BACKGROUND:

During the ST-elevation myocardial infarction (STEMI) review process, Jersey Shore University Medical Center’s (JSUMC) cardiovascular team recognized that inpatient STEMIs had prolonged response times. When compared to the 2016 Door-to-Balloon (D2B) time (presentations via emergency room) averaging at 65 minutes, inpatient EKG-to-Balloon averages 117 minutes. Delay in STEMI recognition to device deployment impact patient outcomes and can result in a higher risk for morbidity and mortality. Pande\(^3\) (2014) reports in patients who suffer a STEMI have longer diagnostic ECG-to-balloon times compared to outpatient STEMI arriving through ER via EMS. Time to treatment within 90 minutes also occurred less often, 68.3% versus 91.5% for in-hospital and outpatients respectively Pande (2014). In 2015, Winslow\(^1\) was featured in The Wall Street Journal reporting that inpatient STEMI’s are a national challenge and “the hospital is no place for a STEMI.”

Pande (2014) notes developing and/or maximizing current systems of STEMI care have been major initiatives of the national cardiovascular organizations and regional networks for greater than a decade. In 2006, American Collage of Cardiology’s Door-to-Balloon Alliance focused its efforts to optimize time to primary PCI in PCI-capable hospitals. Carollo\(^2\) (2014) suggests that implementing inpatient STEMI standardized protocols improve recognition, decrease time to reperfusion and improve clinical outcomes including morbidity and mortality in this patient population.

JSUMC’s current inpatient STEMI process is inconsistent and non-standardized resulting in variant timeliness. These delays have multiple failure modes, including failure to recognize symptoms, delays in EKG reading and delays in STEMI activation. Process improvement efforts are indicated to align with best practice and improve patient outcomes.

METHODS

In November 2016, a multidisciplinary process improvement team was assembled and DEFINE-MEASURE-ANALYZE-IMPROVE-CONTROL methodology was utilized to guide efforts. Initial efforts focused on defining and measuring the existing process through retrospective review of all inpatient
Data points collected include patient demographics, admission diagnosis, unit type, attending physician, onset of symptoms, time to first EKG, first positive EKG to cardiovascular vascular lab (CVL) notification, CVL notification to CVL arrival, positive EKG to device deployment, and patient outcome. Analysis was completed to determine defect rates, process yields and timeliness, and failure modes. The current process was process mapped. Mock STEMIs were conducted to assess current practices.

Cardiovascular Doctorate Prepared Advanced Practice Nurses (DNP, APNs) completed best practice research, as well as inventorying current practices at other network campuses. Current policy & procedures were also reviewed for timeliness and best practice alignment. The team completed a comparative gap analysis between current practice and best practice recommendations to identify areas of opportunity.

The multidisciplinary team developed process redesign features to address areas of opportunity and to produce a process that was evidence based and in alignment with current workflows/practices. Robust education and communication plans were developed and policy and procedures were redrafted and approved. A monitoring plan, including competency checklists, was created for continued assessment.

RESULTS

As inpatient STEMI is a low-volume, high risk, occurrence, post intervention patient data is limited. However, two inpatient STEMIs were observed during process redesign. The STEMIs were attended by two cardiovascular APNs who were able to direct the process in accordance with the new process.

When compared to retrospective data, as well as ED D2B, the process demonstrated improvement. Both STEMIs were well below the inpatient baseline average of 117 minutes at 33 and 42 minutes respectively. Although there is not an “apples-to-apples” match in the measurement, when compared to ACTION Registry® - GWTG™ Median Time in minutes to primary PCI for STEMI patients (Q2 2017 Executive Summary) at 70.5 median minutes, the initial cases were comparable. Both cases were also well below the primary PCI within 90 minutes metric.

CONCLUSION

Creating a multidisciplinary team that included leadership, providers, nursing, educators and process improvement experts was key to building a strong process design for a high risk area for opportunity. The result was a process that had strong physician support and engagement and that empowered nursing to start the STEMI recognition and treatment process. Creating the process together, aligning with best practice and sharing the accountability fostered a shared need and vision for improved patient outcomes. Although outcomes are limited since the process redesign, early measures of success are present. The improved timeliness and reduced process variation resulted in over a 65% improvement rate. Next steps include integration of the process into new technologies to enhance communication during the inpatient STEMI process.

REFERENCES:

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