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Optimization of Door-to-Balloon time implementing a process improvement program

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Primary percutaneous coronary intervention has played a major role in the treatment of ST-segment elevation acute myocardial infarction (STEMI). Delay in revascularization of the culprit vessel affects patient's prognosis. Systematization within a medical institution with catheterization laboratory influences treatment delays.

Objective: The aim of this study was to analyze the impact of a process improvement program on the door-to-balloon time of patients admitted with STEMI in a center with capability to perform primary percutaneous coronary intervention on a 24/7 basis.

Methods: Patients with a diagnosis of STEMI requiring primary percutaneous coronary intervention were prospectively and consecutively included from January 2014 to May 2016. The population was divided into three periods: p1control; p2 program implementation; p3 program operation. Patients with progressive STEMI, rescue angioplasty and Killip and Kimball D were excluded from the study. An analysis of the system was performed to detect the barriers by means of an improvement model. The process was redesigned incorporating the following strategies: ambulance preactivation for patient admission, bypassing the emergency department and catheterization laboratory activation.

Results: Three hundred and fifteen patients were included in the study (p1: 125, p2: 99, p3: 91). There were no differences in baseline population characteristics between the periods analyzed. In 27.1% of cases patients consulted directly at the emergency room, 47.7% were admitted through the emergency service and 24.6% were referred from another center without capacity to perform primary percutaneous coronary intervention. During p3, pre-activation, bypassing the emergency department and possibility of a ready cath lab were implemented in 54.1%, 59.7% and 79.1% of patients, respectively. A significant reduction in door-to-balloon time was observed throughout the periods [p1 76 min (IQR 55-120), p2 53 min (IQR 30-89) and p3 46 min (IQR 29-59); P<0.01]. The trend was maintained both during working hours [p1: 76 min (IQR 53-125), p2: 36 min (IQR 26-60) and p3: 40.5 min (IQR 21-53.5); p1 vs. p3 p=0.02] as during the emergency shift [p1: 80.5 min (IQR 60.2-115), p2: 80 min (IQR 37-100) and p3: 54 min (IQR 34-62, 7); p1 vs. p3 p=0.01]. Impact was obtained in the first physician contact-balloon time [p1: 149 min (IQR 105-195) vs. p3: 94 min (IQR 73.5-130); p=0.012].

Conclusion: An improvement program allows a significant reduction of the door-to-balloon time in patients admitted with STEMI in a center with capability to perform primary percutaneous coronary intervention on a 24/7 basis. I will show in this lecture how we achieve this goal by following an improvement program that includes medical, nursing and support team training, real time simulation, implementation of material - medication sets and continuous feedback, I will also show the follow up of the program for the second period from 2016 to present time.

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