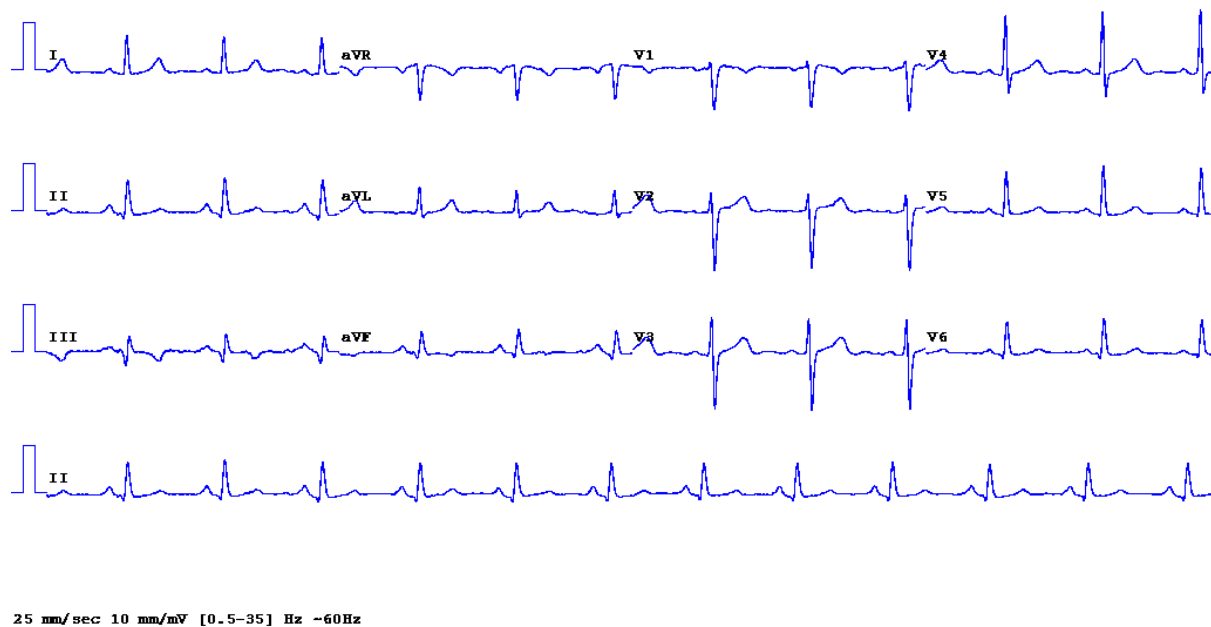
eFigure 14. New electrode placement ECG; similar inferior Q waves; old inferior MI, axis -55



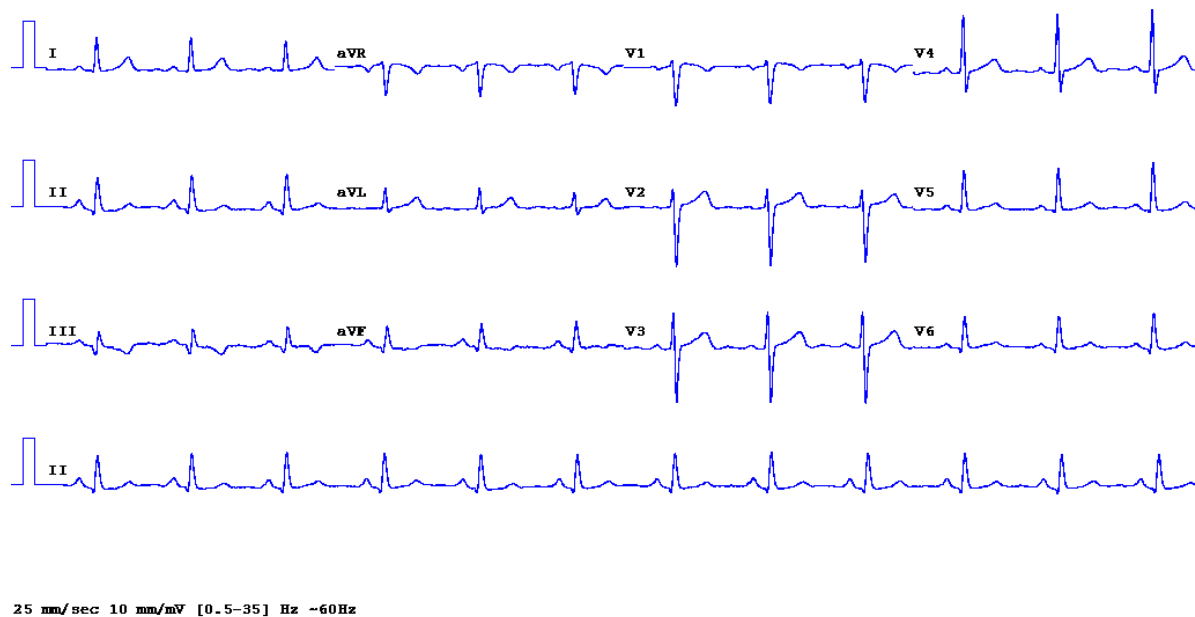
eFigure 15. standard ECG, old inferior MI; axis -47, note artifacts



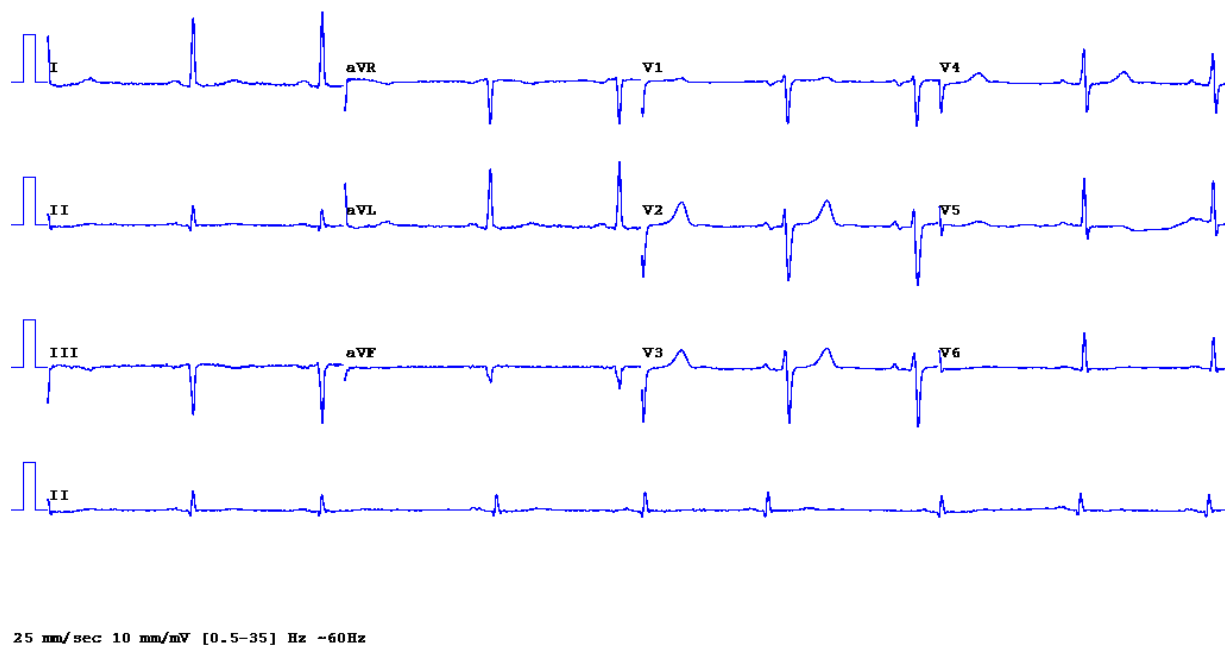
eFigure 16. NEP ECG, old inferior MI similar to standard recording above, but artifacts are minimized and best appreciated if the tracing is enlarged; axis - 42



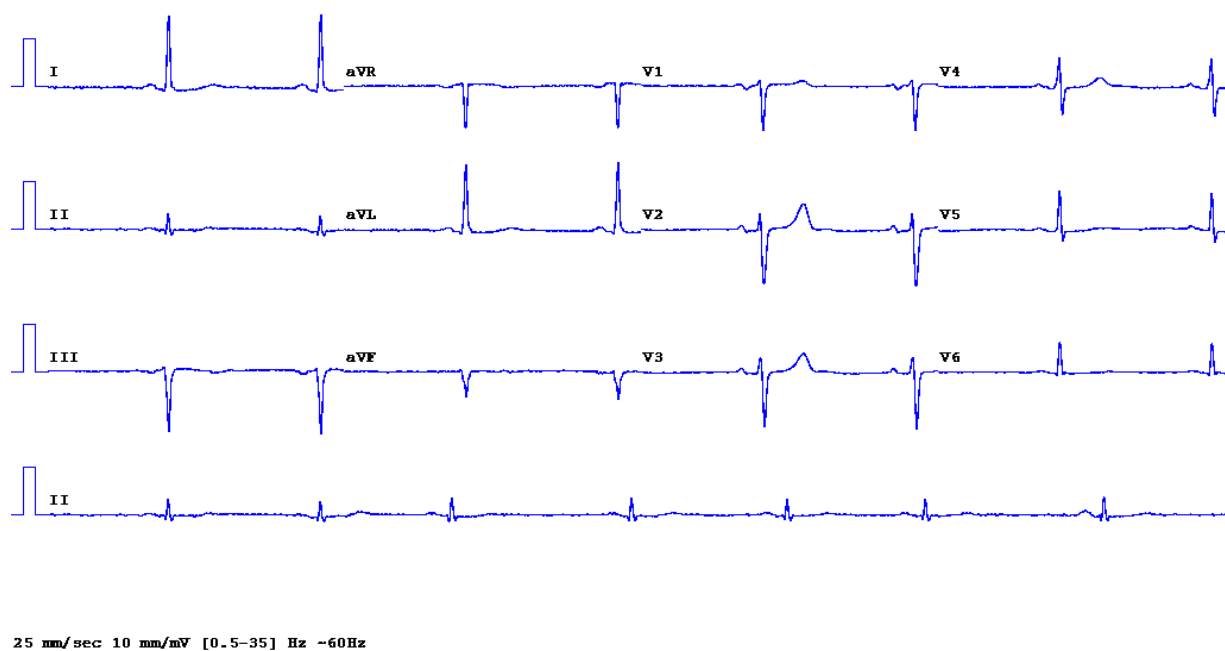
eFigure 17. Standard ECG, inferior Q waves: clinically proven old inferior MI



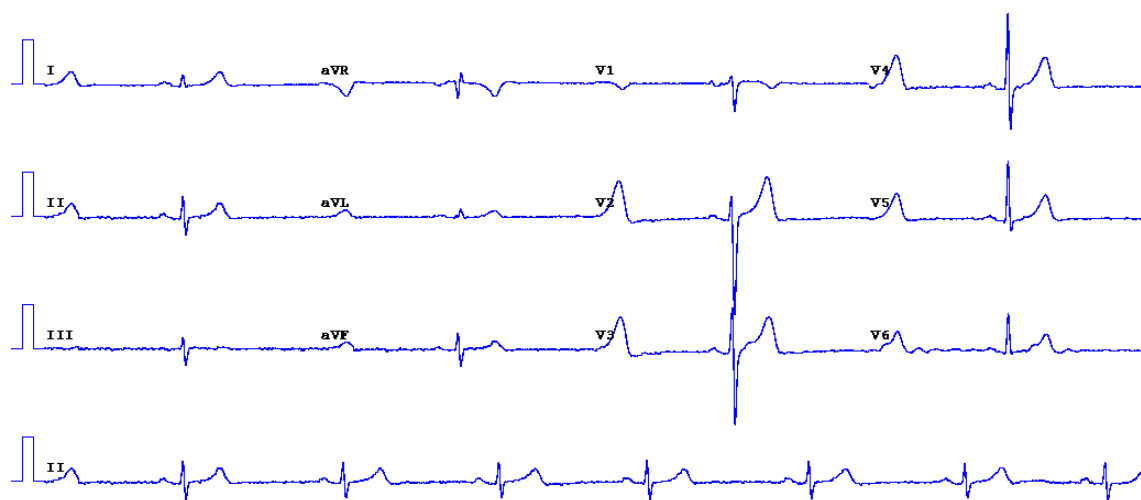
eFigure 18. NEP ECG, old inferior MI, virtually similar wave forms, inferior Q waves



eFigure 19. standard ECG; inferior Q waves; proven old inferior MI,

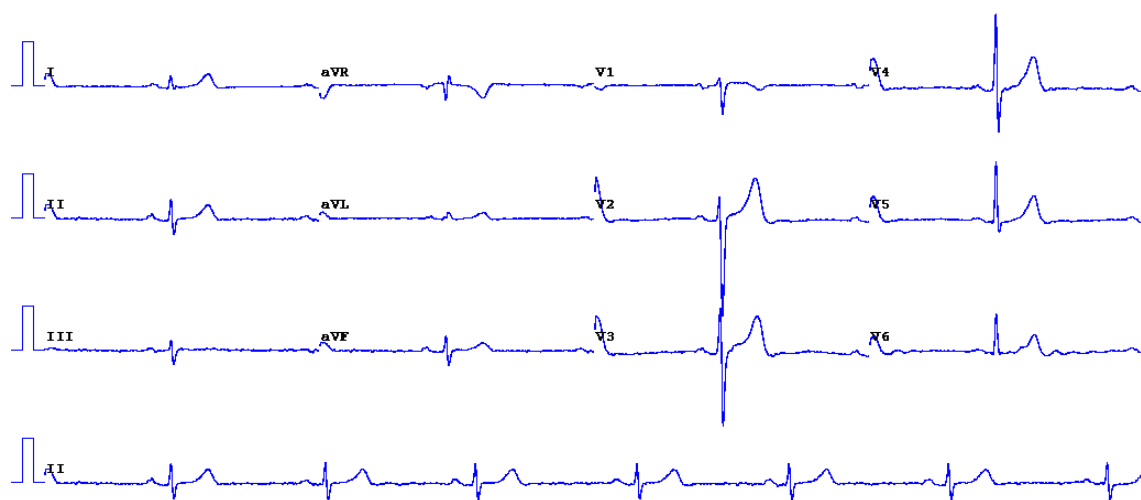


eFigure 20. NEP ECG, similar inferior Q waves; old inferior MI.



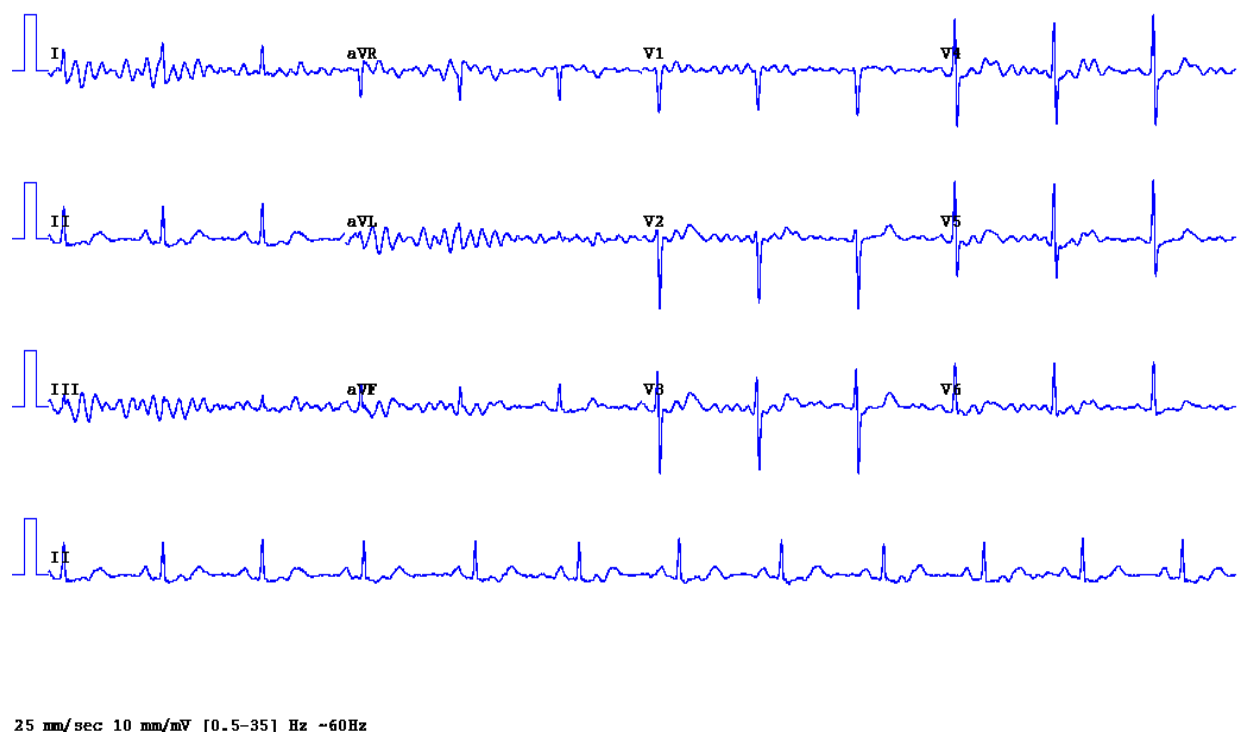
25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 21. Standard 12 – lead ECG; low amplitude R waves in leads 1 and aVL that can result in a QS pattern as observed with torso (modified) - leads

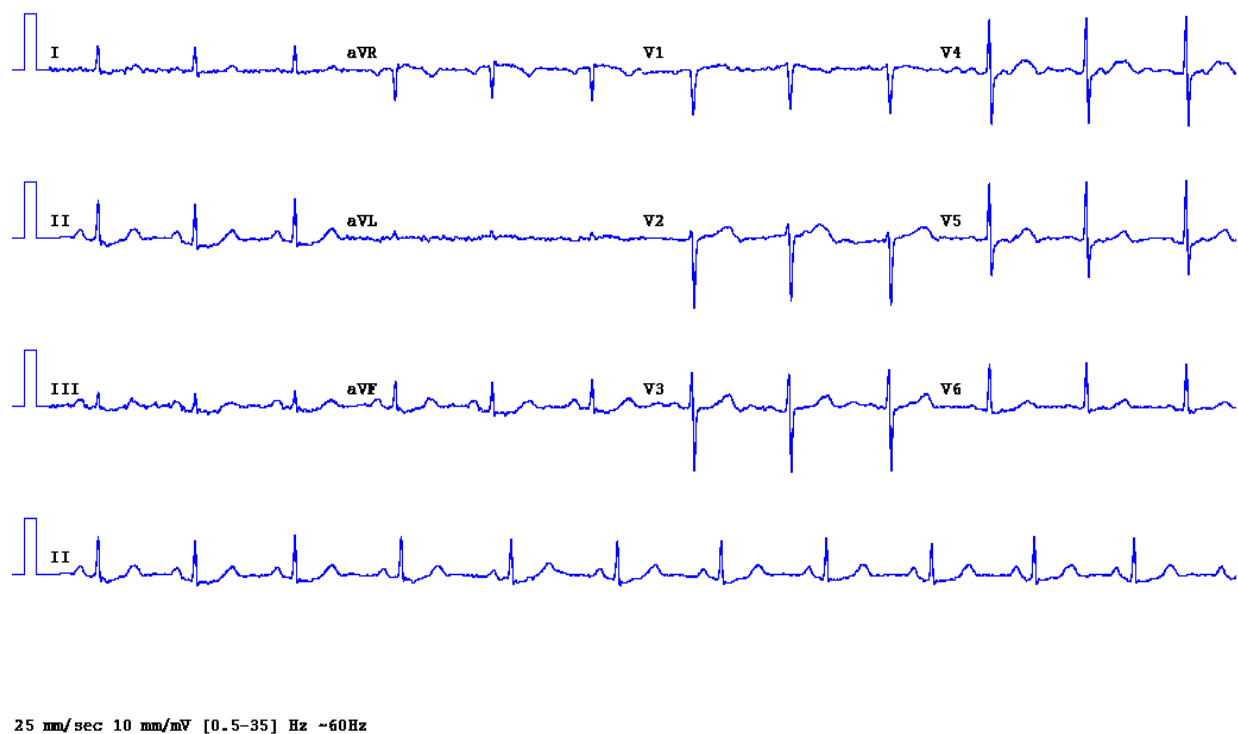


25 mm/sec 10 mm/mV [0.5-35] Hz ~60Hz

eFigure 22. New electrode placement ECG showing no change in R wave amplitude in leads 1, aVL or inferior leads. Virtually the same wave forms.



eFigure 23. July 2014. A standard method ECG shows artifacts; poor quality ECG. This problem we found to be more common in winter months; perhaps the wrist and ankle areas are colder than the torso and upper arm areas that allow better electrode sensing.



eFigure 24. NEP ECG done within 1 minute of STD shows clearing of artifacts