A Multidisciplinary Team Approach for a Successful STEMI Program in a Public Hospital System with Limited Resources

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Introduction

Over the past several years the care of STEMI patients has been focused on early intervention with a goal of a door to balloon time (DTBT) of less than 90 min. Furthermore, recent studies have demonstrated that reducing symptom onset to balloon time (SOBT) to less than 240 min benefits patients by reducing morbidity and mortality [1]. Given that time is a major factor in the treatment of STEMI patients whether one is focused on a DTBT of less than 90 min or a SOBT of less than 240 min many protocols have been implemented in hospitals around the world to ensure that these goals are met. In order for these protocols to be successful in meeting the time constraints and at the same time provide excellent patient care, they require a multidisciplinary approach that requires coordination with cardiology and emergency room (ER) physicians, as well as ER and cath lab nursing, ancillary staff, EMS personnel, and hospital administrators.

The Ben Taub General Hospital (BTGH) of the Harris County Hospital District in Houston, Texas has implemented a STEMI care protocol that was developed and improved over the years by a multidisciplinary team and has proven itself to be effective in reducing the DTBT to the lowest in the nation (of the hospitals that participate and provide data to the National Cardiovascular Data Registry (NCDR) and the Hospital Value-based Purchasing Program) for the first quarter of 2014. Every hospital and community is different and thus a standard protocol would not have similar results in each hospital system, but, we would like to highlight some of the critical factors that are to key to any STEMI program as well as some characteristics that make our program unique. The current protocol at BTGH focuses on four main core principles which are recognition, treatment, accountability and flexibility.

Recognition

Recognition begins the moment patients develop chest pain. Local health care officials, including primary care physicians and cardiologists, have the responsibility of educating and informing the community on the early signs and symptoms of a heart attack in order for them to seek appropriate care in a timely manner. In addition, there should be education on the appropriate transportation in seeking that care as recent studies have shown that ambulance users receive treatment faster than non-ambulance users [2,3].

Once a healthcare professional has made contact with the patient, either by EMS or EC triage nurse, the next step of recognition is to perform an ECG. At Ben Taub General Hospital, if the patient is having chest pain, and they did not present via EMS, an ECG is immediately obtained at the triage station; therefore by-passing the registration process. All ECGs performed on patient's complaining of chest pain are immediately reviewed by an EC attending who signs the ECG and determines if there are changes consistent with STEMI. If the ECG is consistent with a STEMI, the STEMI pager is activated via an exclusive pager number, and the patient is taken immediately to a critical care room in the EC for expedited treatment.

Once the ER activates the STEMI pager, the level of recognition is transitioned to the cardiology service specifically the cardiology fellow and interventional attending on call by-passing the CCU attending. The STEMI pager is always carried by an assigned cardiology fellow 24 h a day (the interventional attending also carries one for back up purposes), and, once it is activated, the page is returned within a 5 min period or less. A quick history of the patient is obtained and the ECG is sent via text message to the fellow, who forwards it to the attending for further review. This should

take no more than an additional 10 min. If it is deemed a STEMI, a second number (separate from the STEMI activation number) is called by the cardiology fellow which is linked to all the cardiac cath lab personnel involved in the treatment of the patient which includes: interventional attending, interventional fellow, cardiology fellow (to ensure the second activation was processed correctly), STEMI program nurse manager, cath lab technician and nurse, and charge nurse in the CCU. It is expected that all the appropriate staff should arrive at the cath lab in 20 min or less.

Treatment

As the second pager is activated the treatment portion of the protocol begins. Once the ER receives confirmation of the STEMI via phone call by the cardiology fellow, the patient is immediately transported to the cath lab accompanied by an ER nurse and a physician, either ER or cardiology. The cath lab is ready to receive the patient by either two assigned cath lab nurses (during the day) or two CCU nurses (overnight) whose role is to prep the patient, administer medications, set up the proper equipment, and enter patient information into the cath lab record. All CCU nurses have taken cardiac cath lab training. This in effect keeps at least 2 cath lab trained personnel in-house 24 h a day, 7 days per week. Once the interventional attending arrives the case begins without any delay waiting for the ancillary staff to arrive. Of note, all of the staff on-call arriving from home has designated parking near an entrance to the ER and elevators to the cath lab.

Accountability and Flexibility

Often undervalued, accountability and flexibility are two key components that have profound importance to the success of STEMI programs including our own. Accountability is the mechanism by which the STEMI protocol can ensure personal responsibility as well as individual and protocol-based assessment and improvement. Our program clearly defines the responsibility and expectation of each healthcare member at each step in the response cascade. A flexible STEMI protocol creates time cushions and multiple parallel response sequences keeping the STEMI protocol on schedule despite encountering certain obstacles that may occur in "real life" clinical environments. Accountability maintains STEMI protocol goals in the long term; where as, flexibility, gives the protocol it is much needed "wiggle room" to keep each STEMI activation on track without losing site of the overall goal. Lack of accountability and flexibility can quickly translate into inappropriate care and/or critical delays that result in loss of precious myocardium.

In our protocol, accountability is implemented using a few key strategies. First of all, the exact progression of the STEMI response, starting with first responders, is clearly explained, and the role of each person in the STEMI team (from the triage nurse to the attending) is clearly defined. Second, the protocol is reviewed on a monthly basis with new or rotating personnel as a refresher and also to address any recent updates. Third, we are members of the NCDR, which catalogues all STEMI response characteristics, including outcomes, as well as provide quarterly reports. These reports give objective, third party analysis for the program as a whole as well as rank us among other programs around the country. Finally, we have a designated STEMI coordinator who follows up on each STEMI's door-to-balloon time, quarterly NCDR reports, follow up on all scheduled meetings, and address any deficiencies that are found with the Chief of Cardiology. The STEMI coordinator as well as the Chief of Cardiology both are responsible for oversight and deliver individual feedback.

Conclusion

Hospital protocols and guidelines for STEMI patients are created in order to help ensure that patient care is not compromised and provide a road map of how that care should be delivered. Much of the success of our STEMI protocol, which has given us the lowest DTBT in the nation, has come from years of tireless effort and regular self-assessment. Therefore, the above STEMI response algorithm has been ultimately tailored to our particular patient demographic and scope of practice. Furthermore, we believe the following characteristics of our program have made the most contributions towards our goal of lowest DTBT. First would be the absolute dedication of all the healthcare workers involved, especially the interventional attendings who lead by example and deliver the highest quality of care including very quick arrivals to the cath lab. Second, the dual trained CCU nurses who provide support in the cath lab while the core response team arrives. And finally, the hospital administrators who provide the much needed flexibility to bypass certain ER triage requirements that help to expedite patient care. Despite the large variance in patient population and hospital patient care models across the country, the above core principles, recognition, treatment, accountability, and flexibility as described above, provide a framework for which a successful STEMI protocol might be derived.

References

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