

Name

Employer

Date

Abbreviations: STD = ST depression, STE = ST elevation

1	List 7 patient complaints that are indications for a 12L ECG.		
2	List 7 locations		
3	List 7 risk factors for ACS.		
4	List 5 ways to minimize artifact on 12L ECG's.		
5	What is most common error made with 12L ECG electrode placement?		
6	Describe correct placement for 12L ECG electrodes.		
7	Identify what portion of myocardium is seen on following leads.		
8	What is the difference between ischemia/injury and infarction?		
9	What are two (2) ECG signs of ischemia?		
10	What is ECG sign of injury?		
11	What is ECG sign of infarction?		
12	Is a Q wave negative or positive?		
13	When measuring ST segment for elevation or depression, what is it compared to?		
14	Describe a systematic method of analysis for 12L ECG's.		
15	ECG 1: What is likely cause of STD seen on only 1 st complex in lead III?		
16	ECG 2: Why is this 12L interpreted as "normal" when there is STE in V3?		
17	Do ECG's 3-4-5 appear "normal"?		
18	ECG 6: What is ECG rhythm? Is device interpreting ECG rhythm correctly?		
19	62M, chest pain (174539), indigestion x10m	Engine from town A, arrived prior to amb from town B, decided to walk pt to ambulance. If pt had been placed on ECG monitor, prior to moving pt from house, do you think crew would have walked pt to ambulance?	

Northwest Community EMS System – Continuing Education – Credit Questions – April 2016 – ACS & 12-L ECG – page 2

20	ECG 7: What ECG changes are triggering interpretation of "Acute MI, inferior inarct"?	
21	ECG 7: What are ECG changes seen in leads I & aVL called/due to?	
22	61F, chest pain (090906): could this pt have been given an IVF bolus? What 5 symptoms support your answer?	
23	ECG 8: What is your 12L interpretation?	
24	ECG 9: What is your 12L interpretation?	
25	ECG 9: Pt c/o dizzy, lightheaded, BP 70/40, pale, cool, lungs clear. How tx this pt? 1 st med?	
26	ECG 9: What if no response to 1 st med?	
27	ECG 10: What is your 12L interpretation?	
28	ECG 10: What are signs of injury?	
29	ECG 10: What are signs of infarction?	
30	73M c/o palpitations (040742): Was O2 admin appropriate for this pt? Why?	
31	ECG 11: What, if any, pathology is seen on 12L?	
32	What is STD a sign of?	
33	ECG 12: Is device interpreting rhythm correctly? What is rhythm?	
34	What are causes of PVC's?	
35	55F c/o nausea x5d (0211821): what indications did pt have for 12L ECG?	
36	ECG 13: What 12L abnormality is seen?	
37	What are inverted T waves a sign of?	
38	ECG 14: What is ECG rhythm?	
39	50M c/o chest pain (200234): Does hx & PE sound like angina or acute MI? Why?	
40	ECG 15: What 12L abnormalities are seen?	
41	ECG 15: What is STD a sign of?	
42	Watch this video (2 links to same video provided)	https://www.youtube.com/playlist?list=PLaKcwBVYPBNBUbTTOMFxVa3gk-EwOqcyV https://www.youtube.com/watch?v=Hcf-44TUcnE&list=PLaKcwBVYPBNBUbTTOMFxVa3gk-EwOqcyV
43	95F c/o dizziness x12h (123640): What criteria did this pt have for a 12L ECG?	
44	ECG 16: Does this pt have a LBBB?	

Northwest Community EMS System – Continuing Education – Credit Questions – April 2016 – ACS & 12-L ECG – page 3

45	What are 2 criteria for a (BBB)?	
46	ECG 16: Using Sgarbossa criteria, is this pt having an acute MI? Why?	
47	ECG 16: Is device interpreting 12L as STEMI?	
48	ECG 17: What leads have abnormal Q waves?	
49	What do abnormal Q waves indicate?	
50	ECG 17: Is this an acute or old infarction? Why?	
51	75F c/o felt weak and fell (052505): What criteria did pt have for 12L ECG?	
52	ECG 18: What is rhythm?	
53	ECG 18: Should pt have received amiodarone? Why?	
54	ECG 19: c/o mild chest pain (1/10) & some difficulty breathing, BP 174/86, P 160, R 24 lungs clear. Tx?	
55	ECG 20: If IV was successful, tx?	
56	36F c/o palpitations x5m (093437) & ECG 21: What tx should pt have received? Why?	
57	23M palpitations x30m (094817) & ECG 23: what tx should pt have received? Why?	
58	ECG 24: Using Sgarbossa criteria, does this ECG show signs of MI?	
59	ECG 25: What ECG changes are triggering interpretation to say "inferior infarct, age undetermined"?	
60	ECG 26: Should a cardiac/STEMI alert be called for this pt? Why?	
61	ECG 27: Using Sgarbossa criteria, does this ECG w/ STE in V1-3 show signs of MI?	
62	ECG 28: Using Sgarbossa criteria, does this ECG show signs of MI?	
63	ECG 29: What are anterior and posterior "fascicles" a branch of?	
64	ECG 30: Are discordant T waves seen in V1-4 a normal finding w/ RBBB?	
x	To differentiate between LBBB and RBBB, look at lead V1. If last portion of QRS complex is negative, think LBBB. If last portion of QRS complex is positive, think RBBB.	
65	ECG 31: LBBB or RBBB?	
x	ECG 32: A bifascicular block is when a pt has both a RBBB and a left anterior or posterior fascicular block.	
66	ECG 33: Why is there a "no" sign through this 12L?	

this page intentionally left blank

12 Lead ECG

Indications

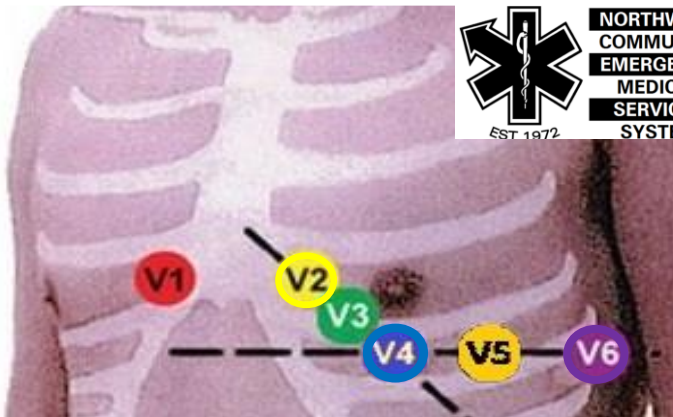
- Discomfort chest, jaw, neck, shoulder, arm, back, epigastric
- Dyspnea / SOB / Heart Failure
- Diaphoresis
- Dizziness / Syncope
- Dysrhythmia, Palpitations
- GI c/o (nausea, indigestion)
- Weak / Tired / Fatigue

Risk Factors

- Age
- Cholesterol (high)
- Diabetes (DM)
- Heart Failure (HF)
- Hypertension (HTN)
- Myocardial Infarction (MI)
- Smoking

I Lateral	aVR	V1 Septal	V4 Anterior
II Inferior	aVL Lateral	V2 Septal	V5 Lateral
III Inferior	aVF Inferior	V3 Anterior	V6 Lateral

Location	Changes	Reciprocal Δ
Inferior	II, III, aVF	I, aVL
Anterior-Septal	V 1-4	na
Lateral	I, aVL, V 5-6	II, III, aVF
Posterior	V 7-8-9	V 1-4



Electrode Placement

Limb leads (RA, LA, RL, LL) on limbs

V1...4th ICS (intercostal space), R of sternum

V2...4th ICS, L of sternum

V3...Midway between V2-4

V4...5th ICS, Mid-Clavicular Line

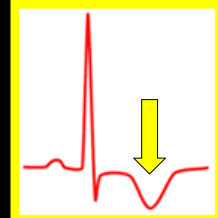
V5...Midway between V4-6, level w/ V4

V6...Mid-Axillary Line, level w/ V4



ISCHEMIA

Hyperacute T wave



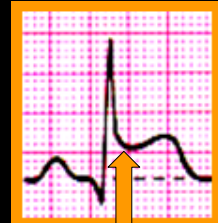
ISCHEMIA

T wave inversion
"flipped"



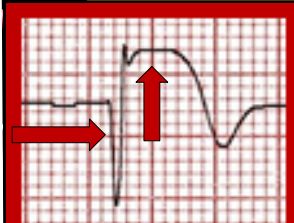
ISCHEMIA

ST depression (STD)
consider reciprocal Δ



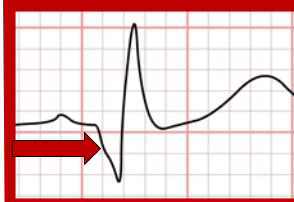
INJURY

ST elevation (STE)
"STEMI"



ACUTE INFARCTION

Q waves, w/ (+) STE

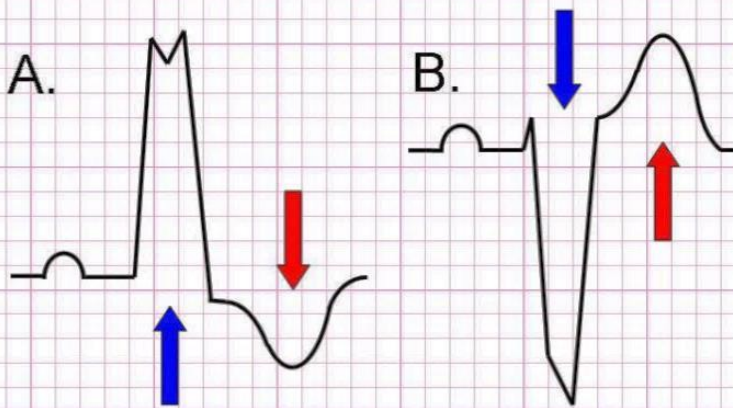


OLD INFARCTION

Q waves, no (-) STE

Discordant ST-Segments and T-Waves

NORMAL (LBBB/paced) should see ST & T shifted opposite majority of QRS

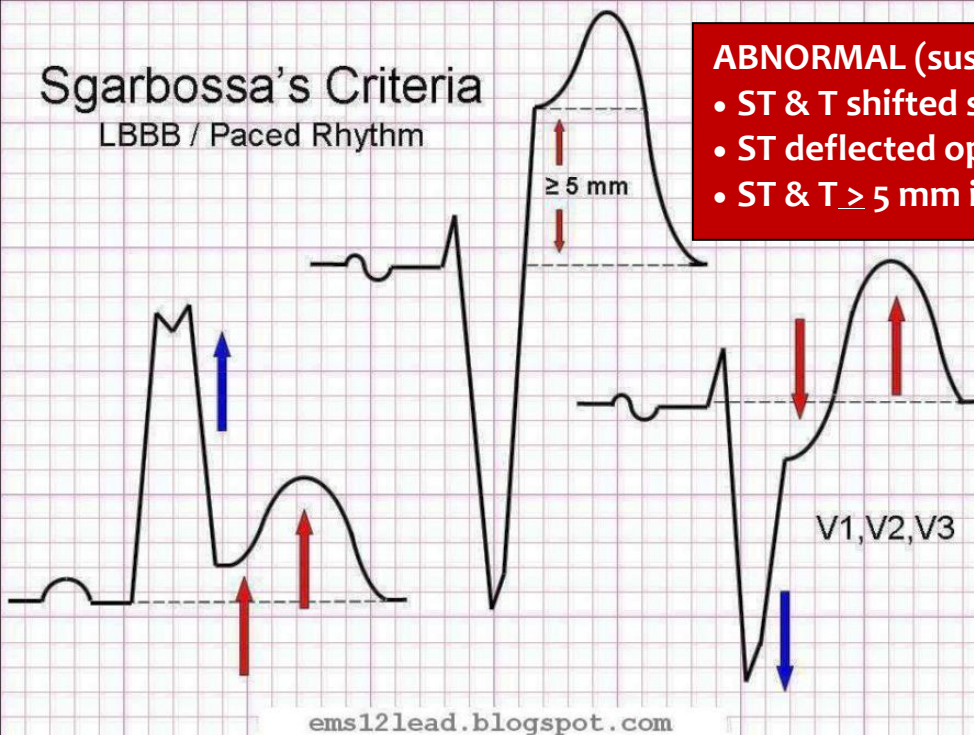


Normal for LBBB and paced rhythm

Sgarbossa's Criteria LBBB / Paced Rhythm

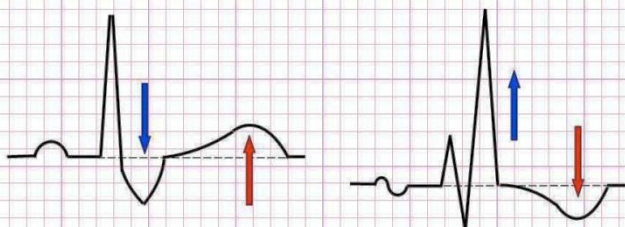
ABNORMAL (suspect STEMI) should NOT see

- ST & T shifted same direction as majority of QRS
- ST deflected opposite T-wave
- ST & T ≥ 5 mm in precordial leads



Discordant T Waves Normal for RBBB

RBBB normal findings



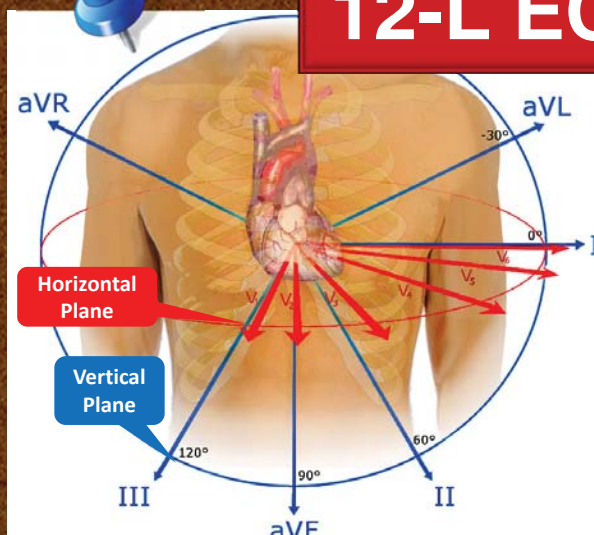
Images EMS 12-Lead: Editor-in-Chief Tom Bouthillet, Fire Captain / Paramedic, Hilton Head Island Fire & Rescue, SC, Cardiac Care Program Mgr, Chief Content Architect ECGMedicalTraining.com, Editor-in-Chief ACLSMedicalTraining.com, Co-Producer Code STEMI Web Series, Author 12-Lead ECG Challenge app. Member Editorial Advisory Board EMS World Magazine, author EMS 12-Lead column EMS1.com. Teaches nationally in UMBC CCEMT-P program, referenced in American Heart Journal, Journal of American College of Cardiology: Cardiovascular Interventions and EP Lab Digest. See more: www.ems12lead.com and www.ecgmedicaltraining.com



NORTHWEST
COMMUNITY
EMERGENCY
MEDICAL
SERVICES
SYSTEM

Continuing Education
April 2016

ACS & 12-L ECG

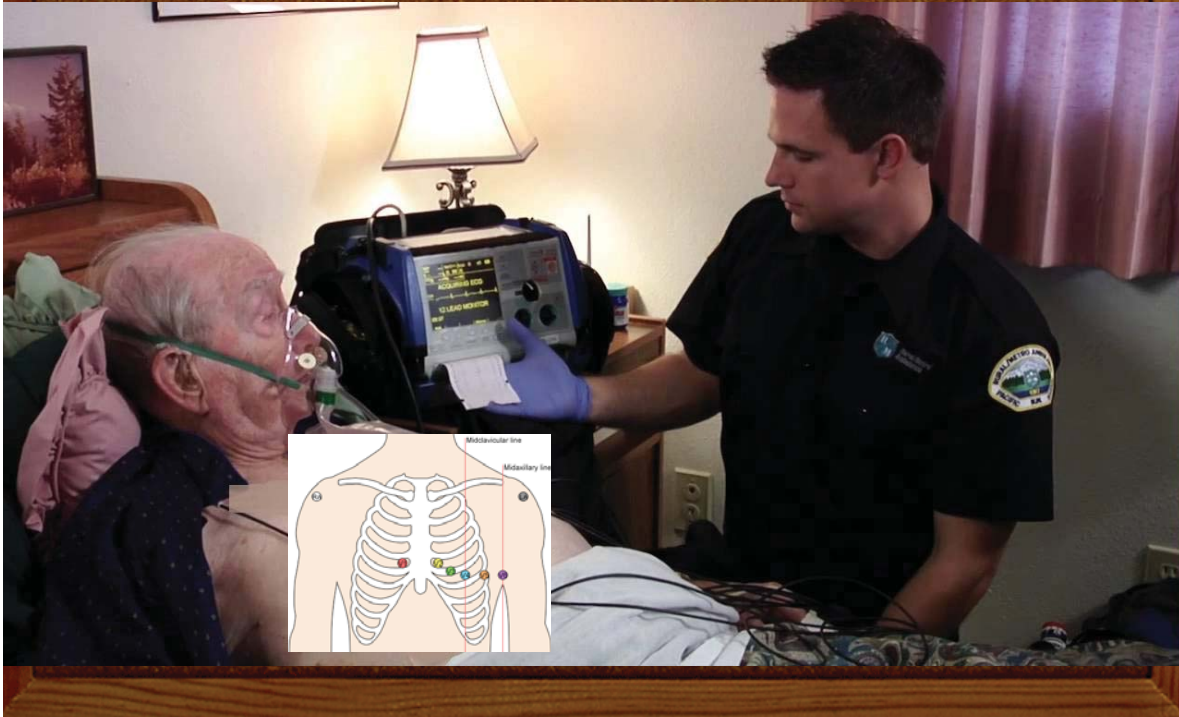


Questions/Comments on this CE are welcome and should be directed to:
Diana Neubecker RN BSN EMT-PM, In-Field Coordinator, dneubecker@nch.org

Objectives

1. Review the relationship of the **coronary arteries** to ACS.
2. Discuss issues important to accurate **12L acquisition**.
3. Review **SOP treatment** of pts w/ ACS, brady and tachycardia.
4. Recognize ECG findings of **ischemia, injury, & infarction**.
5. Relate the presence of **Q waves, ST depression/ elevation T wave abnormalities** to pathology.
6. Practice systematic **analysis of 12L ECG's**.
7. Identify **anterior, lateral, inferior, posterior wall MI** and ischemia on 12L ECG's.
8. Identify a method to help **recognize STEMI** in pts w/ LBBB.

How can we find pts having AMI?

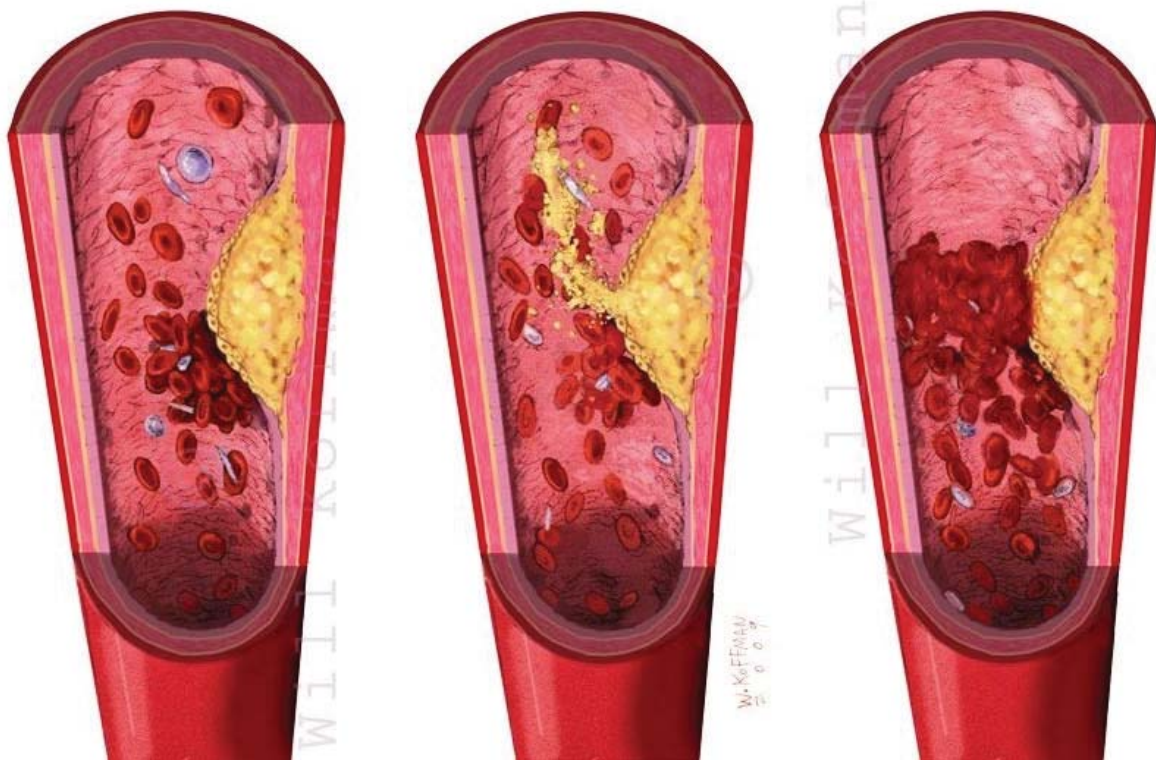
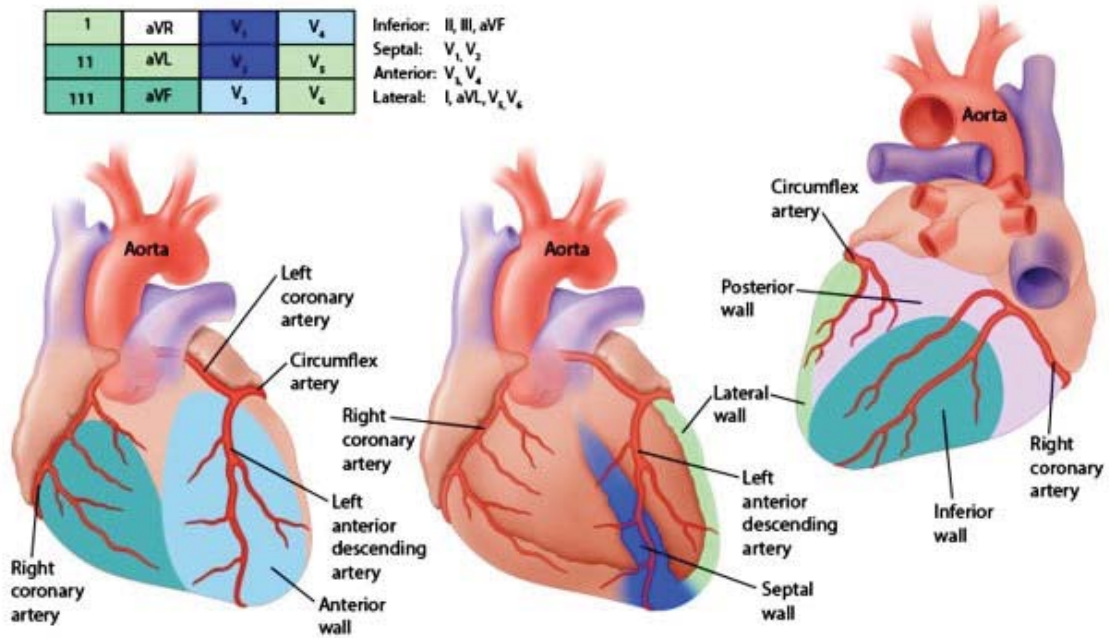


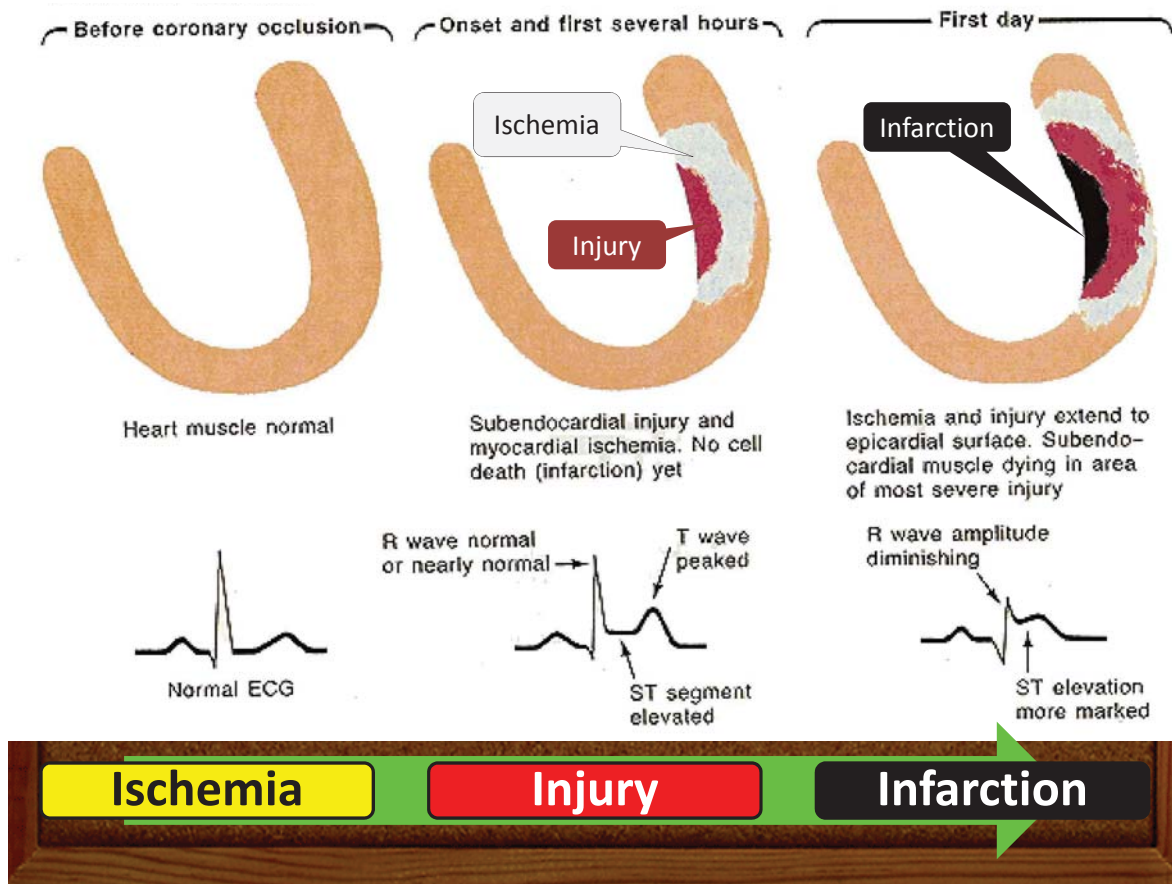
Minimize Artifact

- **Electrodes** (keep gel moist, store in airtight package)
- **Skin prep**
 - Alcohol if skin moist (rub off any residue)
 - all pts: Brisk rub w/ washcloth mild abrade/exfoliate skin
- **Body & limbs are relaxed/supported**
- Tell pt "*need you to hold still for ½ minute*" and then ask "*OK, are you ready?*" - **before** hitting acquire
- Avoid tight wrap ECG cables, replace when needed

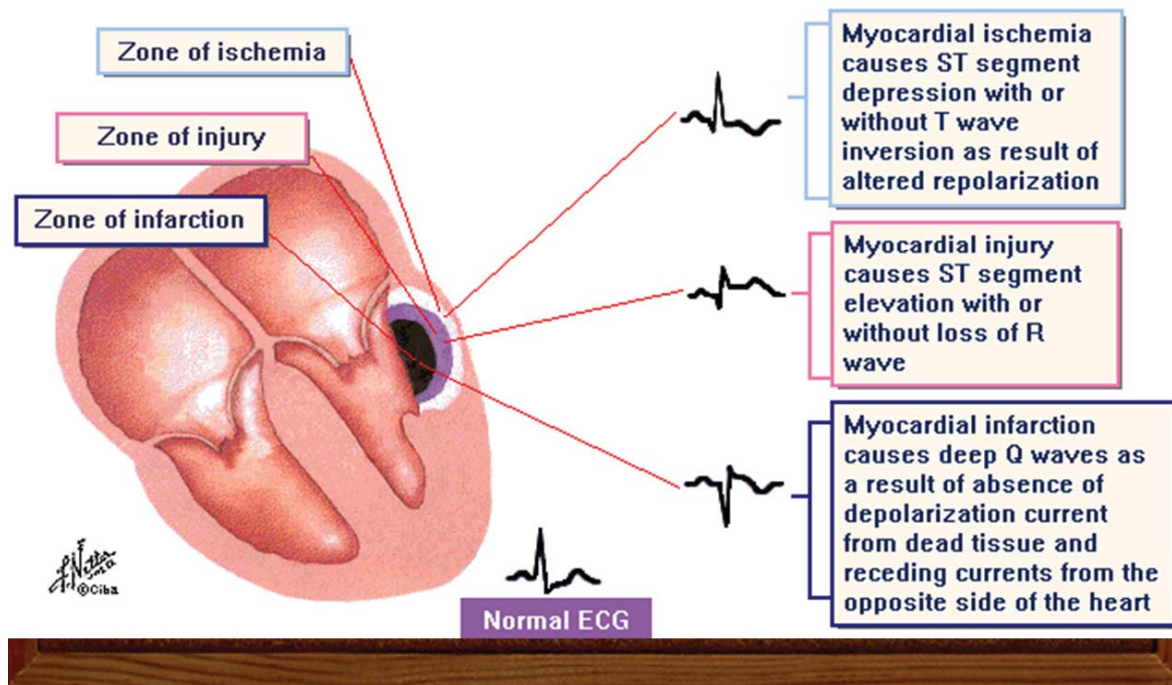
I	aVR	V ₁	V ₄
II	aVL	V ₂	V ₅
III	aVF	V ₃	V ₆

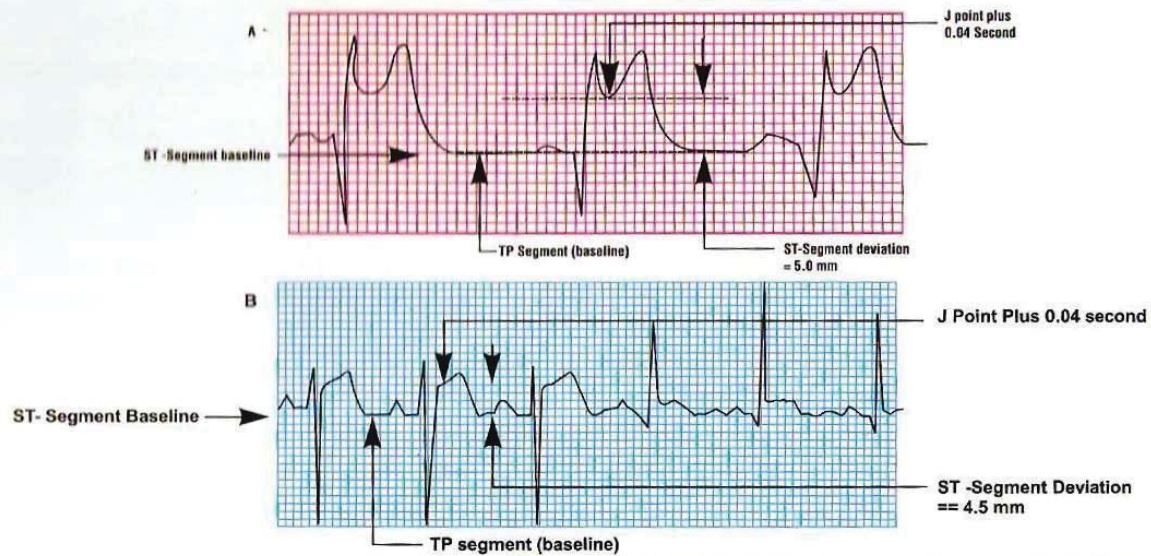
Inferior: II, III, aVF
 Septal: V₁, V₂
 Anterior: V₃, V₄
 Lateral: I, aVL, V₅, V₆



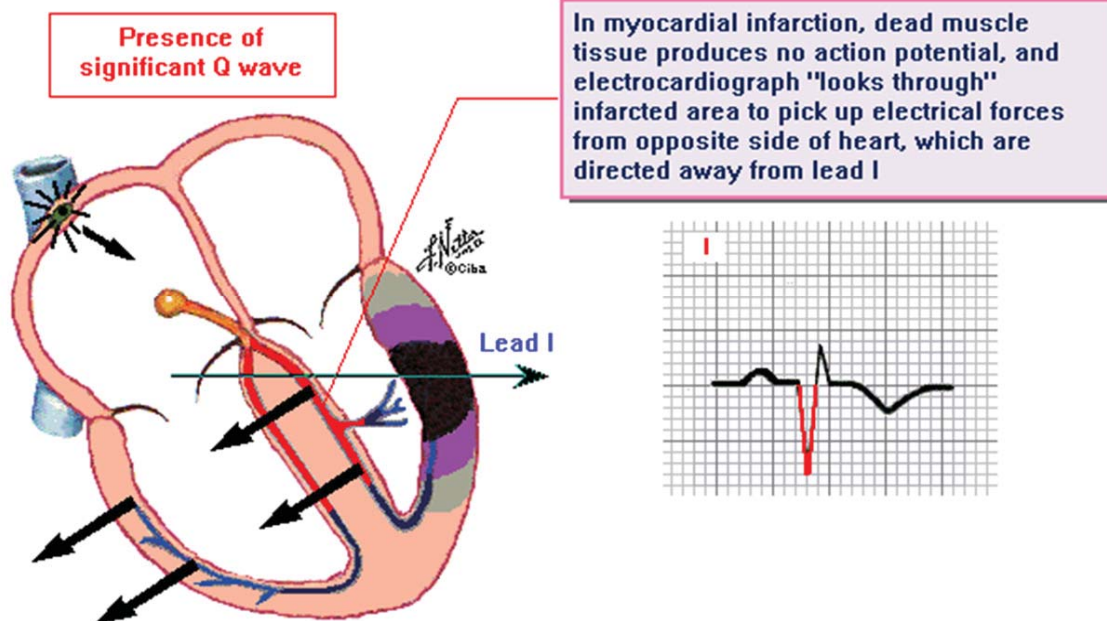


Effects of Myocardial Ischemia, Injury, and Infarction on the ECG





Differential Diagnosis of Q Waves



Analysis

✓ **II, III, aVF**

STE, STD, T wave Δ 's

✓ **V 1-4**

STE, STD, T wave Δ 's

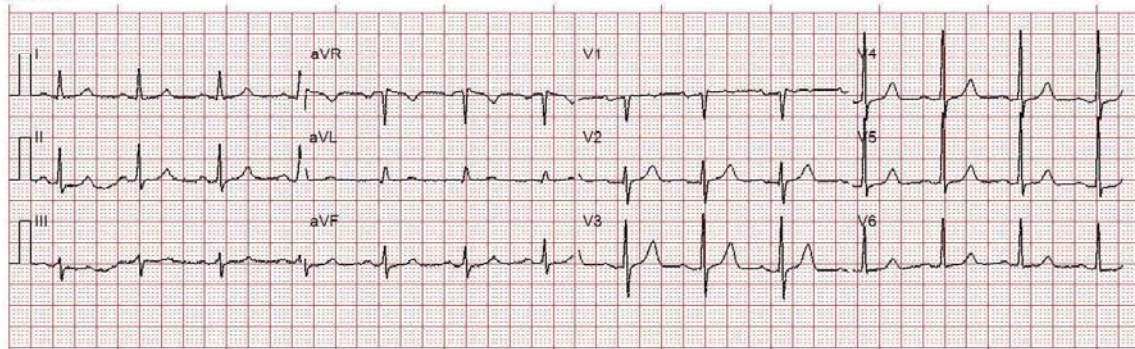
ZOLL® E Series® Defibrillator 12-Lead Report
54 Female
21:31:54

PATIENT NAME: _____ Vent Rate: 82
P Duration: 116 ms
PATIENT AGE: 54 PR Interval: 174 ms
PATIENT SEX: QRS Duration: 82 ms
DEVICE ID: QT/QTc: 364/425 ms
RECORDED: P-R-T Axis: 56 22 39



1

21:31:54



12L ECG ePCR Documentation

NORTHWEST
COMMUNITY
EMERGENCY
MEDICAL
SERVICES
SYSTEM



please post DOCUMENTATION REMINDER

FAQ: How should ECG rhythm & 12-lead ECG be documented in Image Trend?

- "ECG-monitor" = PM's interpretation of lead II rhythm strip
- "12-Lead ECG" = documentation of computer interpretation

Time	ECG Type	ECG Lead	ECG Interpretation
20:43	ECG-Monitor		Normal Sinus Rhythm
21:06	12-Lead ECG		Normal ECG **Unconfirmed** Sinus Rhythm

Time	ECG Type	ECG Lead	ECG Interpretation
03:08	ECG-Monitor	II	NSR
03:12	12-Lead ECG	12 Lead	Sinus bradycardia, Inferior infarct age undetermined, ST & T wave abnormality, consider lateral ischemia. Abnormal ECG.

Time	ECG Type	ECG Lead	ECG Interpretation
11:48	ECG-Monitor	II	SR
11:52	12-Lead ECG	12 Lead	SR, Possible septal infarct age undet, Inferior/lateral ST-T abnormality may be due to myocardial ischemia

Time	ECG Type	ECG Lead	ECG Interpretation
02:09	12-Lead ECG		Normal ECG "Unconfirmed" Sinus Rhythm
02:13	ECG-Monitor		NSR

Time	ECG Type	ECG Lead	ECG Interpretation
09:37	ECG-Monitor	II	A-Fib
09:38	12-Lead ECG	12 Lead	Atrial fibrillation, Right bundle branch block, Left anterior fascicular block, Bifascicular block, Left ventricular hypertrophy with QRS widening

Time	ECG Type	ECG Lead	ECG Interpretation
14:48	ECG-Monitor	II	Sinus Tach.
14:52	12-Lead ECG	12 Lead	Sinus Tachycardia, Short PR interval, Possible right atrial abnormality, Left ventricular hypertrophy, Widespread ST-T abnormality may be due to hypertrophy and/or ischemia.

Time	ECG Type	ECG Lead	ECG Interpretation
17:53	ECG-Monitor	II	A-Fib
17:54	12-Lead ECG	12 Lead	Undetermined Rhythm Left axis deviation Marked ST abnormality, possible inferior subendocardial injury Abnormal ECG

Time	ECG Type	ECG Lead	ECG Interpretation
06:41	ECG-Monitor	II	NSR
06:44	12-Lead ECG	12	Normal sinus rhythm Nonspecific ST and T wave abnormality Abnormal ECG *** Unconfirmed ***

THANK YOU to the following PM's who provided the excellent ECG documentation examples above.

AH Christopher Rymut
ATG Mike Timothy

BG Kurk Paleka
HE Matthew Fijalkowski

HE Matthew Kaiser
LG Michael Lafin

SP Matthew Takoy
SU Spencer Cornell

DIANA:12L-documentation

ZOLL® X Series® Defibrillator 12-Lead Report

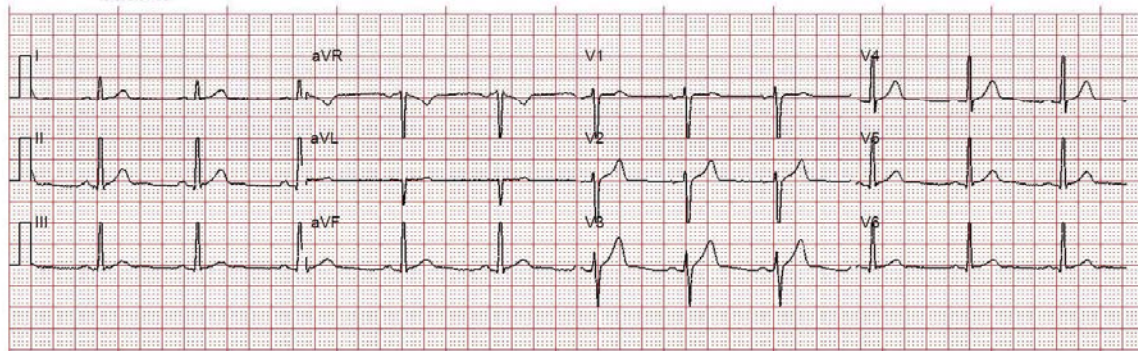
25 Male
08:53:10

PATIENT NAME: _____ HR: 88 BPM
PATIENT ID: _____ PR Interval: 145 ms
PATIENT AGE: 25 QRS Duration: 93 ms
PATIENT SEX: MALE QT/QTc: 344/367 ms
DEVICE ID: _____ P-R-T Axis: 61 76 50
RECORDED: _____



2

08:53:10



25 mm/s 10 mm/mV 0.52-40 Hz, ECG x1

Grid size is 0.2 s x 0.5 mV

	I	II	III	aVR	aVL	aVF	V1	V2	V3	V4	V5	V6
STJ	0.28	0.57	0.29	-0.43	-0.01	0.43	0.21	0.68	1.18	0.84	0.46	0.25

ZOLL® X Series® Defibrillator 12-Lead Report

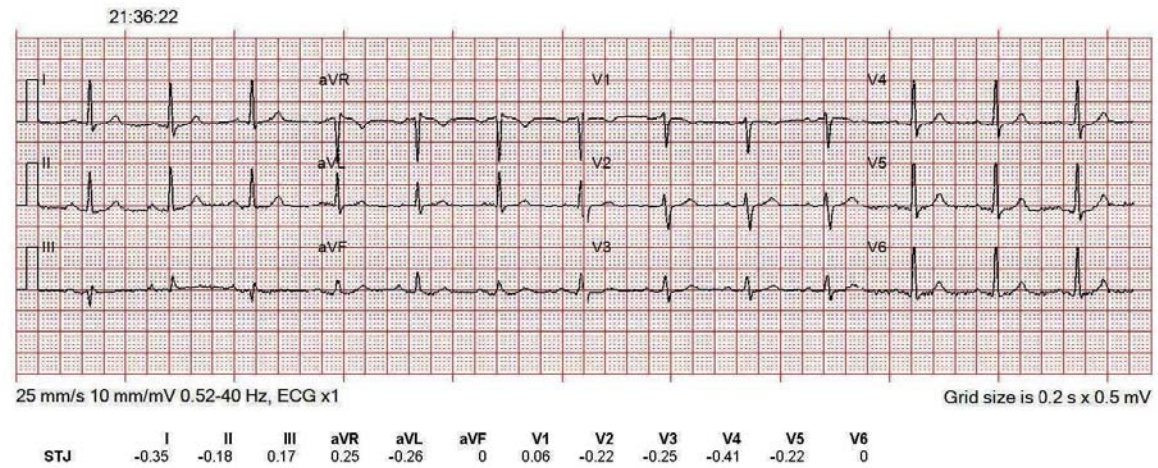
57 Male

21:36:22

PATIENT NAME: _____ HR: 80 BPM
PATIENT ID: _____ PR Interval: 186 ms
PATIENT AGE: 57 QRS Duration: 98 ms
PATIENT SEX: MALE QT/QTc: 359/415 ms
DEVICE ID: _____ P-R-T Axis: 60 28 41
RECORDED: _____



3



ZOLL® E Series® Defibrillator 12-Lead Report

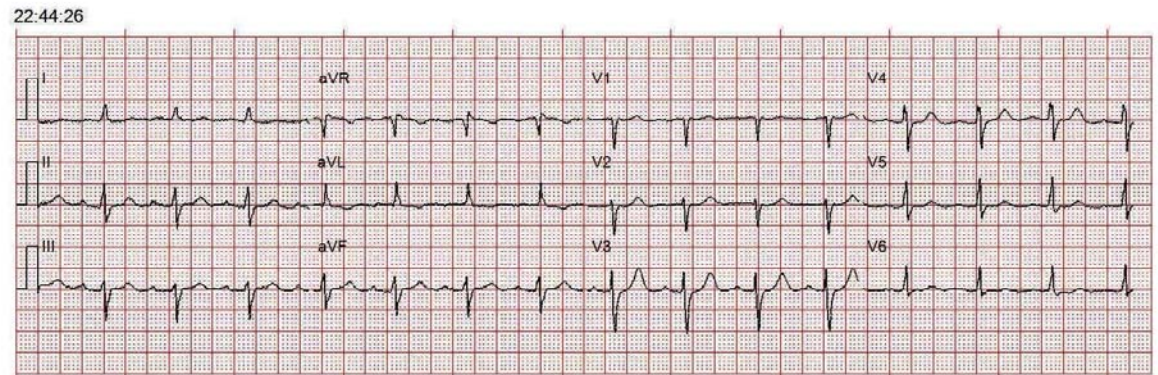
85 Female

22:44:26

PATIENT NAME: _____ Vent Rate: 90
PATIENT AGE: 85 P Duration: 100 ms
PATIENT SEX: _____ PR Interval: 176 ms
DEVICE ID: _____ QRS Duration: 98 ms
RECORDED: _____ QT/QTc: 348/425 ms
P-R-T Axis: 45 -34 80



4



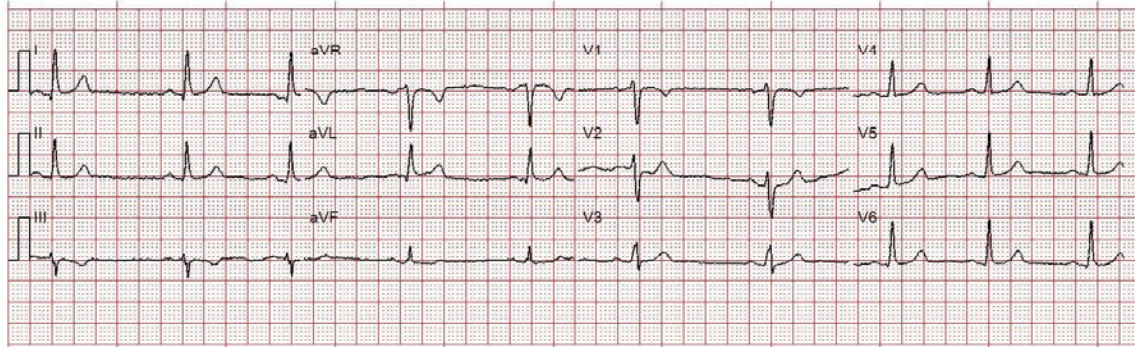
ZOLL® E Series® Defibrillator 12-Lead Report

31 Male
05:09:47

PATIENT NAME: _____ Vent Rate: 57
P Duration: 112 ms
PATIENT AGE: 31 PR Interval: 174 ms
PATIENT SEX: QRS Duration: 98 ms
DEVICE ID: QT/QTc: 400/389 ms
RECORDED: P-R-T Axis: 40 17 12

5

05:09:47



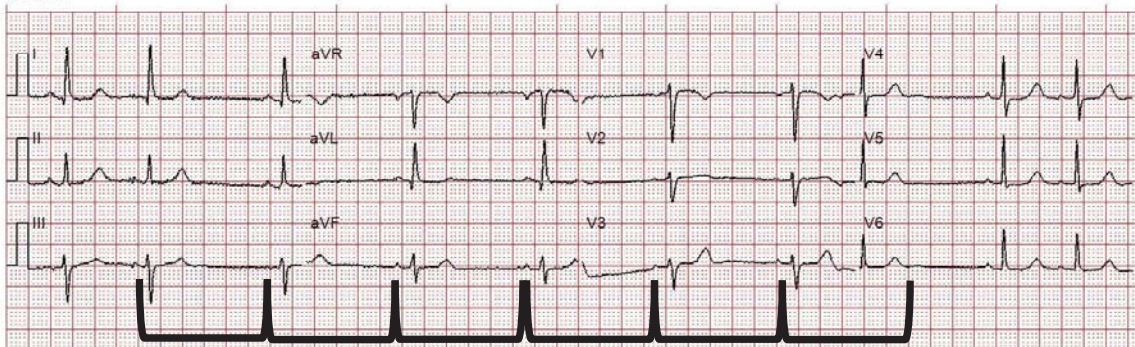
ZOLL® E Series® Defibrillator 12-Lead Report

71 Female
12:06:51

PATIENT NAME: _____ Vent Rate: 59
P Duration: 0 ms
PATIENT AGE: 71 PR Interval: 0 ms
PATIENT SEX: QRS Duration: 82 ms
DEVICE ID: QT/QTc: 446/441 ms
RECORDED: P-R-T Axis: 0 6 61

6

12:06:51



ZOLL® E Series® Defibrillator 12-Lead Report

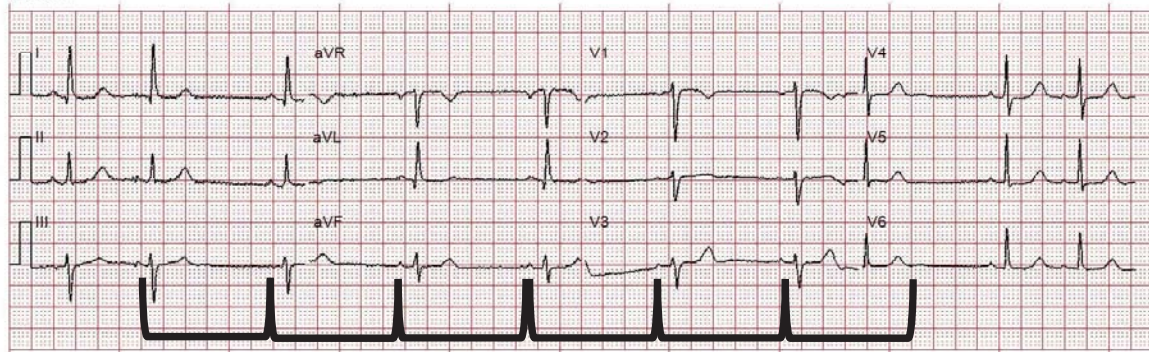
71 Female

12:06:51

6

PATIENT NAME: _____ Vent Rate: 59 Atrial fibrillation with slow ventricular response
 P Duration: 0 ms Abnormal ECG
 PR Interval: 0 ms *** Unconfirmed ***
 PATIENT AGE: 71 QRS Duration: 82 ms
 PATIENT SEX: QT/QTc: 446/441 ms
 DEVICE ID: P-R-T Axis: 0 6 61
 RECORDED:

12:06:51



Age/Gender	CC & Duration	12-L time
Narrative		
PMH & Meds	VS & Physical Exam	Impression & Treatment

Format for subsequent cases
Info cut & pasted from ePCR's
All 12L's were transmitted
from field for actual EMS pts

62M Chest pain, indigestion x10m

174539

Narrative

Summary of Events

Called to the pt's residence for a 62 y.o. male with chest pain. UOA E [REDACTED] Fire Dept, on the scene and stating the pt is walking out to meet us at the ambulance. The pt's driveway had about 6 inches of snow and the air temperature is around -15 F. Pt was walked to expedite care and pt was not currently c/o any pain. Pt is calm and cooperative and does not appear to have any discomfort. Skin parameters are normal and pt said he had pain at 3 p.m. today. Pain was a dull ache rated a 1/10 to his left chest, no radiation, unprovoked. Pt placed on monitor and noticed an elevated ST. 12 lead read AMI and a cardiac alert was relayed to [REDACTED]. Pt given ASA and no NTG due to rhythm being Inferior. Pt remained pain free enroute to [REDACTED]. [REDACTED] contacted and had no orders. Pt taken to bed [REDACTED] at the [REDACTED] ED. Care was transferred to a RN at the ED.

HTN, Cardiac, high chol,
open heart 1999

Avapro, Zetia,
Antara, ASA

148/100-78-12-99%RA
110/80-70-12-100%RA

Chest pain

ASA
IV NS

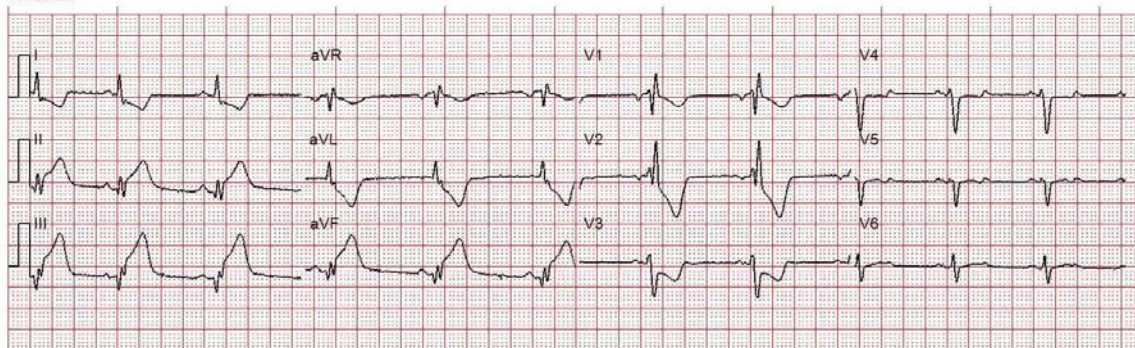
ZOLL® E Series® Defibrillator 12-Lead Report

62 Male
17:45:39

PATIENT NAME: _____	Vent Rate: 65	Normal sinus rhythm with occasional premature atrial complexes
PATIENT AGE: 62	P Duration: 92 ms	Left atrial enlargement
PATIENT SEX: _____	PR Interval: 124 ms	Inferior-posterior infarct, possibly acute
DEVICE ID: _____	QRS Duration: 106 ms	T wave abnormality, consider lateral ischemia
RECORDED: _____	QT/QTc: 392/407 ms	***** Acute MI *****
	P-R-T Axis: 55-22 103	Abnormal ECG
		*** Unconfirmed ***

7

17:45:39



61F Chest pain**090906**

Ax, Ex dispatched to health club for woman w/ chest pain. Upon arrival, CA&Ox4 sitting in chair, C/O chest pain & nausea x 15m following aerobics class. Appeared pale & diaphoretic. ECG revealed STE lead II, ASA & Zofran admin w/o change. Stated pain began during aerobics class she has been attending regularly. CP subsided upon EMS arrival, but felt like might have diarrhea. 12L ST elevation leads II, III, aVF, V5-6. Attempt to transmit failed due to distance from cell phone. Moved to Ax via stretcher, H contacted, STEMI Alert, report given w/o OLMC orders received. Transported w/o incident or change. Admitted to pain/discomfort in back of jaw but would not rate or describe pain due to nausea. IV enroute. Pt care and report given H ED RN and MD.

Ca breast, mastectomy
2009

94/60-74-20
90/60-60-18-100%RA
EtCO2 38, square
90/60-56-16
bG 174
Lungs clear
Skin pale, diaphoretic
Jaw & chest pain

Chest pain

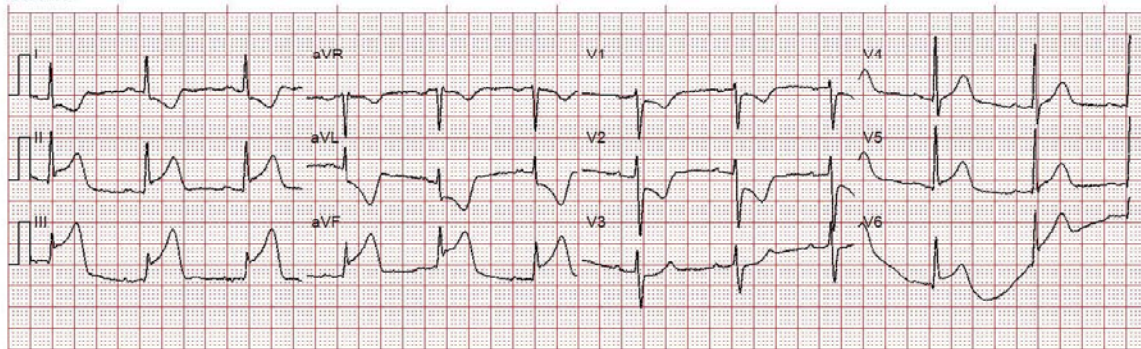
ASA
Ondansetron
IV

ZOLL® E Series® Defibrillator 12-Lead Report**61 Female****09:09:06**

PATIENT NAME: _____ Vent Rate: 67
PATIENT AGE: 61 P Duration: 62 ms
PATIENT SEX: PR Interval: 182 ms
DEVICE ID: QRS Duration: 88 ms
RECORDED: QT/QTc: 394/416 ms
P-R-T Axis: 52 55 106

8

09:09:06



ZOLL® X Series® Defibrillator 12-Lead Report

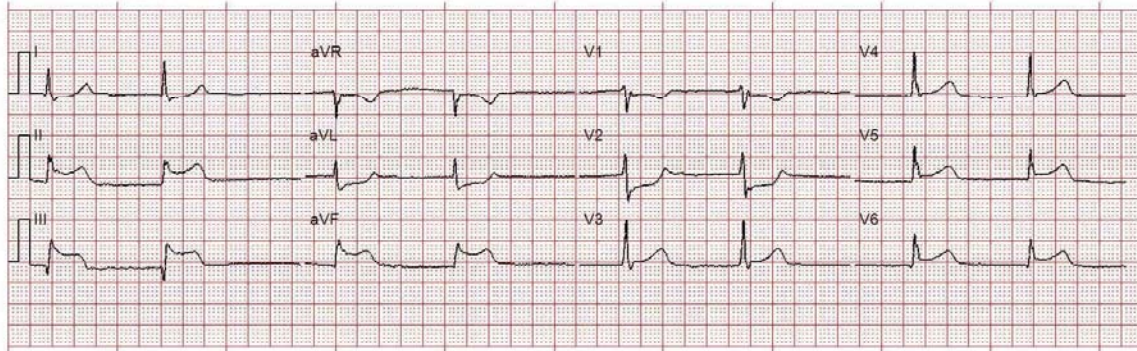
92 Male

08:32:47

PATIENT NAME: _____ HR: 46 BPM
 PATIENT ID: _____ PR Interval: —
 PATIENT AGE: 92 QRS Duration: 113 ms
 PATIENT SEX: MALE QT/QTc: 477/422 ms
 DEVICE ID: _____ P-R-T Axis: N/A 55 67
 RECORDED: _____

9

08:32:47



25 mm/s 10 mm/mV 0.52-40 Hz, ECG x1

Grid size is 0.2 s x 0.5 mV

	I	II	III	aVR	aVL	aVF	V1	V2	V3	V4	V5	V6
STJ	-1.11	2.79	3.9	-0.85	-2.51	3.35	-1.38	-3.5	0.56	0.62	1.46	1.56



ZOLL® E Series® Defibrillator 12-Lead Report

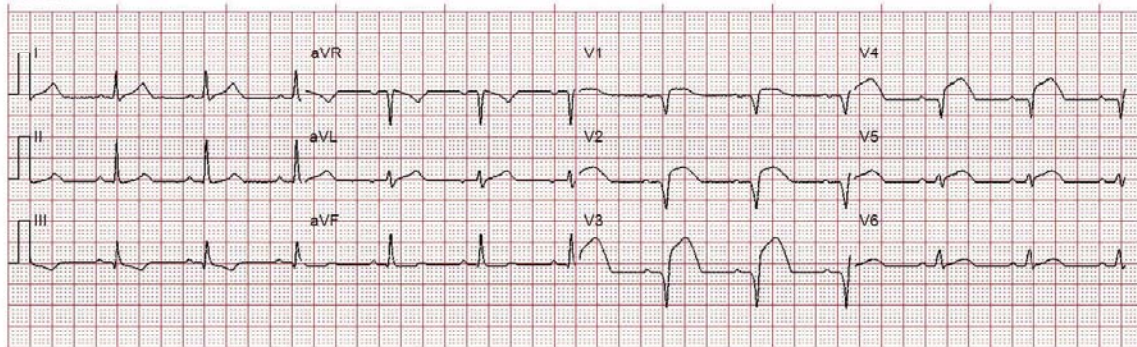
60 Male

14:48:55

PATIENT NAME: _____ Vent Rate: 72
 PATIENT ID: _____ P Duration: 82 ms
 PATIENT AGE: _____ PR Interval: 158 ms
 PATIENT SEX: _____ QRS Duration: 92 ms
 DEVICE ID: _____ QT/QTc: 376/411 ms
 RECORDED: _____ P-R-T Axis: 66 56 4

10

14:48:55



73M palpitations**040742**

Called for person w/ heart problems & low blood sugar. Found pt up and walking around. Pt assisted to chair. A+Ox4. Stated woke up, was hungry, blood sugar 59, ate sandwich. Shortly after waking began feeling heart beating fast. Could tell rate was fast because he could feel it and he used a portable SPO2 monitor. Denied chest discomfort or pain, difficulty breathing, or nausea. Pt was non-symptomatic given ASA, history MI 2y prior. H contacted with STEMI alert. Pt transported to H without incident. Pt care transferred to ER nurse room #x

DM, MI, A-fib

Irbesartab

Balsalazide, prednisone

160/70-130-24-90%RA

140/68-122-24-98%

138/64-140-24-98%

132/64-120-24-98%

bG 163

CSS (-)

Lungs clear

Skin nl

Cardiac rhythm
disturbance

O2 4L NC

ASA

IV unsuccess

ZOLL® X Series® Defibrillator 12-Lead Report

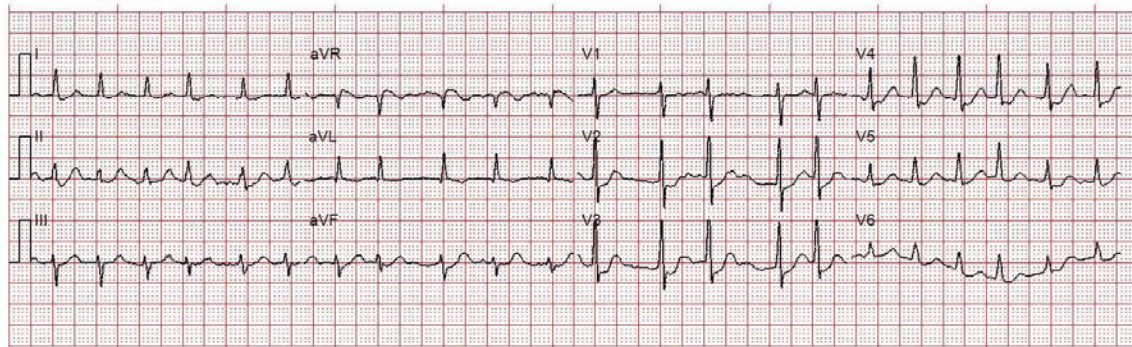
73 Male

04:07:42

PATIENT NAME: _____ HR: 131 BPM
PATIENT ID: _____ PR Interval: ---
PATIENT AGE: 73 QRS Duration: 86 ms
PATIENT SEX: MALE QT/QTc: 371/550 ms
DEVICE ID: _____ P-R-T Axis: N/A 2 56
RECORDED: _____

11

04:07:42



25 mm/s 10 mm/mV 0.52-40 Hz, ECG x1

Grid size is 0.2 s x 0.5 mV

	I	II	III	aVR	aVL	aVF	V1	V2	V3	V4	V5	V6
STJ	-0.55	-1.21	-0.66	0.87	0.05	-0.93	-0.32	-1.41	-1.66	-1.13	-1.13	-0.91

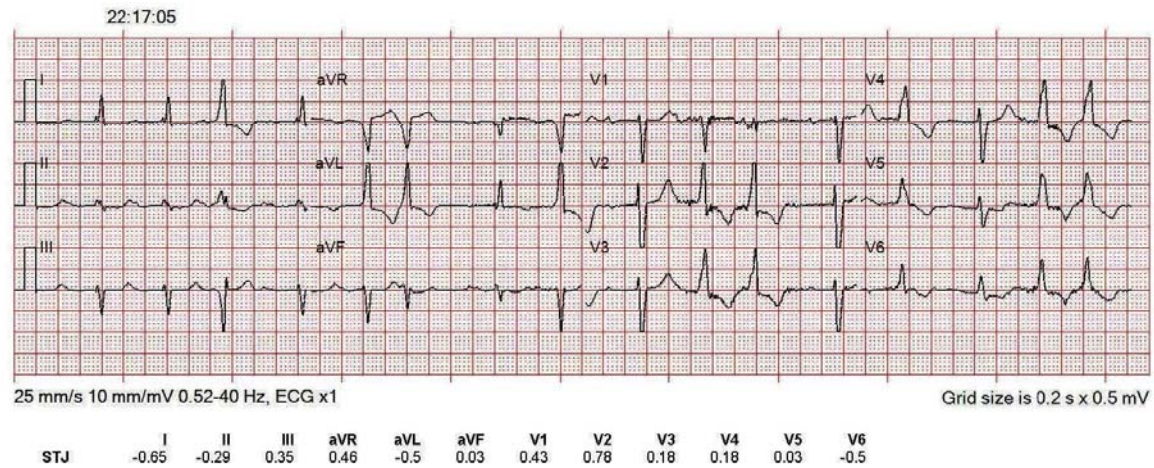
ZOLL® X Series® Defibrillator 12-Lead Report

83 Male

22:17:05

PATIENT NAME: _____	HR: 102 BPM	Abnormal finding for 40+ male Supraventricular tachycardia Nonspecific ST and T wave abnormality
PATIENT ID: _____	PR Interval: —	
PATIENT AGE: 83	QRS Duration: 109 ms	
PATIENT SEX: MALE	QT/QTc: 368/481 ms	
DEVICE ID: _____	P-R-T Axis: N/A -19 97	
RECORDED: 22:17:05		

12



55F c/o nausea x5d

211821

Dispatched for person vomiting. Upon arrival pt in bathroom vomiting into toilet. Once pt done vomiting, able to stand at sink and clean face with no problems. Pt feeling nauseous and vomiting since wed, also feeling lightheaded. When asked day of week, responded Tues, unable to remember her phone. Friend stated not normal, seemed confused. Pt stated drinking alcohol since Wed, not able to remember how much. Pt insisted on changing clothes before going to ambulance. CSS normal. Zofran admin, helped with nausea. Hosp contacted, no orders given. Reassessed during transport, no changes. Pt care transferred & report given to RN in room x.

DM, Hepatitis, Liver failure, esophageal varices, infection R index finger & R big toe, R leg clogged arteries
Amlodipine, warfarin, furosemide, metformin, insulin
Spironolactone, Cymbalta, ertapemem, lexapro, Prilosec, albuterol, synthroid

144/76-94-20-94%
140/80-90-20-94%
GCS 14
bG 215
pain 3

Altered LOC

ondansetron

ZOLL® E Series® Defibrillator 12-Lead Report

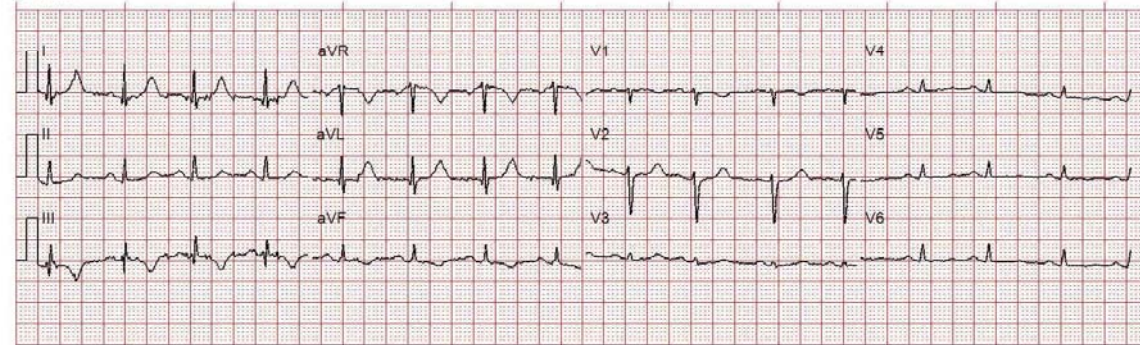
55 Female

21:18:21

PATIENT NAME: _____ Vent Rate: 90
P Duration: 108 ms
PATIENT AGE: 55 PR Interval: 144 ms
PATIENT SEX: QRS Duration: 72 ms
DEVICE ID: QT/QTc: 368/450 ms
RECORDED: P-R-T Axis: 63 40 -8

13

21:18:21



ZOLL® E Series® Defibrillator 12-Lead Report

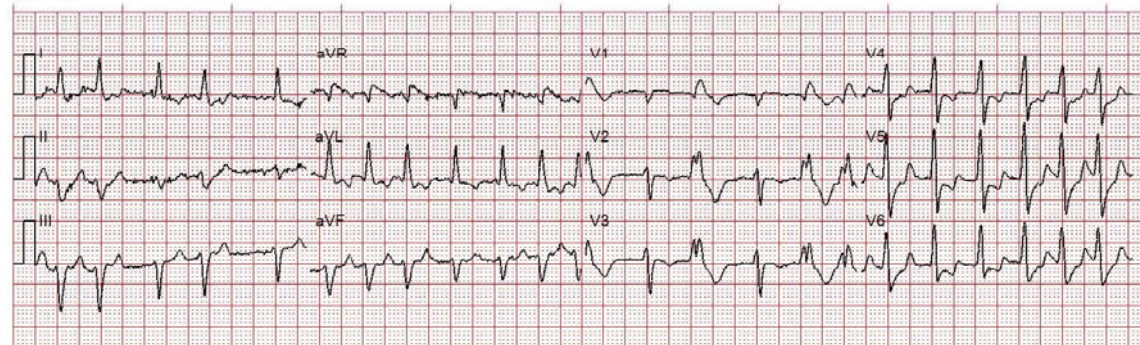
82 Male

16:34:34

PATIENT NAME: _____ Vent Rate: 139 Undetermined rhythm
P Duration: 0 ms Left axis deviation
PR Interval: 0 ms ST & T wave abnormality, consider anterolateral ischemia
QRS Duration: 108 ms Abnormal ECG
DEVICE ID: QT/QTc: 300/456 ms *** Unconfirmed ***
RECORDED: P-R-T Axis: 0 -40 120

14

16:34:34



50M Chest pain

200234

Ax/Ex responded for person having chest pain. Upon arrival crew found pt sitting on floor of living room, A&Ox4 in obvious distress. Stated approx 20 min PTOA was walking up stairs when began to have chest pain and SOB. Rated pain 10/10, radiated down L arm and up neck. Diaphoretic, breathing ~40 RPM. Denied dizziness, weakness, or abnormal meds taken. OLMC contacted, had no orders. Having severe pain back of neck that would come and go throughout transport. Did not want additional med after initial dose. Upon arrival was pain free. Pt care was transferred over to H ED RN in room x, then moved to room x.

HTN

Losartsan

158/58-110-40-99%RA
162/80-104-20-98%
160/78-98-18-99%
Pain 8-0-5
Lungs clear
Skin diaphoresis
CSS (-)

Chest pain/ discomfort

ASA

NS

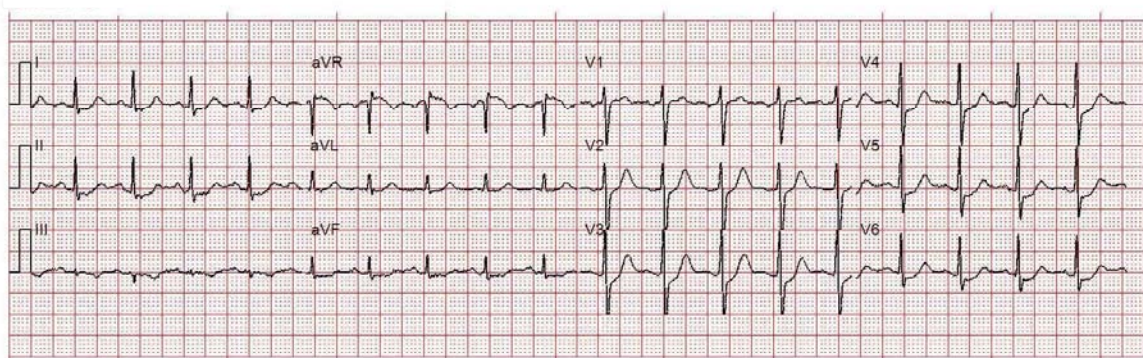
fentanyl

ZOLL® X Series® Defibrillator 12-Lead Report

51 Male
20:02:34

PATIENT NAME: _____ HR: 111 BPM
PATIENT ID: _____ PR Interval: 158 ms
PATIENT AGE: 51 QRS Duration: 87 ms
PATIENT SEX: MALE QT/QTc: 333/454 ms
DEVICE ID: _____ P-R-T Axis: 50 25 1
RECORDED: _____

15



25 mm/s 10 mm/mV 0.52-40 Hz, ECG x1

Grid size is 0.2 s x 0.5 mV

STJ I II III aVR aVL aVF V1 V2 V3 V4 V5 V6
-0.93 -0.99 -0.07 0.95 -0.43 -0.53 0 -0.94 -1.94 -1.72 -1.57 -1.32



Continuing
Medical
Education

ITS NEVER TOO LATE
TO LEARN SOMETHING NEW...



same video – 2 links

<https://www.youtube.com/playlist?list=PLaKcwBVYPBNBUbTTOmFxVa3gk-EwOqcyV>

<https://www.youtube.com/watch?v=Hcf-44TUcnE&list=PLaKcwBVYPBNBUbTTOmFxVa3gk-EwOqcyV>

95F c/o dizziness x 12h

123640

Dispatched for pt. who was sick. UOA found 95F A&Ox3 sitting in chair. States dizziness started yesterday at dinner. Had nothing to eat today. Last meal dinner yesterday. bG 327. IV attempts x2 unsuccessful. Pt. originally SPO2 85% RA. Placed on 4L O2 via NC improved SPO2 to 95%. Pt. denied any other complaints or recent trauma. X contacted and had no further orders. Pt. transported to X and transferred to ED nurse in room X without further incident.

DM, HTN

90/60-50-16-85%RA
98/52-54-16-94%

Dizziness/Vertigo

Amlodipine
Lopressor
Glucator

90/p-52-16-95%
Lungs clear
Skin dry/dehydrated

O2 4L NC
IVx2 Unsuccessful

ZOLL® E Series® Defibrillator 12-Lead Report

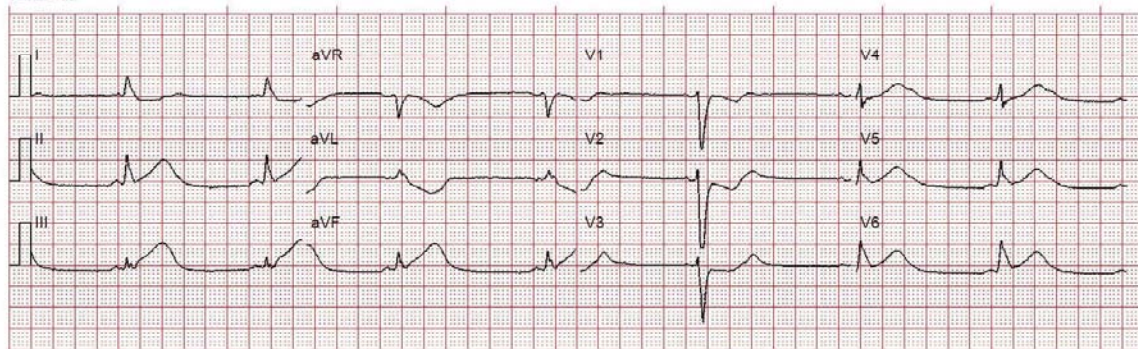
95 Female

12:36:40

PATIENT NAME:		Vent Rate:	45	Marked sinus bradycardia
PATIENT AGE:	95	P Duration:	118 ms	Left bundle branch block
PATIENT SEX:		PR Interval:	122 ms	Abnormal ECG
DEVICE ID:		QRS Duration:	142 ms	*** Unconfirmed ***
RECORDED:		QT/QTc:	804/522 ms	
		P-R-T Axis:	61 48 90	

16

12:36:40



ZOLL® E Series® Defibrillator 12-Lead Report

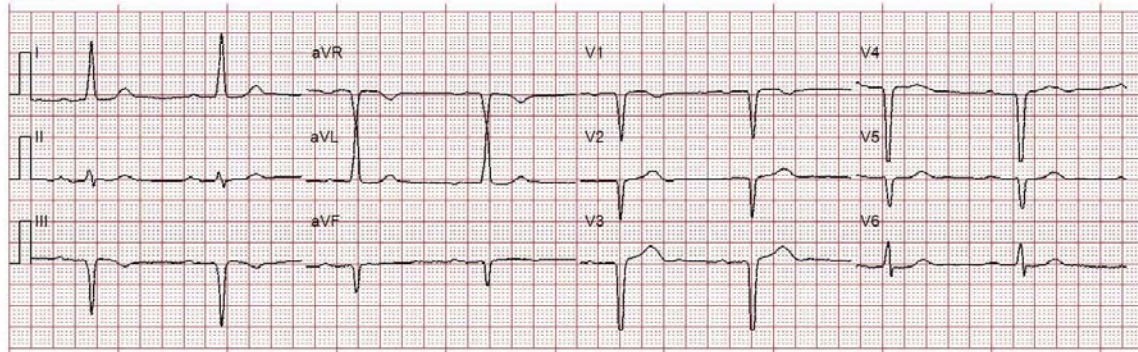
91 Female

13:20:23

PATIENT NAME: _____ Vent Rate: 49
 PATIENT AGE: 91 P Duration: 146 ms
 PATIENT SEX: PR Interval: 276 ms
 DEVICE ID: QRS Duration: 110 ms
 RECORDED: QT/QTc: 472/426 ms
 P-R-T Axis: 62 -29 3

17

13:20:23



75F Felt weak and fell

052505

Ax and Sx dispatched for woman who fell. Sx arrived first and began assessment. Ax arrived 3m later, received info from Sx & husband. Pt got up to bathroom and when returning to bed became weak and fell to floor in carpeted hallway. Husband states fell earlier in eve, with his help, was able to get up & go to bed. We finished assessment, placed C-collar, placed on stair-chair, moved to 1st floor, transferred to cot. No trauma noted by either crew, pt denies head, neck or back pain. In AMB took vitals, established Monitor. Did 12 Lead, contacted OLMC. Attempted IV, unsuccessful. Began transport, looked for another IV site. No areas looked good. Pt stable, pulse remained below 150. U/A at H transferred care to ED RN for bed.

Pulm fibrosis,
alzhimers, a-fib

Warfarin, namendia,
topiramate, prednisone,
azathioprine,
levetiracetam

110/70-140-16-98%RA
110/p-134-16

GCS 15
Pain 0
ECG VT
Lungs clear
skin nl

Weakness

C-collar
IV unsuccessful

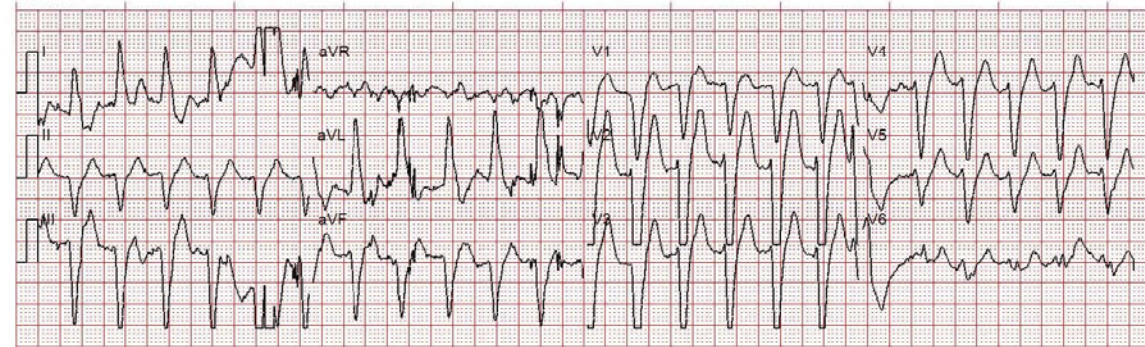
ZOLL® E Series® Defibrillator 12-Lead Report

75 Female

05:25:05

PATIENT NAME:		Vent Rate:	140	Undetermined rhythm
PATIENT AGE:	75	P Duration:	0 ms	Left axis deviation
PATIENT SEX:		PR Interval:	0 ms	Left bundle branch block
DEVICE ID:		QRS Duration:	142 ms	Abnormal ECG
RECORDED:		QT/QTc:	334/509 ms	*** Unconfirmed ***
		P-R-T Axis:	0 -51 89	

05:25:05



18

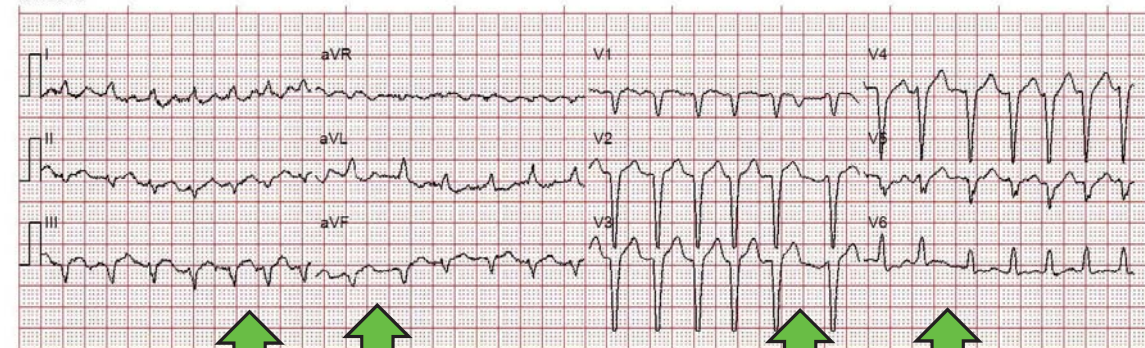
ZOLL® E Series® Defibrillator 12-Lead Report

81 Female

10:56:24

PATIENT NAME:		Vent Rate:	154	Atrial fibrillation with rapid ventricular response
PATIENT AGE:	81	P Duration:	0 ms	Left axis deviation
PATIENT SEX:		PR Interval:	0 ms	Low voltage QRS
DEVICE ID:		QRS Duration:	108 ms	Cannot rule out Anteroseptal infarct, age undetermined
RECORDED:		QT/QTc:	304/486 ms	ST & T wave abnormality, consider lateral ischemia or digitalis effect
		P-R-T Axis:	0 -44 91	Abnormal ECG
				*** Unconfirmed ***

10:56:24



19

58M Palpitations**084217**

Called for 58M feeling sick. Upon arrival, found pt laying down on dialysis chair, alert, c/o palpitations past 30 min. Pt is dialysis ctr employee, began having palpitations at work. Denied chest pain, nausea, or difficulty breathing, was on O2 prior to our arrival. 12-lead ECG SVT. IV x2 unsuccessful. Instructed and attempted vagal maneuvers during transport. H contacted with report, no orders given. Pt care given to ER RN in bed x.

DM

HTN

metoprolol

104/78-180-20-99%RA

110/74-188-20-98%RA

bG 130

lungs clear

skin nl

Cardiac rhythm
disturbance

IV x2 unsuccessful

ZOLL® E Series® Defibrillator 12-Lead Report**58 Male****08:42:17**

PATIENT NAME: _____

PATIENT AGE: 58

PATIENT SEX:

DEVICE ID:

RECORDED:

Vent Rate: 184

P Duration: 0 ms

PR Interval: 0 ms

QRS Duration: 98 ms

QT/QTc: 244/427 ms

P-R-T Axis: 0 -12 -33

Supraventricular tachycardia

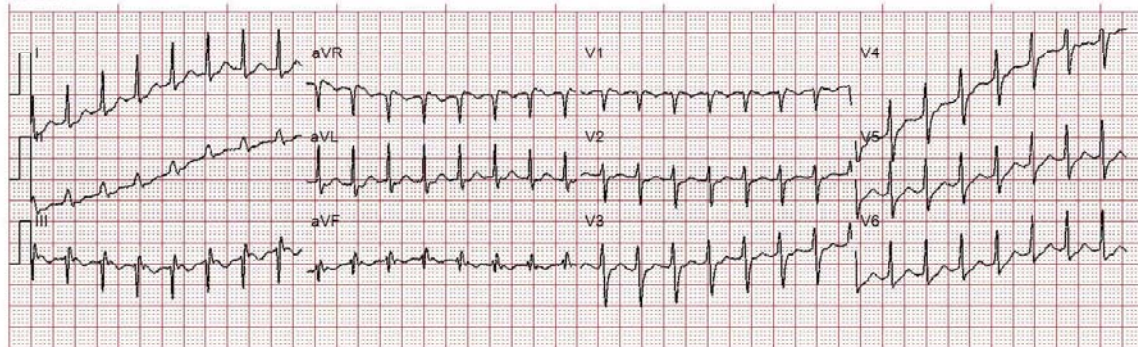
Nonspecific ST and T wave abnormality

Abnormal ECG

*** Unconfirmed ***

20

08:42:17



36F c/o palpitations x5m

093437

Called for person who feels like they are going to pass out. On arrival, A&Ox4 pt sitting in chair outside office bldg c/o near syncope, dizziness, and heart palpitations. Stated just began, has a hx of this happening. Denied chest pain, SOB, headache, or N&V. Attempted to obtain radial pulse and BP, both unable initially. Stated hospitalized last week for same, related to magnesium deficiency, elevated WBC, poor Creatinine levels, tx at hosp w/ fluids, Mg, Abx x3d, released 7d ago. Vagal x 3 unsuccessful. Called H for authorization to give Adenocard due to hx asthma and low BP. H allowed 6mg w/ 20cc flush only, required BP and call back. Adenocard given rapidly in proximal vein, w/ conversion to ST at 120. While conversion pt c/o lightheadedness and chest heaviness, subsided once conversion was complete. Stated palpitations diminished, felt better. BP taken and 2nd 200cc challenge suspended. Re-contacted H, explained procedure successful. Transported pt without incident or change to bed, report to RN.

Asthma, low Mg, low BP

Advair

Mg

RR 28-100%RA

70/p-200-24

72/p-200-28

118/82-120-20

GCS 15, Pain 0

Lungs clear, skin nl

cardiac rhythm
disturbance

IV NS 300mL

Adenosine 6mg

ZOLL® E Series® Defibrillator 12-Lead Report

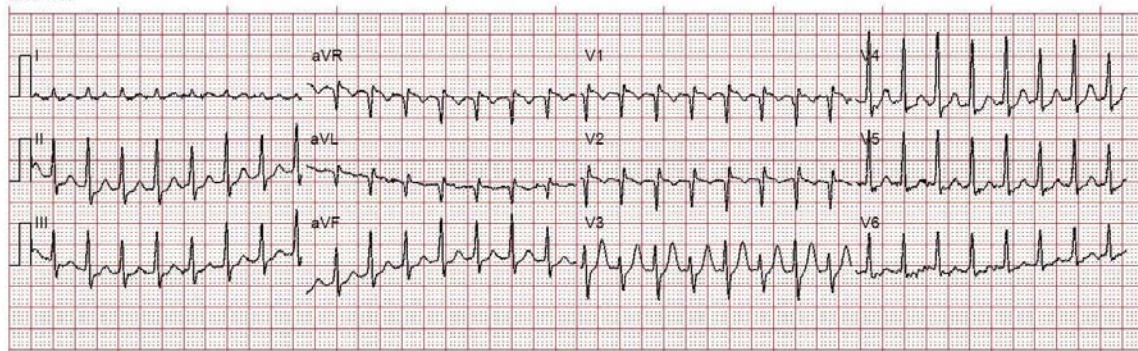
36 Female

09:34:37

PATIENT NAME:	Vent Rate: 186	Supraventricular tachycardia
PATIENT AGE: 36	P Duration: 0 ms	Septal infarct, age undetermined
PATIENT SEX:	PR Interval: 0 ms	Abnormal ECG
DEVICE ID:	QRS Duration: 72 ms	*** Unconfirmed ***
RECORDED:	QT/QTc: 244/429 ms	
	P-R-T Axis: 0 75 78	

21-22

09:34:37



25 mm/s 10 mm/mV 0.05-40 Hz, ECG x1

Grid size is 0.2 s x 0.5 mV

23M Palpatations x 30m**094817**

Called for 23M c/o chest pain. UOA, found pt sitting upright on chair in nurse's office. Began experiencing chest palpitations earlier this am. Denied chest pain/pressure, SOB, vomiting. Stated felt lightheaded and slightly nauseous. Had anxiety issues in past, denied any cardiac hx. Coached pt on vagal maneuvers. 12L on scene. Moved to Ax. H contacted on scene, advised tx w/ adenosine. Adenosine x2 before converted. Condition improved during transport after conversion. Pt care transferred to ER nurse bed B12.

ADD
Ritalin

84/54-212-16-99%RA
102/76-94-14
GCS 15
Lungs clear
Skin nl

Cardiac rhythm
disturbance

ASA
IV NS
Adenosine 6mg, 12mg

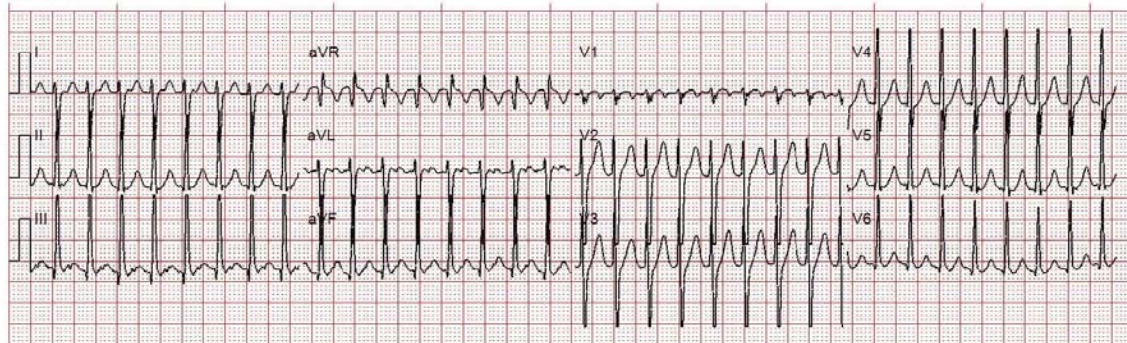
ZOLL® E Series® Defibrillator 12-Lead Report

23 Male
09:48:17

PATIENT NAME:		Vent Rate: 199	Supraventricular tachycardia
PATIENT AGE: 23		P Duration: 0 ms	Right axis deviation
PATIENT SEX:		PR Interval: 0 ms	Abnormal ECG
DEVICE ID:		QRS Duration: 76 ms	*** Unconfirmed ***
RECORDED:		QT/QTc: 238/433 ms	
		P-R-T Axis: 0 110 55	

23

09:48:17



12L post adenosine:
NSR, ventricular pre-excitation, WPW pattern

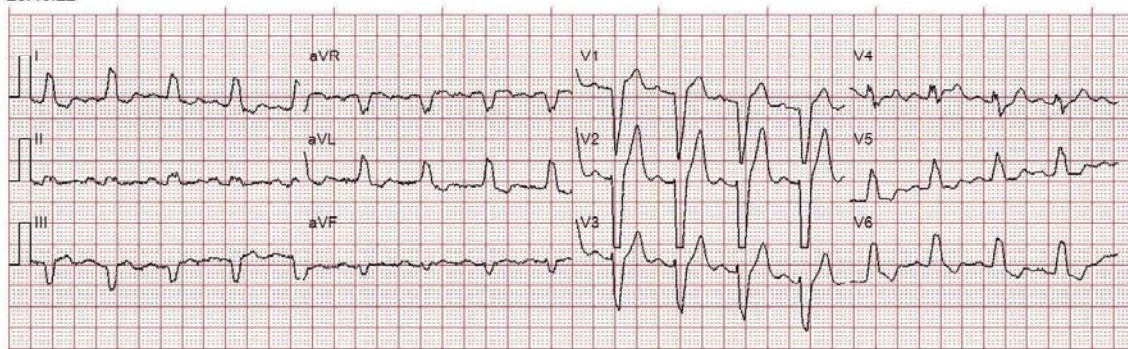
ZOLL® E Series® Defibrillator 12-Lead Report

77 Male

20:46:22

PATIENT NAME:		Vent Rate:	103	Sinus tachycardia
PATIENT AGE:	77	P Duration:	114 ms	Left bundle branch block
PATIENT SEX:		PR Interval:	192 ms	Abnormal ECG
DEVICE ID:		QRS Duration:	130 ms	*** Unconfirmed ***
RECORDED:		QT/QTc:	318/416 ms	
		P-R-T Axis:	63 -14 124	

20:46:22



24

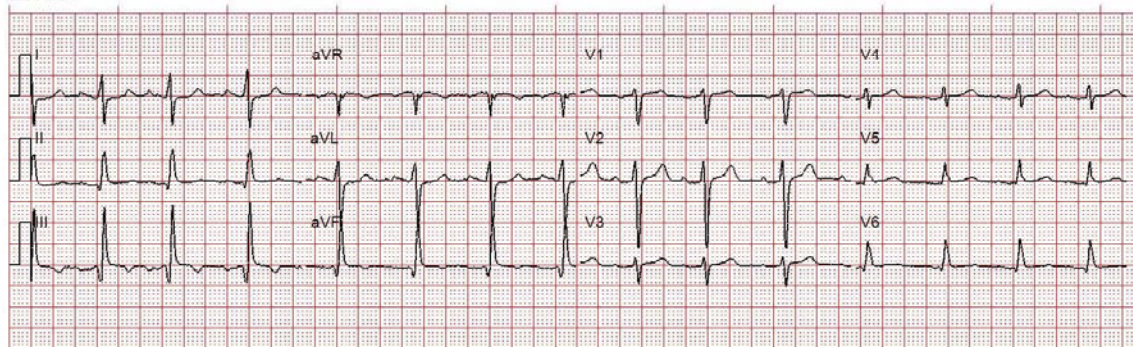
ZOLL® E Series® Defibrillator 12-Lead Report

64 Female

09:11:12

PATIENT NAME:		Vent Rate:	86	Normal sinus rhythm with sinus arrhythmia
PATIENT AGE:	64	P Duration:	110 ms	Rightward axis
PATIENT SEX:		PR Interval:	174 ms	Inferior infarct, age undetermined
DEVICE ID:		QRS Duration:	102 ms	Abnormal ECG
RECORDED:		QT/QTc:	366/437 ms	*** Unconfirmed ***
		P-R-T Axis:	-2 101 0	

09:11:12



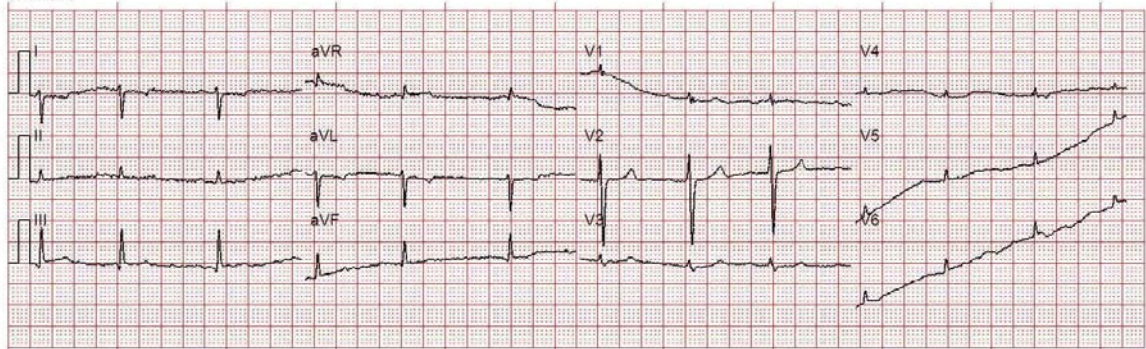
25

ZOLL® E Series® Defibrillator 12-Lead Report
51 Female
18:54:03

26

PATIENT NAME: _____ Vent Rate: 79 Normal sinus rhythm with occasional premature ventricular and fusion complexes
P Duration: 62 ms Possible Right ventricular hypertrophy
PR Interval: 194 ms ST elevation consider lateral injury or acute infarct
QRS Duration: 80 ms Prolonged QT
QT/QTc: 552/632 ms ***** Acute MI *****
RECORDED: P-R-T Axis: 72 135 -175 Abnormal ECG
*** Unconfirmed ***

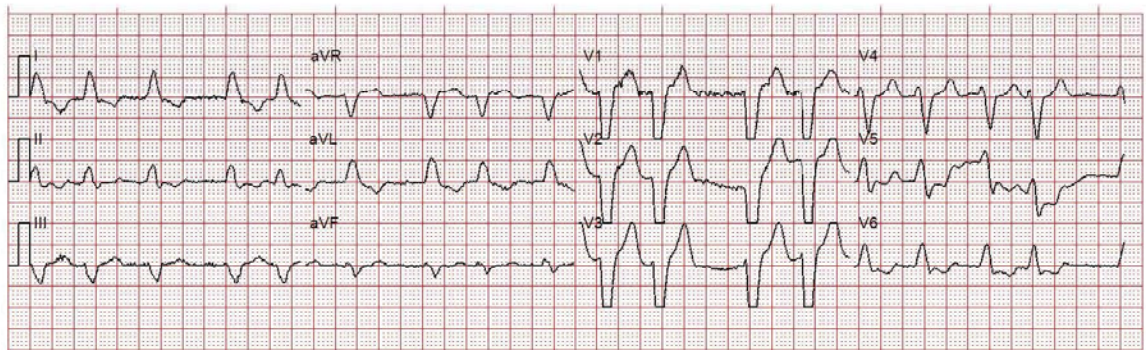
18:54:03



ZOLL® X Series® Defibrillator 12-Lead Report
88 Male
09:03:28

27

PATIENT NAME: _____ HR: 102 BPM Abnormal finding for 40+ male
PATIENT ID: _____ PR Interval: --- Atrial fibrillation with rapid ventricular response
PATIENT AGE: 88 QRS Duration: 174 ms Left bundle branch block [120+ ms QRS duration, 80+ ms Q/S in V1/V2, 85+ ms R in I/aVL/V5/V6]
PATIENT SEX: MALE QT/QTc: 401/525 ms Excluding conditions detected (CLBBB, QRSD>140 ms)
DEVICE ID: _____ P-R-T Axis: N/A -7 146
RECORDED: _____



25 mm/s 10 mm/mV 0.52-40 Hz, ECG x1

Grid size is 0.2 s x 0.5 mV

STJ	I	II	III	aVR	aVL	aVF	V1	V2	V3	V4	V5	V6
	-0.94	-0.49	0.45	0.71	-0.7	-0.02	2.25	2.87	2.31	-0.22	-2.29	-1

86F Hypertension**175252**

Ax dispatched for hypertension. U/A, 86F, A&Ox3. Family took pt to treatment ctr to get rash on L triceps examined. Pt. became light headed & SOB while walking to car. Family concerned BP was high, got pt home, attempted to check BP, but not able to get reading. EMS assessment, pt. denied chest pain or SOB, denied any type of pain. Family stated pt. looked a little pale. Pt. and family stated would feel more comfortable if pt. examined at hospital. H contacted, info relayed, no orders given. Pt. transported without any changes in condition. Pt. care transferred to RN assigned to room x of the ER.

HTN, colitis

Metoprolol, lisinopril,
synthroid

148/90-72-18-95%RA

GCS 15

Pain 0

bG 101

lungs clear

skin pale

Hypertension

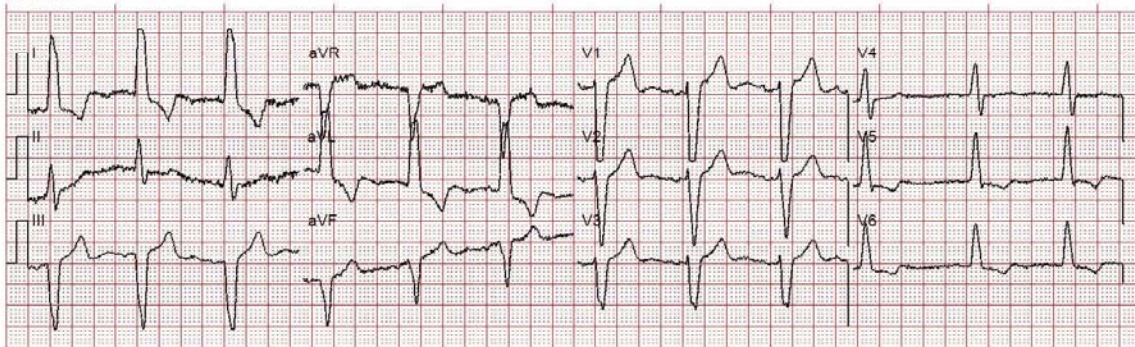
ZOLL® E Series® Defibrillator 12-Lead Report**86 Female****17:52:52**

PATIENT NAME: _____ Vent Rate: 71
PATIENT AGE: 86 P Duration: 42 ms
PATIENT SEX: PR Interval: 152 ms
DEVICE ID: QRS Duration: 132 ms
RECORDED: QT/QTc: 390/423 ms
P-R-T Axis: 108 -23 142

Normal sinus rhythm with occasional premature supraventricular complexes
Left bundle branch block
Abnormal ECG
*** Unconfirmed ***

28

17:52:52



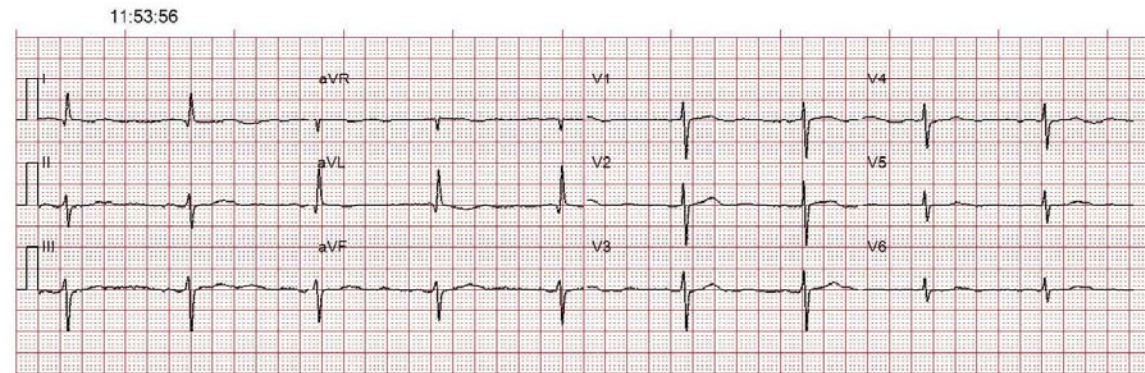
ZOLL® X Series® Defibrillator 12-Lead Report

85 Female

11:53:56

PATIENT NAME: _____	HR: 53 BPM	Abnormal finding for 40+ female
PATIENT ID: _____	PR Interval: 167 ms	Sinus bradycardia
PATIENT AGE: 85	QRS Duration: 111 ms	Left anterior fascicular block (QRS axis < -44, QR in I, RS in II)
PATIENT SEX: FEMALE	QT/QTc: 411/389 ms	Nonspecific T wave abnormality
DEVICE ID: _____	P-R-T Axis: 94 -47 86	
RECORDED: _____		

29



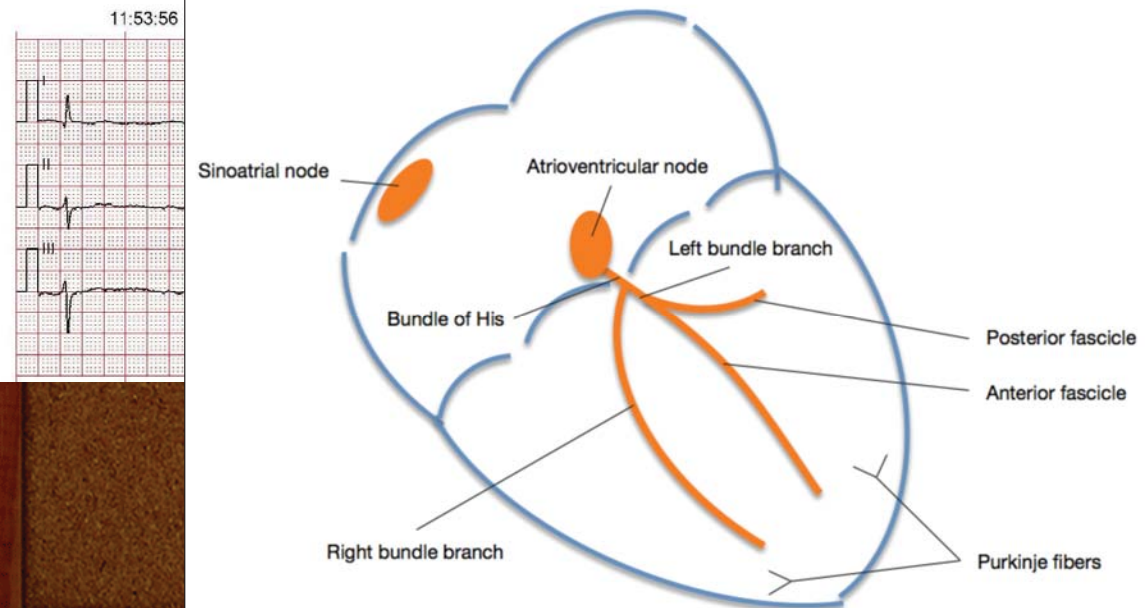
ZOLL® X Series® Defibrillator 12-Lead Report

85 Female

11:53:56

PATIENT NAME: _____	HR: 53 BPM	Abnormal finding for 40+ female
PATIENT ID: _____	PR Interval: 167 ms	Sinus bradycardia
PATIENT AGE: 85	QRS Duration: 111 ms	Left anterior fascicular block (QRS axis < -44, QR in I, RS in II)
PATIENT SEX: FEMALE	QT/QTc: 411/389 ms	Nonspecific T wave abnormality
DEVICE ID: _____	P-R-T Axis: 94 -47 86	
RECORDED: _____		

29



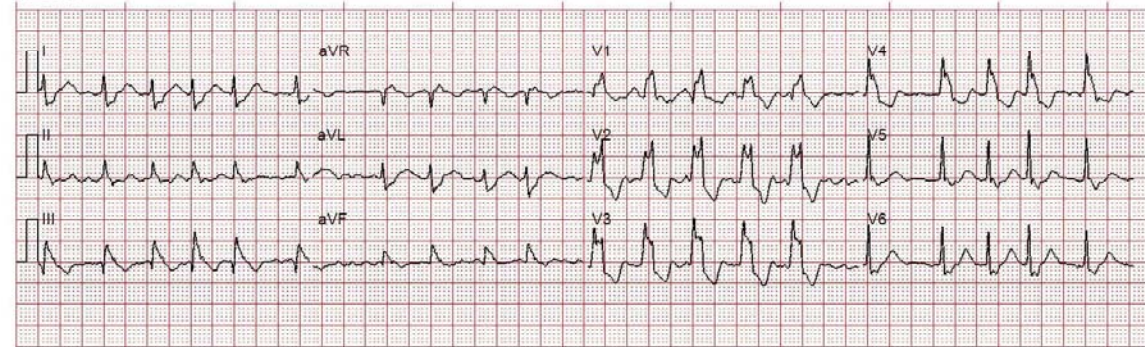
ZOLL® E Series® Defibrillator 12-Lead Report

73 Male

08:35:00

PATIENT NAME: _____ Vent Rate: 120 Atrial fibrillation with rapid ventricular response
P Duration: 0 ms Right bundle branch block
P-R-T Axis: 0 79 -1 Abnormal ECG
*** Unconfirmed ***

08:35:00



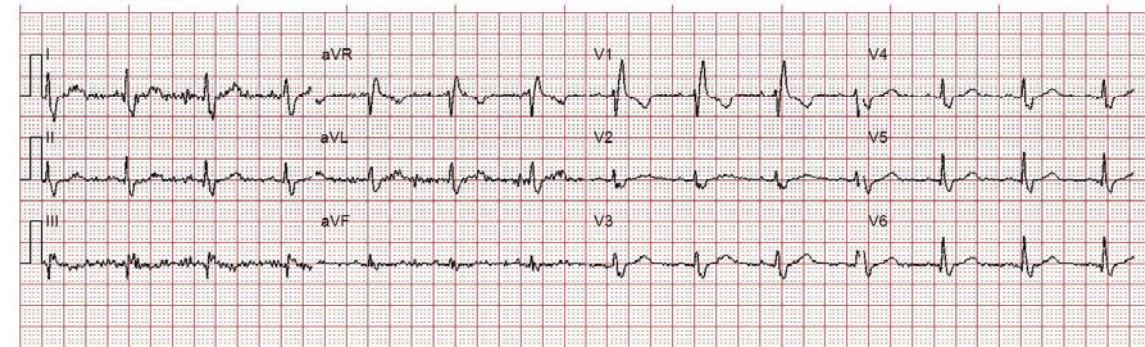
ZOLL® X Series® Defibrillator 12-Lead Report

73 Male

210:23:55

PATIENT NAME: _____ HR: 80 BPM
PATIENT ID: _____ PR Interval: 153 ms
PATIENT AGE: 73 QRS Duration: 146 ms
PATIENT SEX: MALE QT/QTc: 394/457 ms
DEVICE ID: _____ P-R-T Axis: 59 -9 20
RECORDED: _____

10:23:55



25 mm/s 10 mm/mV 0.52-40 Hz, ECG x1

Grid size is 0.2 s x 0.5 mV

	I	II	III	aVR	aVL	aVF	V1	V2	V3	V4	V5	V6
STJ	0.1	0.14	0.03	-0.13	0.03	0.08	-0.13	0.15	0.28	0.15	0.03	0

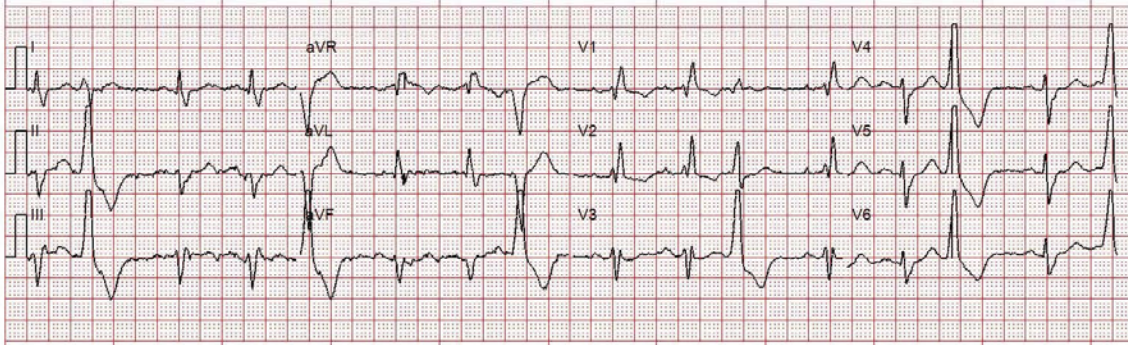


ZOLL® E Series® Defibrillator 12-Lead Report
MACK 83 Female
06:43:08

32

PATIENT NAME:	Vent Rate: 90	Normal sinus rhythm with frequent premature ventricular complexes
PATIENT ID:	P Duration: 114 ms	Right bundle branch block
PATIENT AGE: 83	PR Interval: 174 ms	Left anterior fascicular block
PATIENT SEX:	QRS Duration: 146 ms	*** Bifascicular block ***
DEVICE ID:	QT/QTc: 416/508 ms	Abnormal ECG
RECORDED:	P-R-T Axis: 58 -81 60	*** Unconfirmed ***

06:43:08

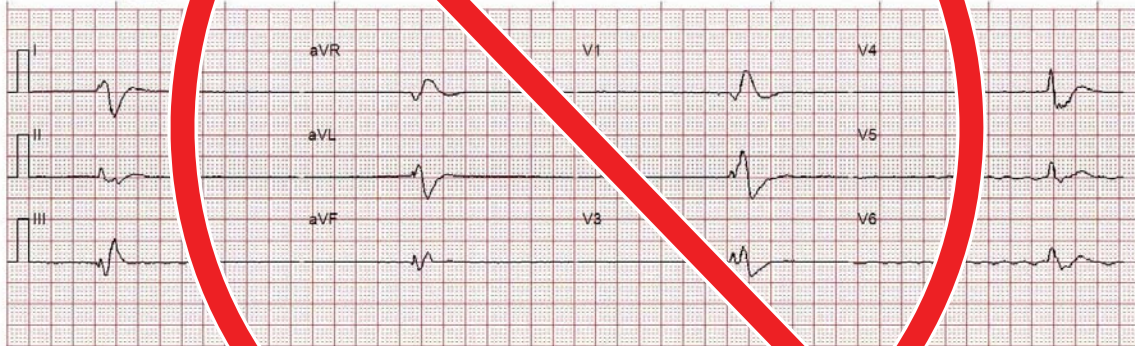


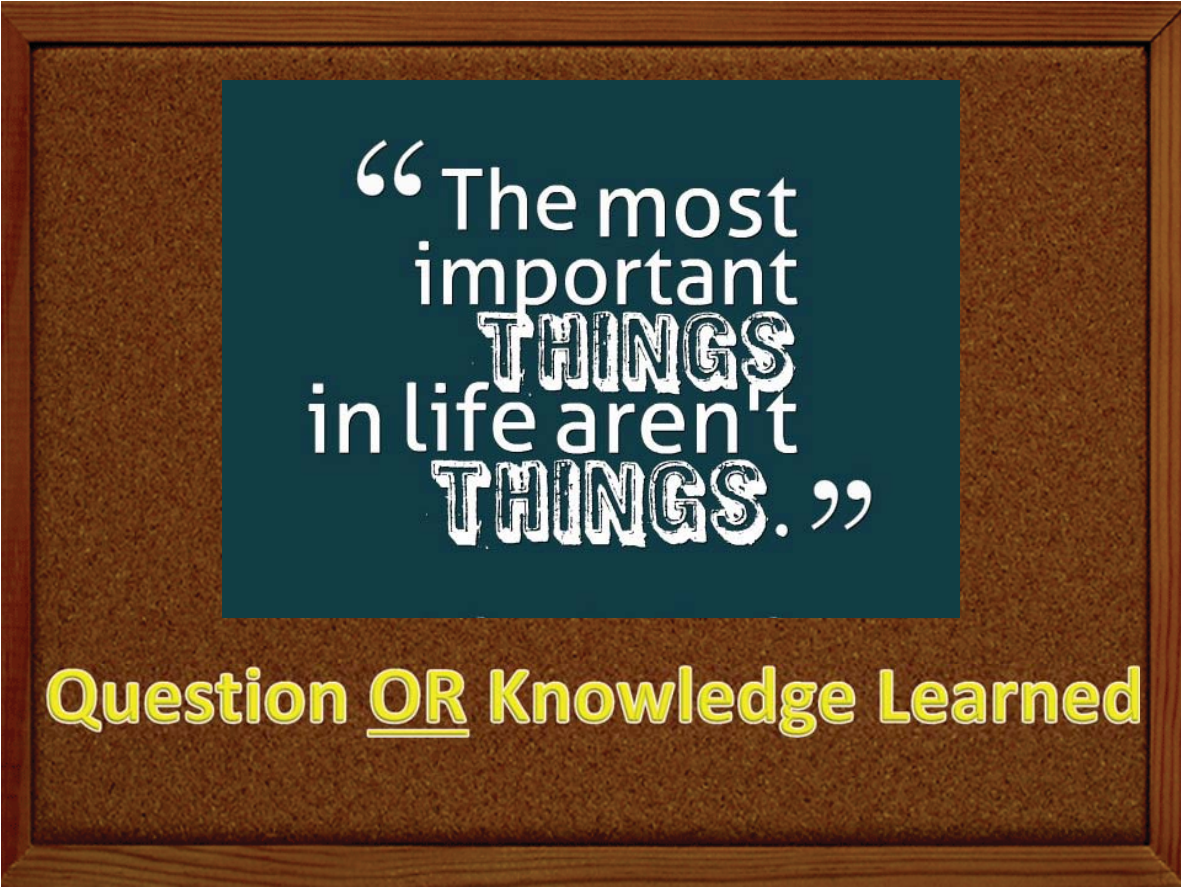
ZOLL® X Series® Defibrillator 12-Lead Report
45 Male
17:24:18

33

PATIENT NAME:	HP	20 BPM	Abnormal finding for 40+ male
PATIENT AGE: 45	Interval: —	Duration: 239 ms	Probable acute ST elevation posterior infarct w/ ST extension [confounder adj. STE in III, ST dep in aVL/V2/V3]
PATIENT SEX: MALE	Q: 455/268 ms	Right bundle branch block [120+ ms QRS duration, uprig. 40+ ms S in I/aVL/V5/V6]	Undetermined regular rhythm
DEVICE ID:	P-R-T: N/A 150 180	Left posterior fascicular block [QRS axis > 109, inferior Q]	Short QT interval
RECORDED:			Excluding conditions detected (RBBB, QRSD>140 ms)

17:24:18





“The most
important
THINGS
in life aren't
THINGS.”

Question OR Knowledge Learned