

Cardiac Case Studies

EMS, CAH, & Tertiary

Clinic to Hospital

Brandi Ellison, MBA, BSN, RN
Sanford Bismarck

Background:

- ★ 54 yo M with sudden onset substernal chest pain approximately 1 hour PTA
 - Patient weak, diaphoretic, and felt “woozy”
- ★ PMH
 - Hyperlipidemia
 - Coronary Artery Disease
 - Current 0.5 ppd Smoker X 35 Years
- ★ Home Medications
 - ASA daily
 - NTG PRN for Chest Pain

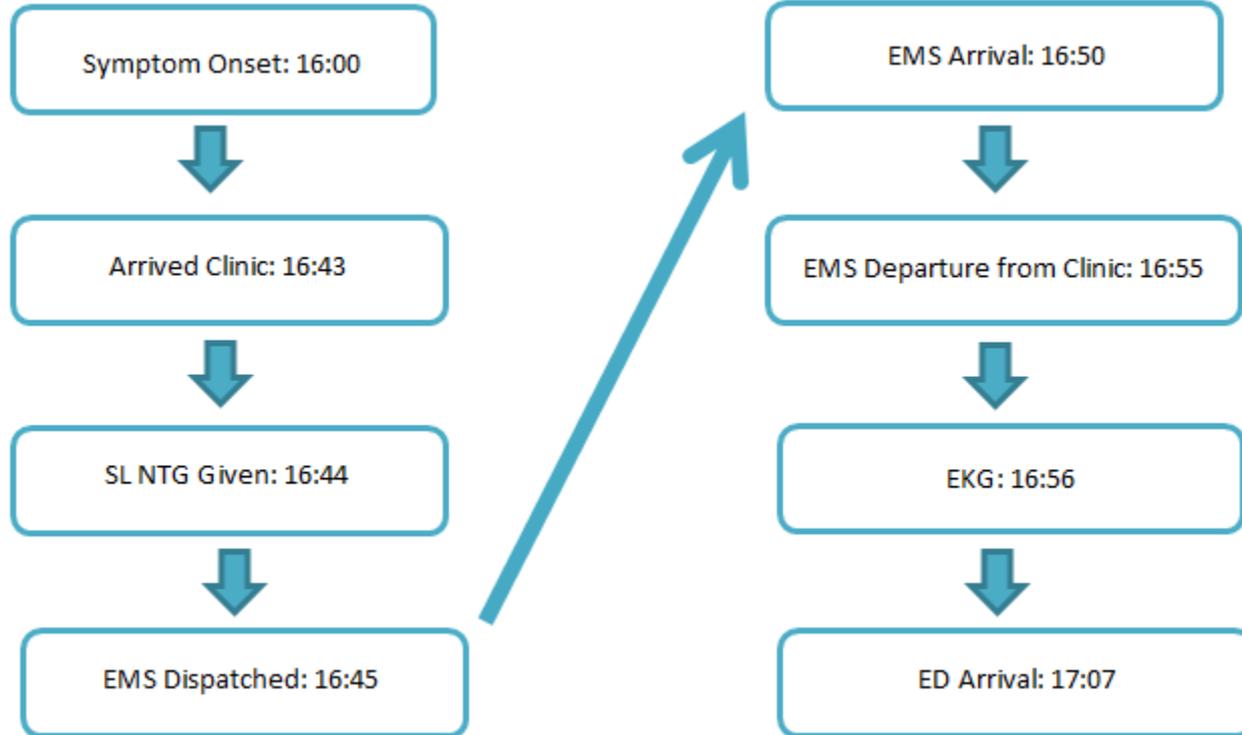


Clinic:

- ★ Patient presented to clinic via private vehicle
- ★ Immediately roomed and assessed by nurses and a physician
 - Initial vitals: BP 120/70; HR 50; O2 96% 2L O2; Pain 7/10
 - Patient took ASA PTA
 - Received SL NTG which decreased pain rating to 4/10
 - EMS contacted for emergent transfer to hospital



Clinic and EMS Timeline:

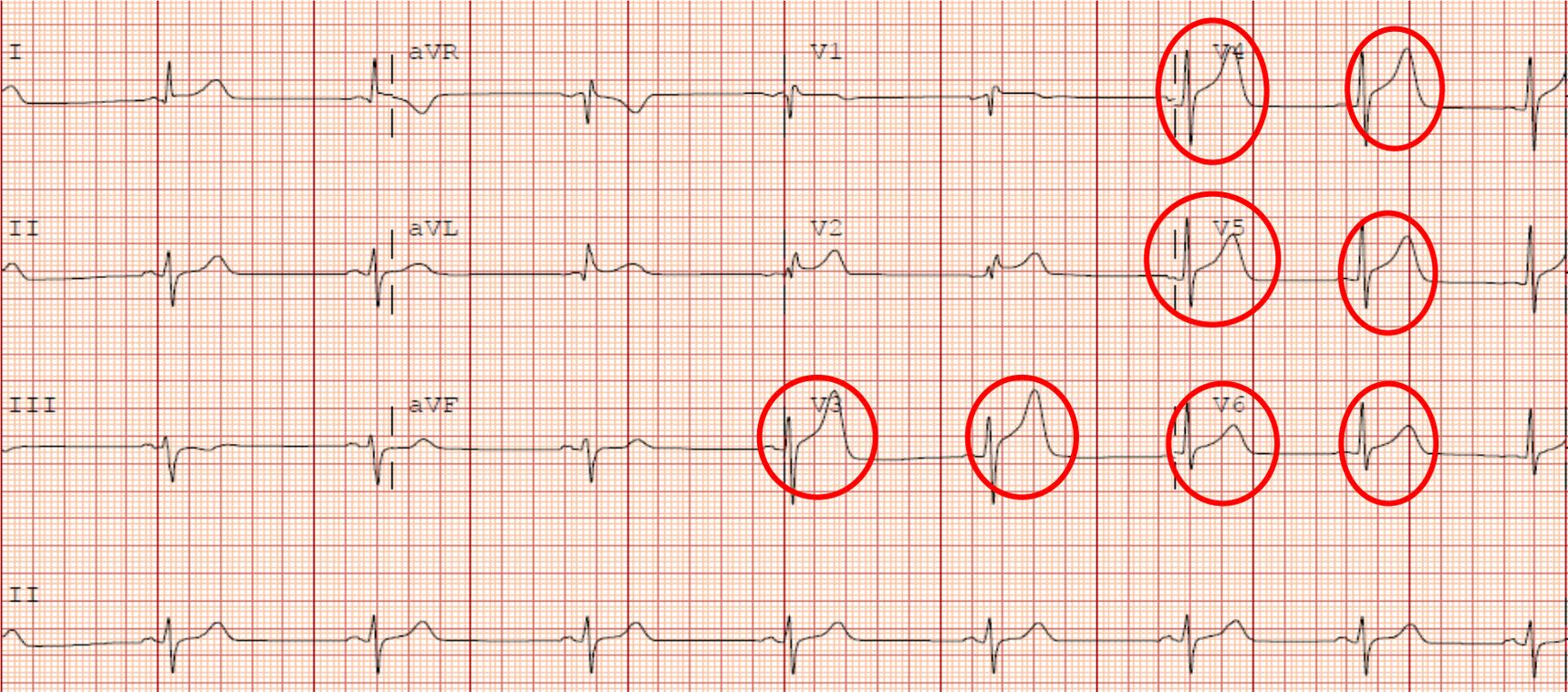


Clinic & EMS:

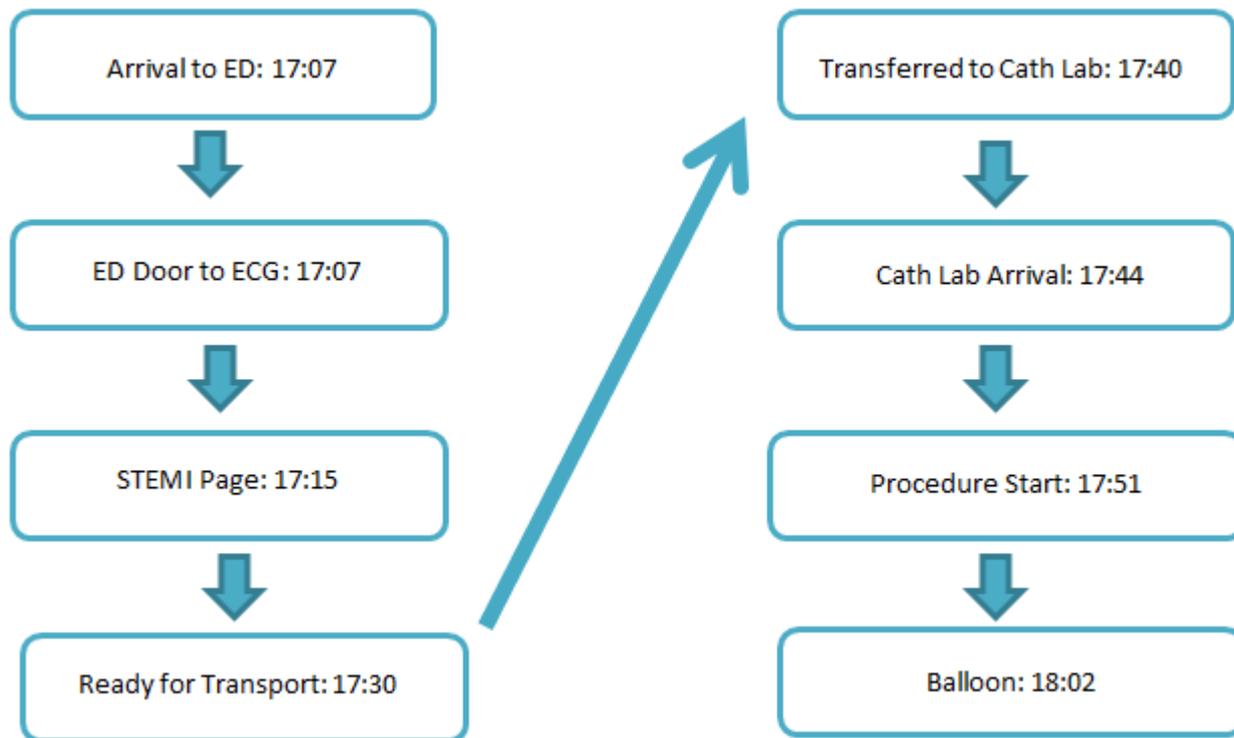
- ★ Clinic Door In Door Out Time: 12 Minutes
- ★ Clinic Door to EMS Dispatch Time: 2 Minutes
- ★ EMS Dispatch to EMS Arrival Time: 5 Minutes
- ★ EMS Arrival to EMS Departure Time: 5 Minutes
- ★ EMS Arrival to ECG: 6 Minutes
- ★ EMS Departure to Arrival at Sanford ED: 12 Minutes
- ★ Patient Arrival at Clinic to Arrival at Sanford ED: 24 Minutes



ECG: Hyperacute T Waves and Elevation in Anterior and High Lateral Leads

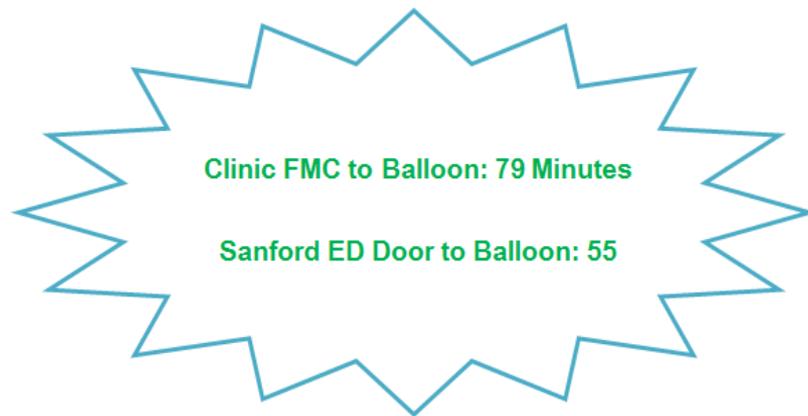


ED and Cath Lab Timeline:

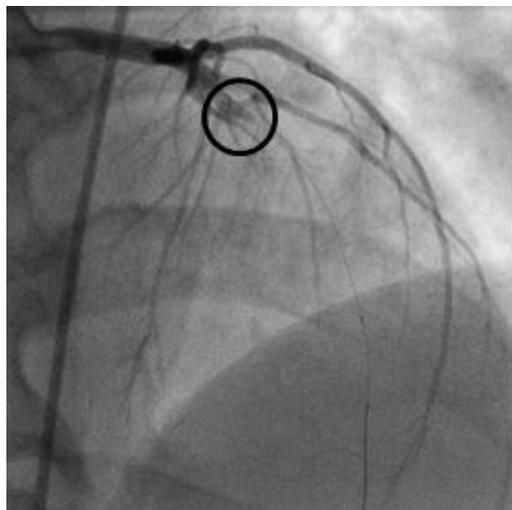


ED & Cath Lab:

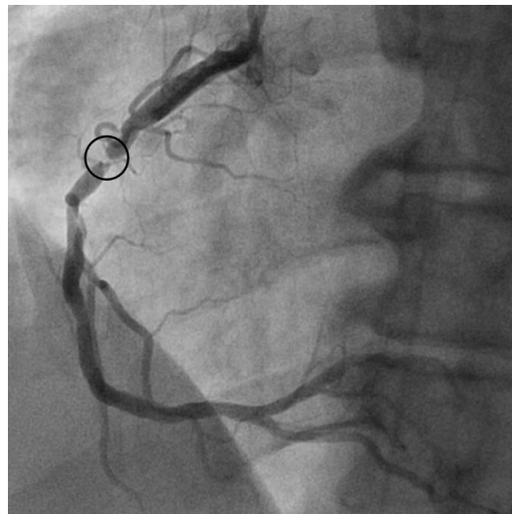
- ★ ED Door In Door Out Time: 33 Minutes
- ★ ED Door to ECG Time: 0 Minutes
- ★ ECG to STEMI Page Time: 8 Minutes
- ★ STEMI Page to ED Door OutTime: 25 Minutes
- ★ ED Door Out to Arrival in Cath Lab Time: 4 Minutes
- ★ Cath Lab Door to Procedure Start Time: 7 Minutes
- ★ Procedure Start Time to Balloon Time: 11 Minutes



Cath Lab Pre Images

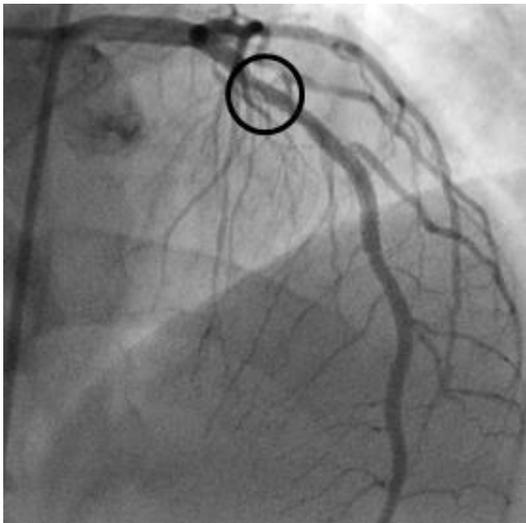


- ★ Culprit Lesion
- ★ 100% Stenosis to Mid LAD
- ★ TIMI 0 Flow Distal to the Lesion

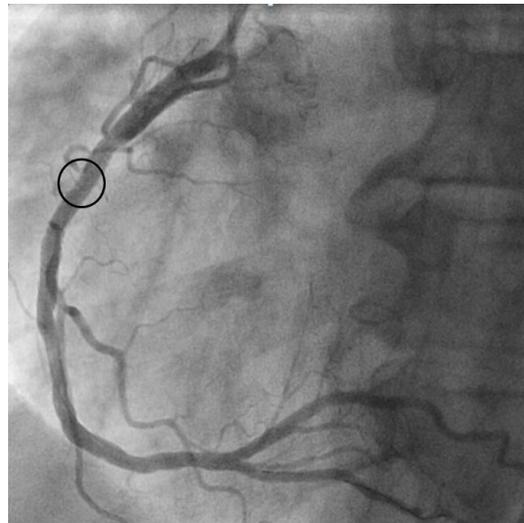


- ★ 100% Stenosis to Mid RCA
- ★ TIMI 2-3 Flow Distal to the Lesion

Cath Lab Post Images



- ★ Post Balloon Dilation and Stent Placement
- ★ 0% Residual Stenosis
- ★ TIMI 3 Flow Distal to the Lesion



- ★ Post Balloon Dilation and Stent Placement
- ★ 0% Residual Stenosis
- ★ TIMI 3 Flow Distal to the Lesion

Post Cath

- ★ After cardiac cath and PCI, patient was transferred to the general cardiac floor and discharged after a 3 night stay.
- ★ Discharged on ASA, Ticagrelor, Beta Blocker, ACE-I, and High Intensity Statin
- ★ Received smoking cessation counseling during hospital stay
- ★ Referred to a comprehensive cardiac rehabilitation program



Recap

- ★ First Medical Contact (Clinic) to Balloon/Device: **79 Minutes** (Goal \leq 90 Minutes)
- ★ ER Door to Balloon/Device: **55 Minutes** (Goal \leq 90 Minutes)

★ Clinic and Cardiology staff involved in the patient's care were nominated for and received the Hero Award!





Thank You!

EMS to Tertiary Hospital

Jerilyn Alexander, BSN, RN
Trinity Health

Patient Scenario

— — —

EMS dispatched to home of patient experiencing chest pain.

- Patient 61 yo male
- PMH IDDM
- Pain onset just prior to calling 911
- “Elephant sitting on my chest”
- Pale, diaphoretic, restless

EMS

Dispatched: 1444

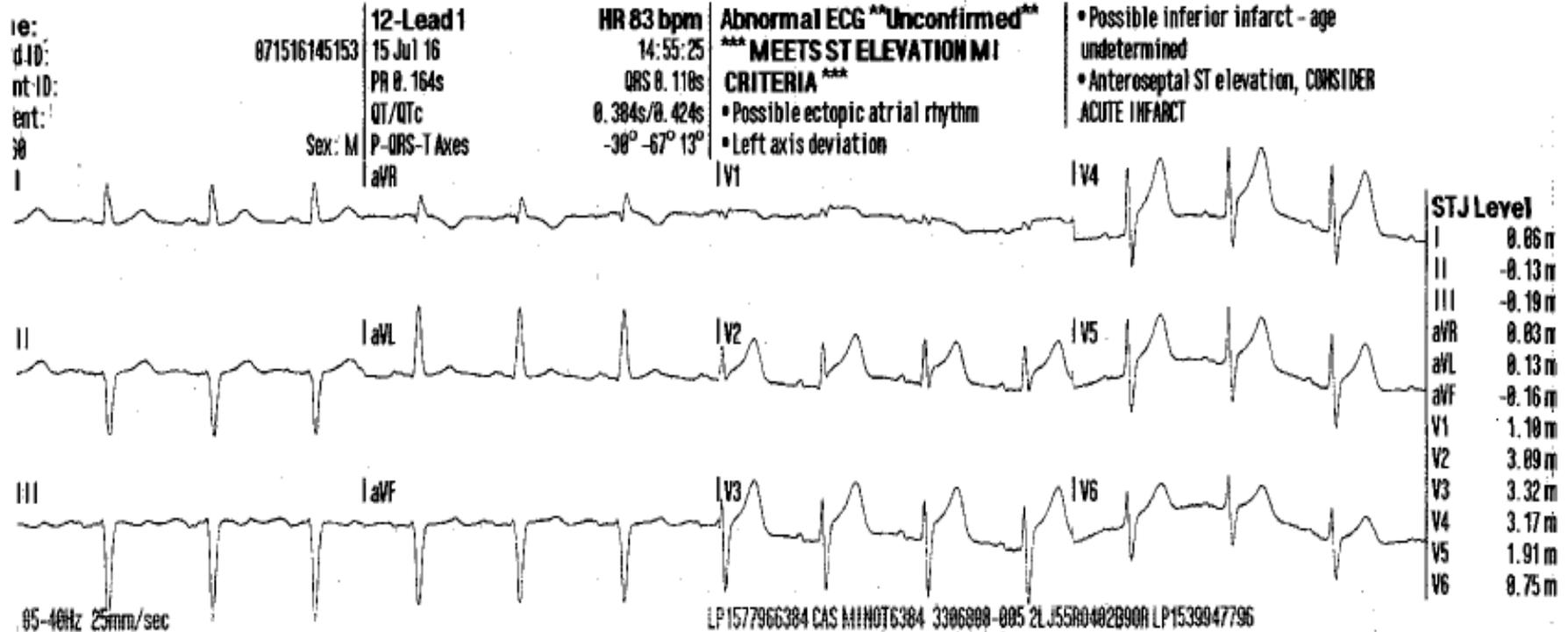
Arrive: 1450

Contact: 1451

EKG: 1455



Initial EKG



EMS

1451- Contact with patient
— — —

1452-Patients pain 10/10

1453- VS: BP 160/94, HR 90, Resp 18

1455-EKG **STEMI**

1456-4 Baby Aspirin given

1458-Nitro Spray

1500-IV Normal Saline started

1501- VS: BP 133/83, HR 83, Resp 18

1503- Pain 5/10, **DEPART SCENE**

1504 VS: BP 172/106 HR 72, Resp 18



**Contact time to ECG-
4 minutes
Scene time-13 minutes**

Emergency Department

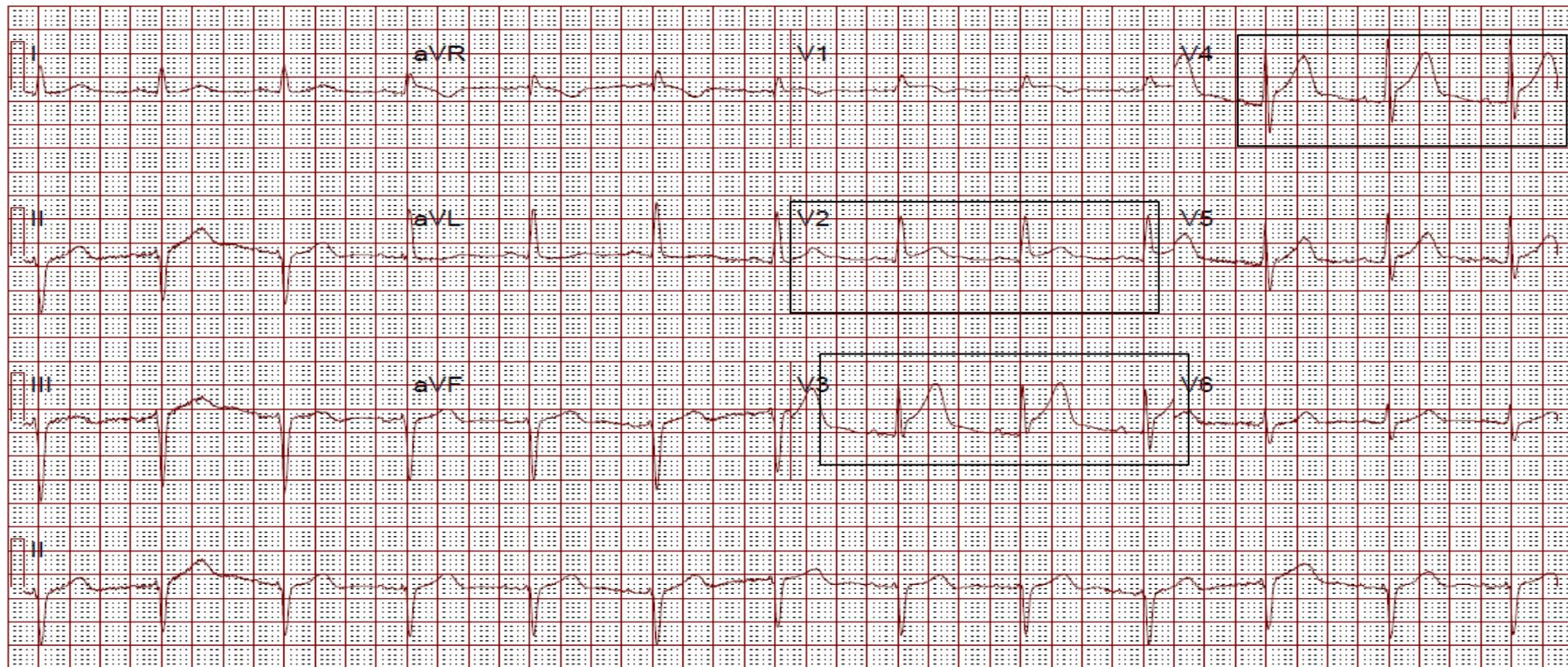
STEMI Alert called at 1505

Arrival 1509

EKG 1511



Hospital EKG-Early ST Elevation in Anterior Leads



Hospital Course

Brief exam by ED physician

Nitro drip started

To Cath lab at 1516

Procedure started at 1526

Wire crossed lesion at 1534



THEN....

Name:

ID: 20160715152116 15 Jul 2016 15:36:08 HR: 239

▼Shock 1: 200J Impedance 97

x1 1-30Hz

AMISEKG



25mm/sec

17040 3201646-056 2065588KG36678 LP2038481628

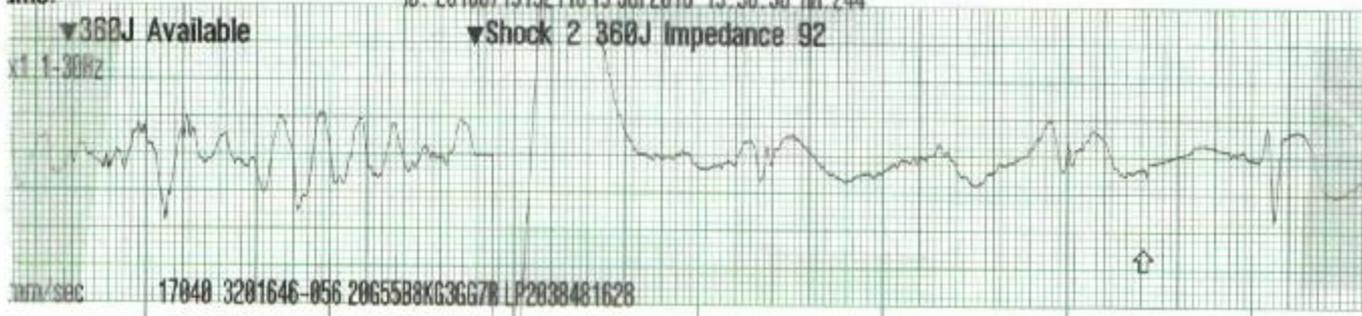
Name:

ID: 20160715152116 15 Jul 2016 15:36:38 HR: 244

▼360J Available

▼Shock 2: 360J Impedance 92

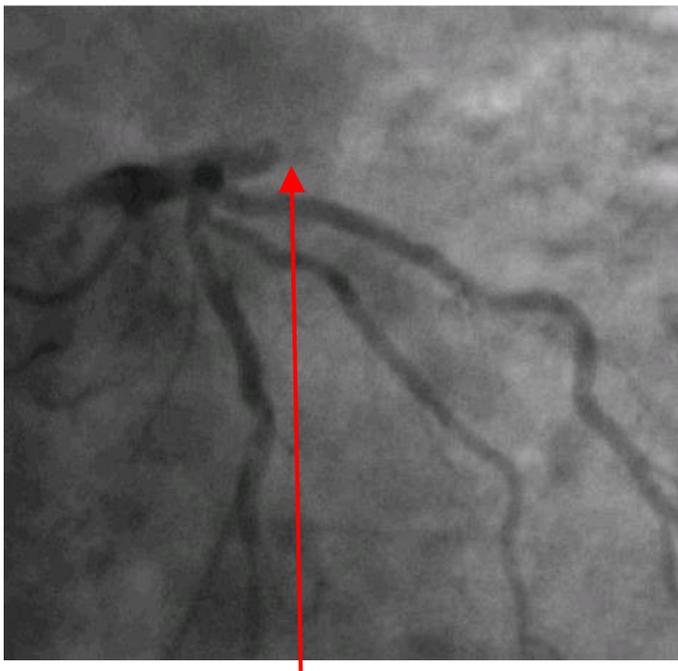
x1 1-30Hz



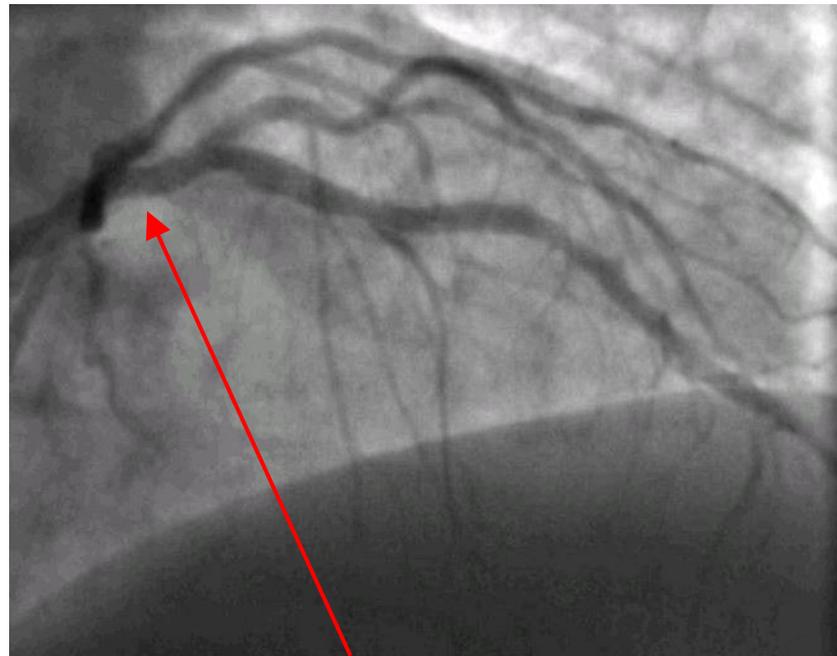
25mm/sec

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Cath lab Pictures



Before-LAD 100% Occlusion



After-Angioplasty/DES placement to LAD

STEMI Timing

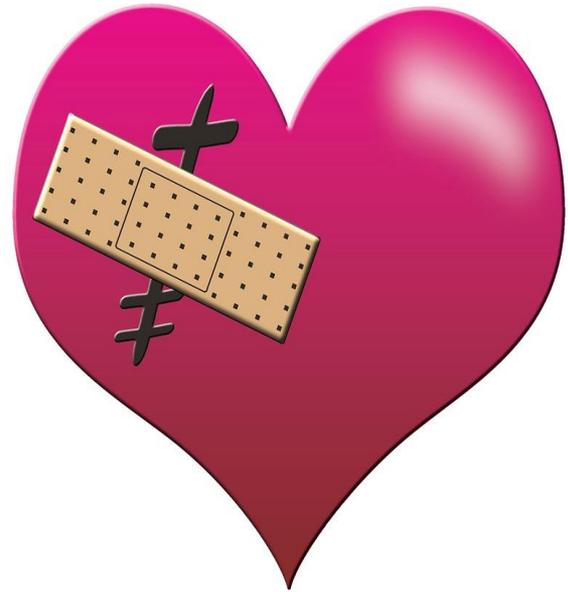
Door to EKG= **2** minutes (GOAL < 10)

Door to Cath Lab= **7** minutes (GOAL < 30)

Door to Wire= **25** minutes (GOAL < 60)

First Medical Contact to Reperfusion=

43 minutes



Outcome

DC home in 2 days

AMI Aborted as Troponin and CPK had minimal elevation

He had to come back for staged intervention to the RCA and Circumflex

No complications from his AMI or procedure

EF at discharge 45-50%

DC meds ASA, Plavix, Lisinopril, Toprol, Lipitor

CAH to Tertiary Hospital

Lynde Quirk, RN
Altru Health System

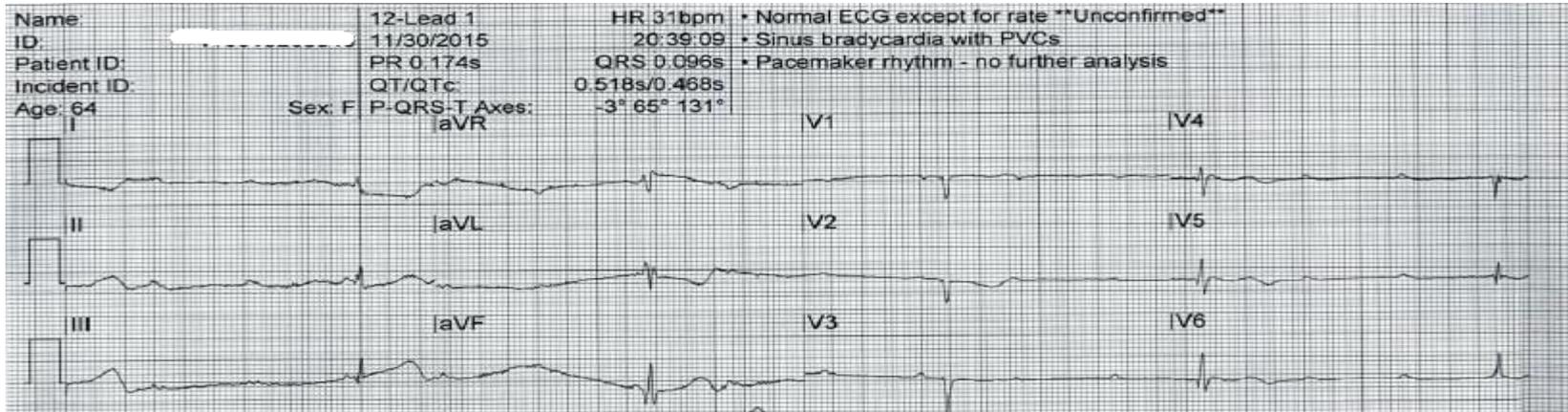
Patient Scenario:

- EMS dispatched out for a women who “passed out”, who had chest pain. Family told EMS that she attempted to come by car but collapsed to the ground. She has taken Aspirin.

Patient Scenario:

- On arrival the 64 y.o. Female patient had a pulse was 26 BPM and her blood pressure was 92/56. She was very pale. She then was transported via EMS to CAH with complaints of chest pain that started approximately at 1700, 3 hours prior to the call to 911.

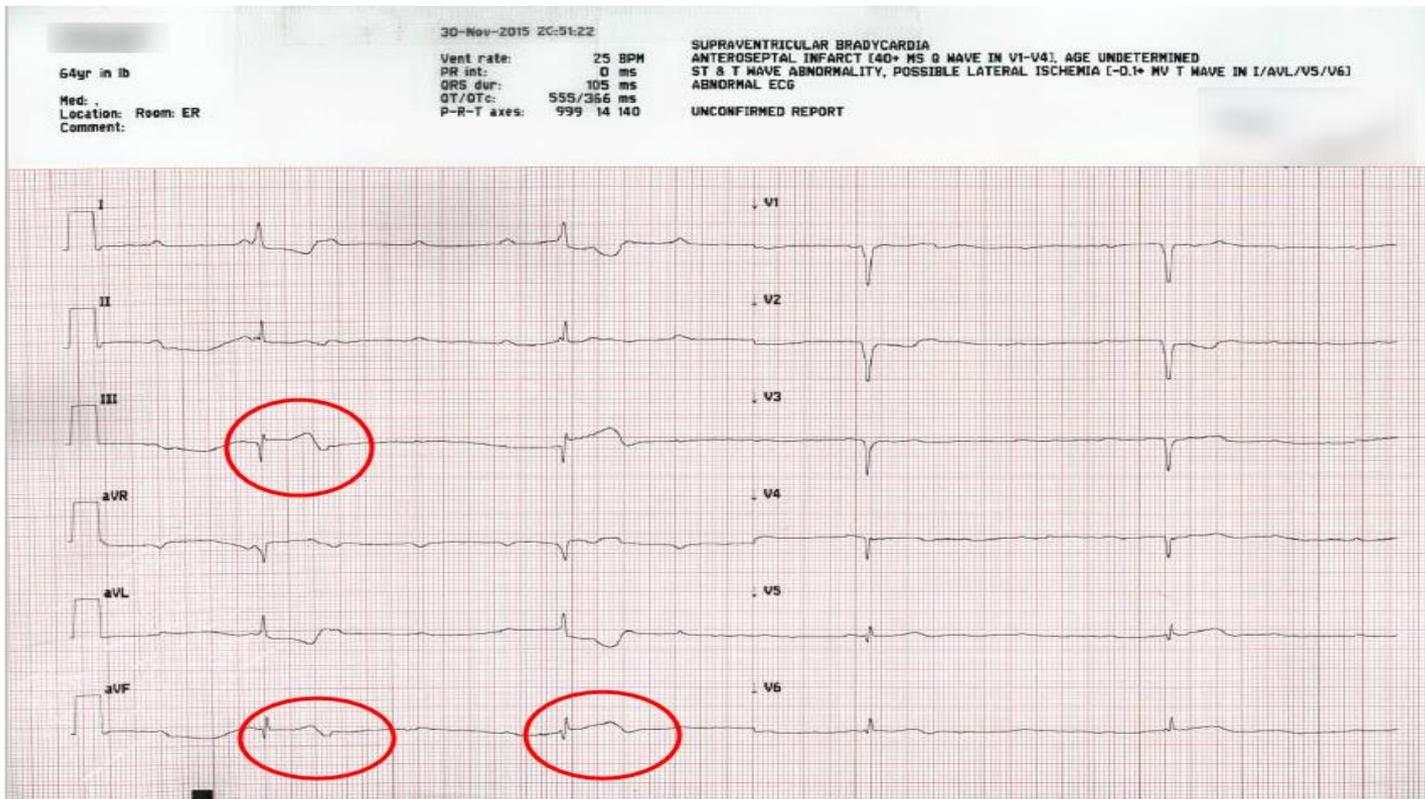
EMS EKG



Patient Scenario:

- On arrival to ED her heartrate was in the 20s. BP 90s systolic. Patient is very pale cool and diaphoretic. EKG showing a 3rd degree heart block along with STEMI.

1st EKG



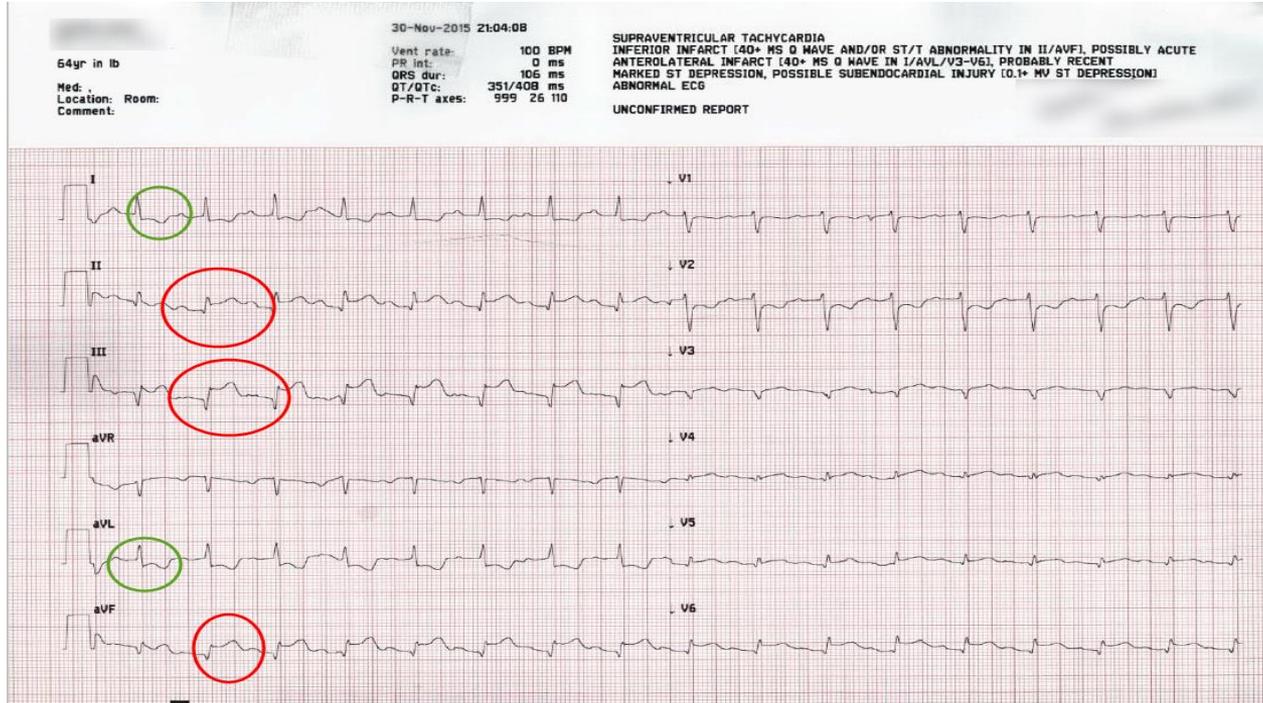
Patient History

- Hypertension
- Non-ST elevation myocardial infarction (NSTEMI) – 2011
- Triple Vessel Disease - Coronary artery bypass graft – 2011
 - LIMA to LAD, and saphenous vein graft to distal circumflex, and saphenous vein graft to the PDA of the RCA

Hospital Course:

- IV was established and atropine 1mg IVP given at 2053. Heart rate increased to 65 with a BP of 130/62. Patient has O₂ at 4 liters and continues to report that she has substernal chest pain.
- Altru accepted patient.
- 2056 heart rate at 75 BP 116/60. Repeat EKG completed and both EKGs Faxed to cardiologist with Avera. IV heparin bolus 5000 units given followed by IV heparin gtt at 1200 units. Patient left hospital ER at 2110.

EKG after Atropine



TIMELINE:

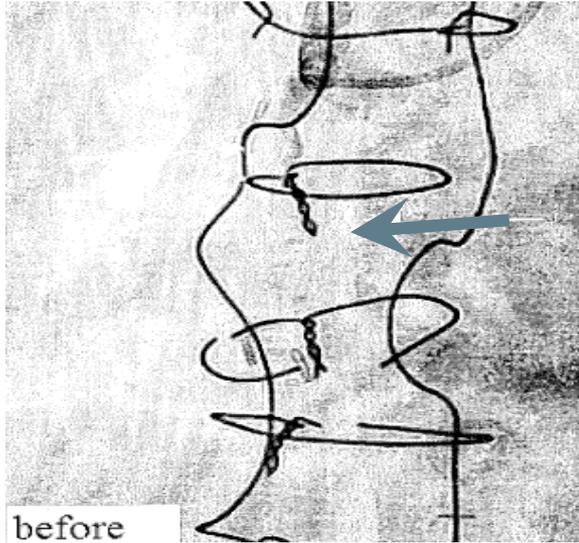
- 2030 - EMS makes contact with patient
- 2043 - Patient arrives at CAH
- 2110 - Patient leaves CAH Hospital
- 2131 - Altru EMS intercept with EMS (poor road conditions)
- 2202 - Patient arrives in Cath Lab
- 2220 - PCI of patient

TIMELINE:

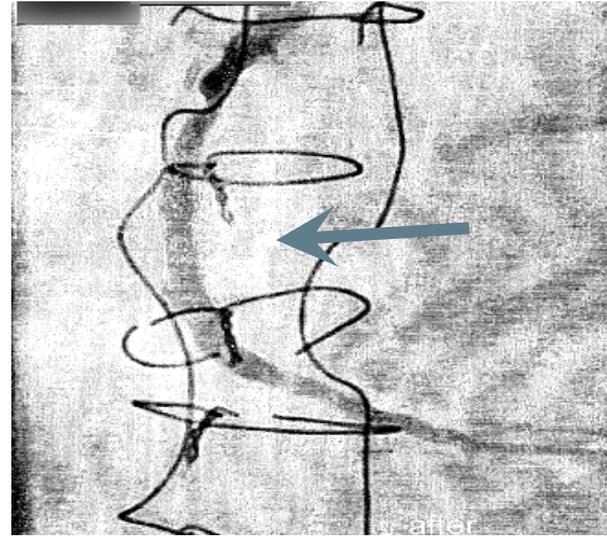
TOTAL Time breakdown -

- 13 minutes from EMS contact to Arrival at CAH
- 27 minutes at CAH (+ gave heparin, and consulted Dr. Aboufakher)
- 97 minutes from arrival at CAH to PCI
- 110 minutes from EMS contact to PCI

Results:



Before PCI



Successful aspiration of clot & stenting of the bypass graft to the distal right coronary artery.

Patient Outcome

- EF 40%
- Added Discharge medication: Plavix, Nitro, Crestor
- Patient was already on Beta Blocker, ACE, Aspirin
- Cardiac Rehab Referral

Outcome:

- All medications were given appropriately!
- Communication between all parties was *OUTSTANDING!*
- Patient received accelerated care, and that protected her precious heart muscle!
- Patient was admitted 11/30/2015 & Discharged home 12/2/2015

EMS to CAH to Tertiary

Mallory Bosch, BSN, RN
Essentia Health

Patient Background

- EMS dispatched to the home of a 51 yo male with chest pain, sudden onset and occurring at rest
 - Initially called friend for a ride to the hospital; on arrival to his home, the friend wisely called 911
 - Described pain as 10/10, crushing, with radiation to bilateral arms and shoulders
 - PMH significant for hypertension, depression, and anxiety
 - On prazosin for HTN
 - Current every day smoker
 - **Symptom onset 09:15**

EMS

- 911 Call: 09:58
- Dispatched: 09:58
- En route: 10:02
- At scene: 10:09
- First Medical Contact: 10:10
- EMS initial assessment: patient with 10/10 crushing chest pain, alert and oriented, cool, pale, and diaphoretic
- Initial vital signs: HR 75, BP 145/94, RR 30, SpO2 100% on room air



EMS

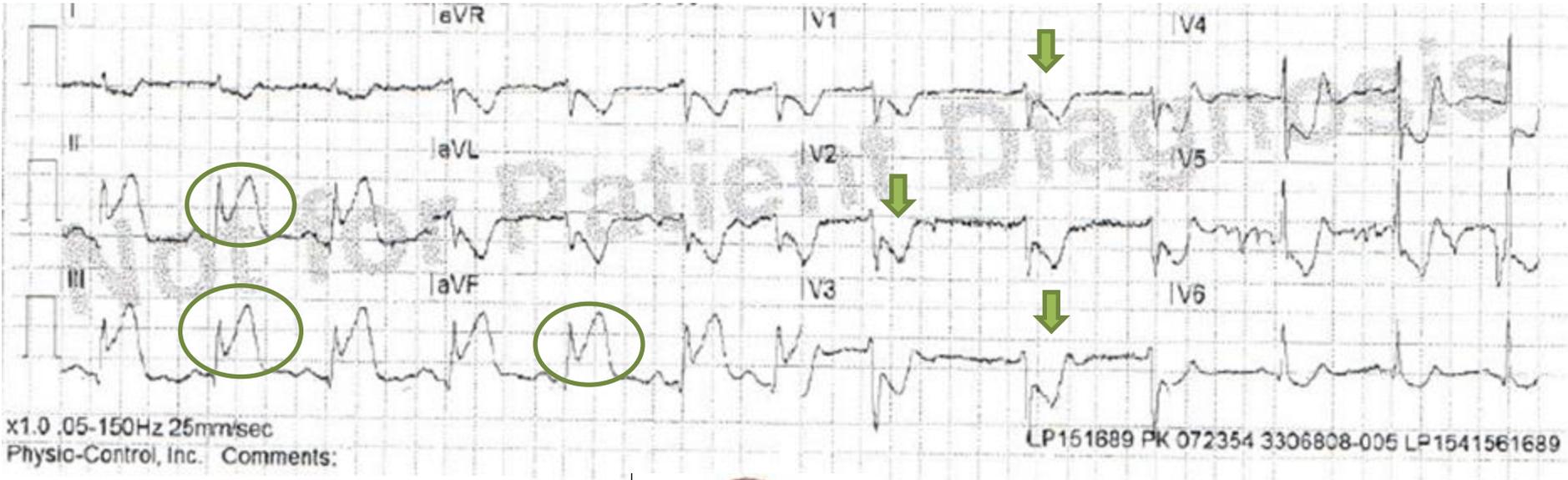
- 0:11 – ASA 324 mg PO
- 10:13 – First 12-lead ECG
 - Crew diagnosed ST elevation in inferior leads II, III, and aVF with reciprocal depression
- 10:13 – Nitro spray
- 10:14 – Air intercept requested
- 10:18 – Nitro spray
- 10:18 – Moving patient to cot when he went into Vfib; CPR initiated
- 10:19 – Defibrillation 200 Joules; CPR resumed
- Patient started to wake and grab at responder doing compressions. Strong pulse present. Transported to nearby Critical Access Hospital.

FMC to 12-lead ECG: 3 minutes

Scene time: 11 minutes

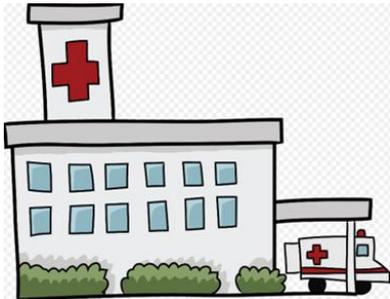
Transport time to CAH: 5 minutes

Initial ECG



CAH – Emergency Department

- 10:25 – Arrival
- 10:31 – Regional hospital activates STEMI alert
- 10:32 – 12-Lead ECG
- 10:53 – Flight crew arrives
- 11:15 – Flight departs with patient for Essentia Fargo

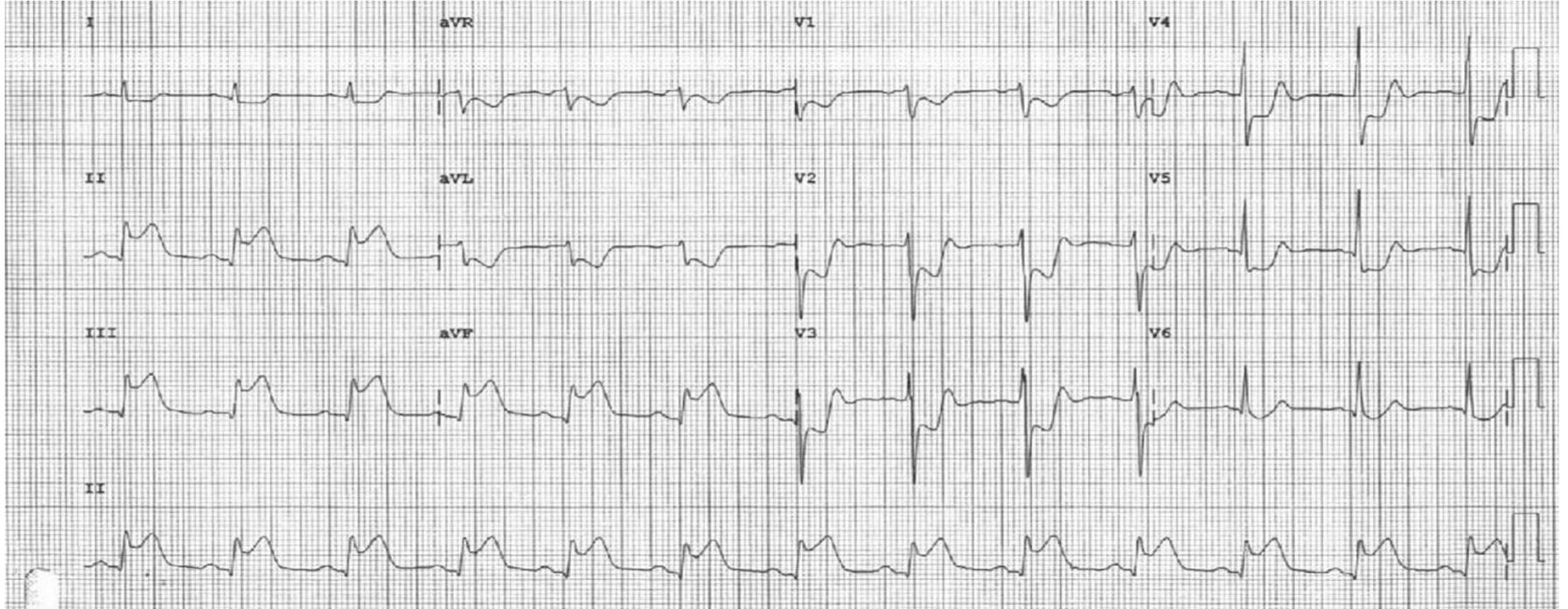


Referring facility DIDO: 50 minutes

EMS Turnaround Time: 22 minutes

Transport time to tertiary hospital: 34 minutes

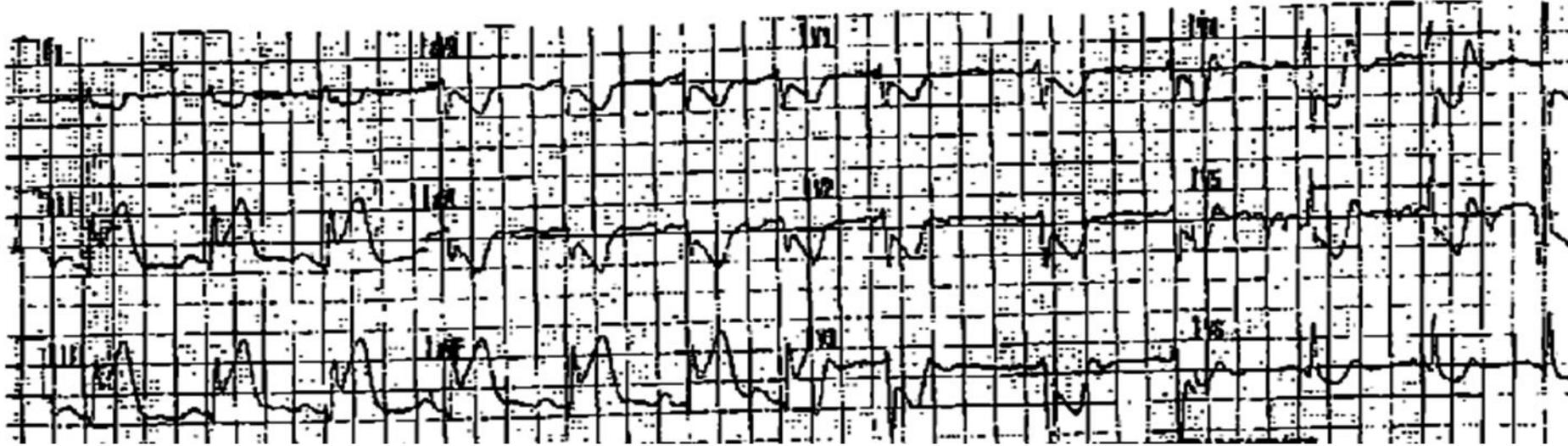
CAH: 12-Lead ECG



CAH ED Treatment

- ED Physician evaluation
- Patient mildly lethargic and oriented, chest pain rated at 3/10
- 10:32 – Amiodarone 150 mg IV bolus
- 10:37 – Amiodarone drip 1 mg/min (continued during transport)
- 10:38 – Zofran 4 mg IV
- 10:43 – Heparin bolus IV, and drip
- 10:56 – Plavix (clopidogrel) 600 mg PO
- 11:00 – Morphine 2 mg
- 4 L O2 nasal cannula
- Vitals: HR 67, BP 126/84, RR 22, SpO2 95%
- Labs
- Nurse-to-nurse report called
- Patient direct to cath lab at tertiary hospital

En Route...



No changes to patient condition during transport

Tertiary Hospital

- 11:49 – Flight crew lands
- 11:54 – Cardiac cath lab arrival
- 12:04 – Procedure start
- 12:20 – First device



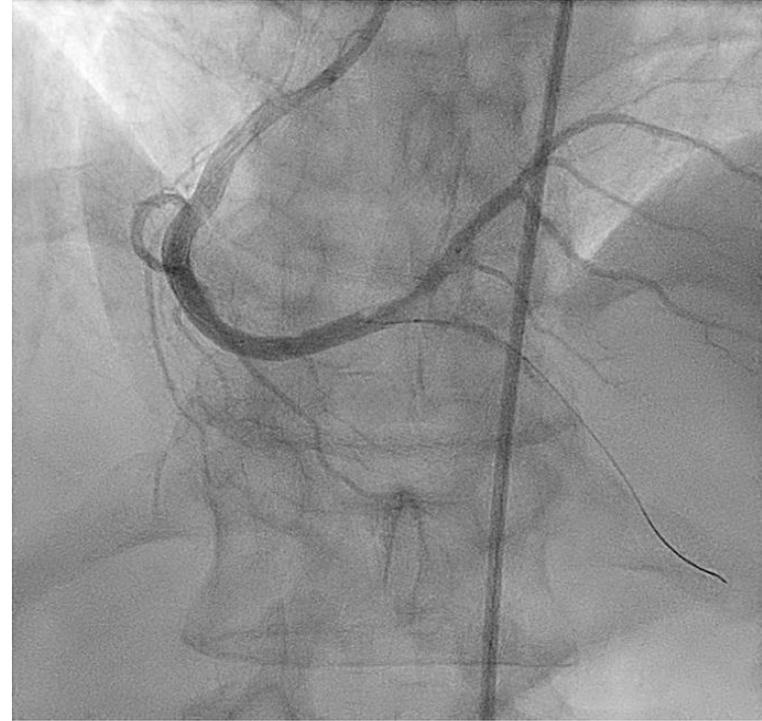
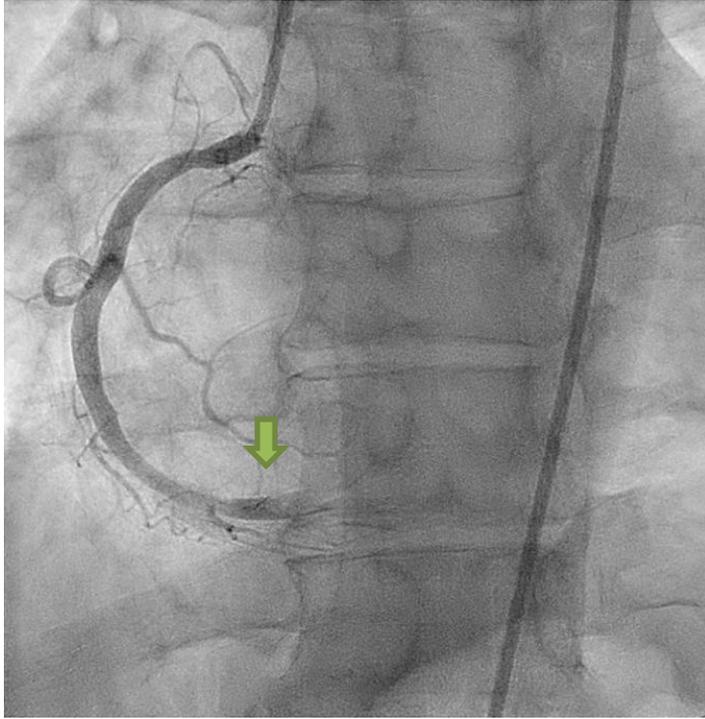
Tertiary Hospital

- Lesion site
 - Total occlusion of distal RCA before the bifurcation to the posterolateral branch and the PDA
 - Evidence of thrombus
 - TIMI 0 flow

Tertiary Hospital

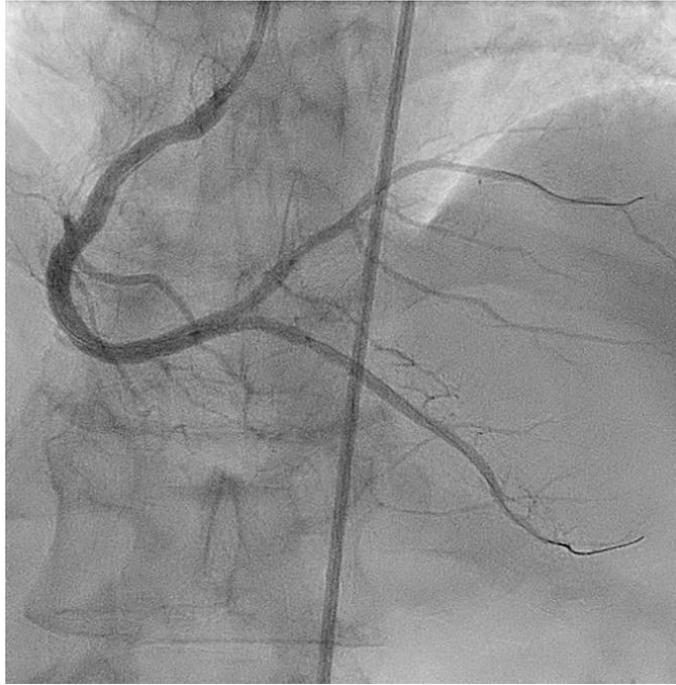
- Treatment
 - Thrombectomy and ballooning
 - TIMI 1-2 flow
 - Placement of 2 bare-metal stents
 - TIMI 3 flow

Tertiary Hospital – Cath Lab



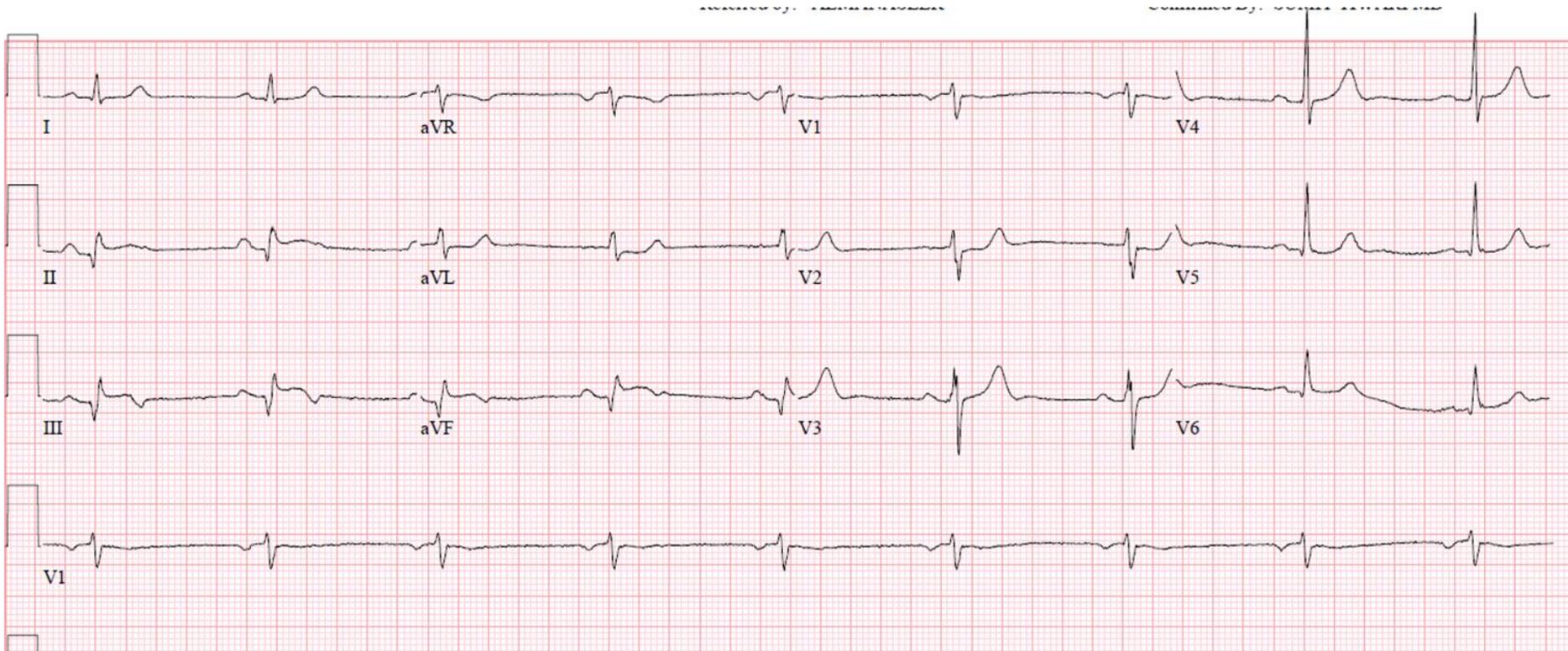
Distal RCA: pre-intervention

Tertiary Hospital – Cath Lab



Distal RCA: Post-intervention

Post-Procedure 12-Lead ECG



STEMI Metric Performance

- EMS FMC to ECG: **3 minutes** (Goal \leq 10 minutes)
- DIDO Time in Referring Facility: **50 minutes** (Goal \leq 45 minutes)
- EMS FMC to Referral Facility to Balloon/Device: **130 minutes** (Goal \leq 120 minutes)
- Referral Facility Door to Balloon/Device: **115 minutes** (Goal \leq 120 minutes)
- Cath Lab Arrival to Balloon/Device: **26 minutes**

Tertiary Hospital

- Outcome
 - Post procedure echo – EF of 65-70%
 - Discharged home after 3 days
 - New medications prescribed at discharge: Aspirin, Plavix, metoprolol, Lipitor
 - Tobacco cessation consult
 - Referral made to cardiac rehab program

To Sum Up...

- Questions?
- Comments?
- Concerns?
- Strengths?
- Opportunities?