From Emergency Bay to Ambulance Bay: Efforts to Assess and Improve Utilization of STEMI Activation at Vidant Medical Center

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BACKGROUND

Use of Emergency Medical Services (EMS) in the activation of hospital-based protocols are crucial for time sensitive scenarios. Early recognition of ST-Elevation Myocardial Infarction (STEMI) is integral to improved outcomes in patient care. Studies have shown that pre-hospital activation of STEMI is associated with shorter door-to-balloon times in emergent percutaneous coronary intervention (PCI).[1]

Currently there remains a divide between emergency prehospital systems and the emergency room itself at Vidant Medical Center (VMC). Many avenues towards bridging the gap between these two integral components of the chain of survival remain open. Both diagnostic accuracy and adequate communication mechanisms are necessary to bridge this gap.

PROJECT AIM

In this study we aim to identify the barriers involved in delayed STEMI activation within VMC and seek to address barriers to activation within the Pitt County EMS System through improving electrocardiogram (EKG) diagnostic accuracy among EMS personnel and identifying challenges within the varying modes of communication between the hospital and incoming ambulances.

PROJECT DESIGN/STRATEGY

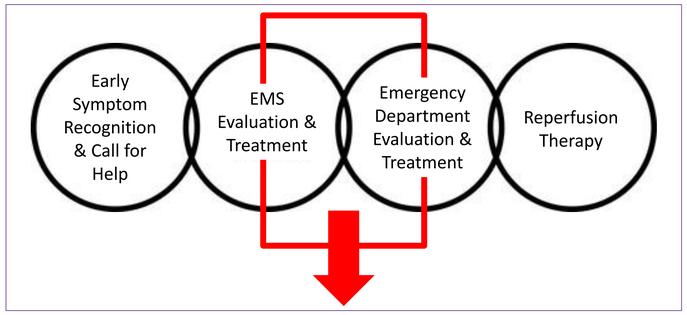
False activation rate was determined by matching hospital diagnosis and intervention to EMS charts. Data was pulled from Pitt County EMS and cross-matched to patient records using their HAR for the encounter.

Subsequently, we sought to identify the current rate of STEMI EKG transmission from ambulance to VMC Emergency Department (ED) between 12/27/2019 and 10/14/2020. A repeat analysis was performed between 06/01/2021 and 11/14/2021. Unsuccessful transmissions of incoming STEMI's continue to be reported.

Using this data, false activation EKGs were analyzed and assessed for common mistakes and a curriculum is in ongoing development for continuing education purposes among Pitt County EMS personnel.

As an additional component to the study, our team assessed modes of communication and mechanisms of EKG transmission between Pitt County EMS and the VMC ED.

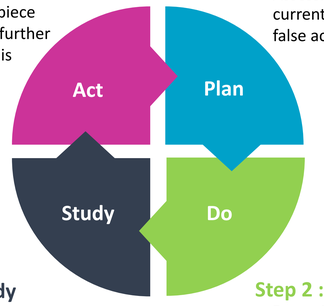
CHANGES MADE (PDSA CYCLES)



PDSA 1: STEMI False-Activation

Step 4 : Act
- Assess if this educational piece worked or if further intervention is needed

Step 1 : Plan
- Assessing current rate of false activation



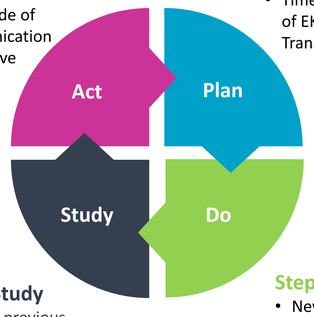
Step 3 : Study
- Reassess STEMI False Activation Rate

Step 2 : Do
- Educational Instruction to EMS Personnel

PDSA 2: EMS to ED Communication

Step 4 : Act
- Assess if this dual mode of communication is effective

Step 1 : Plan
- Timed analysis of EKG Data Transmission



Step 3 : Study
- Compare previous EMS to ED diagnostic agreement to current

Step 2 : Do
- New process implemented: Transmit + Call to Attending

RESULTS/OUTCOMES

During our initial review for patients with a diagnosis of STEMI in the hospital, data was pulled from 12/2019 through 10/2020. Among the 35 cases labeled as a STEMI who arrived by Pitt County EMS or Greenville Fire & Rescue, 30 were correctly diagnosed in the field, bringing an improper activation rate to 14.29%.

Repeat analysis from 06/2021 through 11/2021 revealed 42 cases labeled as a STEMI. Of the 42 cases, 25 were correctly diagnosed in the field, bringing an improper activation rate to 40.47%.

Common Mistakes Identified between EMS & ED interpretations:

- EKG unchanged compared to prior
- Inferior STEMI vs NSTEMI
- STEMI vs Left (and Right) Bundle Branch Block

Continuing Education:

Results for our next steps are pending. This educational piece will contain pre-and post-test evaluation for EMS personnel.

Communication Review:

Initial review of EMS to ED communication revealed a 3-minute delay between EKG submission and print-out at centralized ED printer.

LESSONS LEARNED

The results of this study are limited in large part by the size of its sample; however, represent the need for further assessment of EMS and its role within the larger health system.

Our initial reviews suggests mixed results regarding diagnostic accuracy for STEMI using EKGs among EMS personnel.

Our findings suggest that Pitt County EMS personnel may require additional reinforcing education to maintain adequate diagnostic accuracy. Further, communication between EMS and ED may be a limiting factor.

NEXT STEPS

Future plans for this project include:

- Implementing our educational objectives within Pitt County EMS Continuing Education courses
- Re-evaluation of false-activations following our initial educational session.
- Further analyze ways to ensure streamlined communication between EMS and the ED
- Evaluate for other modes of integrated activation services, e.g., Code Stroke.

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REFERENCES

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