INTERNATIONAL JOURNAL OF ADVANCES IN CASE REPORTS

e - ISSN - 2349 - 8005

www.mcmed.us/journal/ijacr

Case Report

A RETROSPECTIVE OBSERVATIONAL STUDY OF DOOR TO BALLOON TIME IN PATIENTS UNDERGOING PRIMARY CORONARY ANGIOPLASTY AT TERTIARY CARE HOSPITAL DURING THE COVID PANDEMIC

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ABSTRACT

Background: Door-to-balloon (DTB) time of 90 min during primary angioplasty is considered as the benchmark duration according to American Heart Association's (AHA) guidelines. Shorter DTB time has been shown to have good clinical outcomes, both with respect to patient and procedure. Methods: A Retrospective observational study of 2 years in Apollo Hospital Sheshadripuram was conducted in patients presenting with acute coronary syndrome features undergoing primary angioplasty during COVID. The DTB time was calculated, along with the difference in both day shift and nigh shift timings. Results: The analysis of 311 patients who underwent angioplasty, the median DTB time in our study was shown to be 51 minutes. It is also noted that majority of the patients who had acute coronary syndrome were of the age group 61-70, contributing to almost 49 % of the entire study group. Out of 311 patients, 175 patients who underwent angioplasty, the DTB was 50.39±16.68 during 6:00pm to 8:59am and 136 patients who underwent angioplasty; the DTB was 47.66±14.8 during 9:00am to 5:59pm. The P value of 0.127 shows that there is no significant time interval difference between day shift and night shift hours, Conclusion: As per the guidelines issued by the American heart Association, the door to balloon time of less than 90 minutes is considered as the benchmark time limit. The median DTB time in our study was shown to be 51 minutes. The door to balloon time was maintained within the standard time during the covid period. This article highlights the importance of proper and timely implementation of acute coronary syndrome management protocols for better patient outcome.

Key words: Door-to-balloon, Coronary syndrome, Angioplasty, Covid.

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Access this article online	
Home page: http://www.mcmed.us/journal/ijacr	Quick Response code

Received: 12.10.2021	**Revised**: 22.11.2021	**Accepted**: 20.12.2021

INTRODUCTION

In the most common event of an acute Myocardial infarction (STEMI) in a tertiary care setup, primary percutaneous coronary intervention (PCI) is preferred treatment modality. As per the guidelines issued by the AHA, the timely management of PCI plays a crucial role in the outcome of the patients; this is where door to balloon

time (DTP) comes into play. Door to balloon time by literal definition means the time interval between the entry of patient to the Emergency department and the ballooning procedure (PCI). The AHA guidelines state a standard target time line of 90 minutes or less. This study also assesses the contributing factors responsible for varying DTB time.

Methodology:

Retrospective observational study was conducted at Apollo Hospital Sheshadripuram. All patients undergoing primary angioplasty from September 2019 to September 2021 were included. Ethics committee approval was obtained. DTB is defined as the average time from arrival of the patient with Acute Myocardial Infarction (definition of AMI as per AHA definition) in the ER to first balloon inflation in the Cath lab. All patients with acute coronary syndrome presenting to the emergency and are subsequently taken up for primary percutaneous coronary intervention were included in the study. Patients less than 18 years of age were excluded from the study. All data were tabulated using Excel. Descriptive and inferential statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean SD (Min-Max) and results on categorical measurements are presented in Number (%). Student t test has been used to find the significance of study parameters on continuous scale between two groups (Inter group analysis) on metric parameters. The Statistical software namely SPSS 22.0, and R environment ver.3.2.2 were used for the analysis of the data and Microsoft word and Excel have been used to generate graphs, tables etc.

RESULTS:

During the study period 311 patients underwent primary percutaneous intervention. The age distribution of the patients involved in our study is shown in Table-1.

Majority of the patients were in the age group of 61-70 years (49.19 %), the next common age group was 51-60 years (19.90 %). The gender distribution of the patients involved in the study has been shown in Table-2.

About two thirds of the study group was males as compared to females. The time of presentation to the hospital has been showed in Table – 3.

The Antiplatelets and Statins administered before the procedure (PCI) has been showed in table – 4. Around 103 patients received these drugs at outside hospital and 208 patients received in our hospital.

The DTB minutes has been showed in Table – 5. Out of 311 who underwent door to balloon procedure for which the mean duration was of less than 51 minutes. Among which, majority of the patient's i.e., 54.98 % of the patients, underwent Door to Balloon (DTB) in less than 50 mins, and 38.90 % of the patients underwent DTB in time interval of 51-70mins, also 13 % of the patients underwent DTB between the time intervals of 71-90 mins. Only 6 % of patients underwent DTB beyond 90 minutes.

Table 1: Showing the age distribution of patients who underwent PCI.

Age in years	No. of patients (%)
1-10	0 (0 %)
11-20	0 (0 %)
21-30	4 (1.28 %)
31-40	13 (4.18 %)
41-50	35 (11.25 %)
51-60	62 (19.90 %)
61-70	153 (49.19%)
71-80	34 (10.93 %)
>80	10 (3.21 %)
Total	311 (100 %)

Table 2: Gender distribution of patients studied.

Gender	No. of patients (%)
Female	95 (30.54 %)
Male	216 (69.45 %)
Total	311 (100.0 %)

Table 3: Time distribution of patients studied.

Time of presentation	No. of patients (%)
9:00 AM - 5:59 PM	136 (43.72 %)
6:00 PM - 8:59 AM	175 (56.27 %)
Total	311 (100.0 %)

Table 4: Initial Antiplatelets / Statins administration before PCI.

Antiplatelets	No. of patients (%)
Given at outside hospital	103 (33.11 %)
Given at our hospital	208 (66.88 %)
Total	311 (100 %)

Table 5: Difference Balloon- Frequency distribution of patients studied.

DOOR TO BALLON (MIN)	No. of patients (%)
<50 min	171 (54.98 %)
51-70 min	121 (38.90 %)
71-90 min	13 (4.18 %)
91-110 min	4 (1.28 %)
>110 min	2 (0.64 %)
Total	311 (100 %)

DISCUSSION:

The median Door to Balloon time in our study was 51 min, which is in par with the guidelines issued by the American College of Cardiology and AHA stating the time should be 90 min or less [1-3]. This is to keep in mind the implications regarding the prolonged door to balloon time and the complications concerning with it, which included the morbidity and mortality aspect as well [4-9]. Every minute is very crucial in management of Acute Coronary Syndrome patient presenting to the hospital [10].

Majority of the patients which presented to the Emergency Department where of the age group 61-70 years, contributing to 49.19 % of the patients presenting with Acute Coronary Syndrome as compared to the findings noted by Madhavan et al [11] which mentioned about the majority occurrence of Acute Coronary Syndrome in age group of 80 and contrary to the study done by Aggarwal et which mentioned about the newer perspectives of Coronary Artery Disease in Young [12]. Male patients showed more dominant presentation figures compared to females contrary to the study done by Lokhandwala et al [13], which mentioned about the higher incidence of Coronary Artery Disease in women and the leading cause of mortality in them. It is also quite evident that most of the patients presented during the night shift timings (6 pm to 8:59pm) covering almost to 65% compared to the day shift patient presentation (35%), but with their being no significant time interval difference in our tertiary care setup, which was also a similar finding in a tertiary care setup done by Graham et al [14].

Anti-platelet administration was done to almost 66.88 % of the patients, among which 49.5% received anti platelets within the time limit of 5-10mins compared to the 33.11 % people who had already received anti-platelets outside. Anti-platelet administration has proven to be very effective in management of Coronary Artery Disease presentation which was studied extensively by Reddy K et al showing reduced patient morbidity and mortality [15]. Significant patients were administered statins in our hospital as well, contributing to 66.68 % of the presenting patients. The remaining 33.11 % of the patients had already received the drug before arrival into our triage care. This also brings into the light of Diamantis et al study findings of the importance of statin administration in patients with Acute Coronary Syndrome highlighting their anti-inflammatory actions on Coronary Artery Disease [16].

Despite the prevalence of COVID since January 2020, the door to balloon was at a median time of less than 51 mins, the lesser the time taken for coronary intervention, the greater the prognosis of the patients as mentioned earlier in our discussion. On arrival to Emergency Room, the revascularization team consisting of cardiologists, Echocardiography and cath lab personnel will be alerted and all the concerned staff and the cath lab will be primed. The installation of Abbott ID which worked as Rapid Nucleic Acid Amplification test, for the detection of SARS-CoV2, prompt consent and early financial clearance also favoured into no delay in management contributed by its high specificity as described by Stokes et al, regarding its performance [17]. Abbott ID, along with all the other COVID safety guidelines and protocols, we managed to keep on track with the prompt management of Coronary Artery Disease. The door to balloon time was most commonly around the time range of <50 mins (54.98 %), the group of the patients whose door to balloon time was >90 mins (1.92 %) was due to a variety of contributing like patients / family refusal, time costing decision making process by the attenders / patients, and other complicating factors of presentation like stroke, decompensated heart failure.

Extensive awareness about the knowledge and significance of symptoms of coronary artery disease, accessible ECG facilities in diagnostic centres, and affordable angioplasty finance schemes in hospitals can help in reducing decision and diagnosis making time by the patients and doctors respectively. Active and collaborative

effort by the doctors, other referring doctors and the emergency medical staff regarding disease specific treatments modalities and counselling can also help in reducing the time for revascularization therapy. The door to balloon time will help us evaluate time consuming factors involved in crucial management of critical patients. Installation of COVID Abbott ID testing equipment will also help in assessing the COVID status of the presenting cases aiding in reduced door to balloon time management and taking relevant precautionary measures with respect to doctor and other patient safety. Dedicated criteria for assessing risk of coronary artery disease in the triage system can also shorten the delay.

CONCLUSION:

As per the guidelines issued by the American heart Association, the door to balloon time of less than 90 minutes is considered as the benchmark time limit. The median DTB time in our study was shown to be 51 minutes. The door to balloon time was maintained within the standard time during the covid period irrespective of the timing of presentation. This article highlights the importance of proper and timely implementation of acute coronary syndrome management protocols for better patient outcome.

ACKNOWLEDGEMENT:

Niharika S, Ashika R and Swathi Gupta for creation of Tables, Listing and Graphs (TLG) and Statistical Analysis Reporting (SAR) and Dr. K.P. Suresh, Ph.D. (Biostatistics) for reviewing methodology and results.

DECLARATION OF INTEREST: None declared.

REFERENCES

1. O'Gara PT, Kushner FG, Ascheim DD, CaseyJr DE, Chung MK, De Lemos JA. (2013). ACCF/AHA guideline for the management of ST-elevation myocardial infarction: executive summary: a report of the American College of Cardiology Foundation / American Heart Association Task Force on practice guidelines. *J Am College Cardiology*, 61, 485-510.
2. Steg PG, James SK, Atar D, Badano LP, Lundqvist CB, Borger MA. (2012). ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation. *Eur Heart J*, 33, 2569-2619.
3. Cannon CP, Gibson CM, Lambrew CT, Shoultz DA, Levy D, French WJ. (2000). Relationship of symptom-onset-to balloon time and door-to-balloon time with mortality in patients undergoing angioplasty for acute myocardial infarction. *JAMA*, 283, 2941-2947.
4. Rathore SS, Curtis JP, Chen J, Yongfei W, Brahmajee KN, Andrew JE. (2009). Association of door-to-balloon time and mortality in patients admitted to hospital with ST elevation myocardial infarction: national cohort study. *BMJ*, 338, 1807.
5. McNamara RL, Wang Y, Herrin J, Curtis JP, Bradley EH, Magid DJ. (2006). Effect of door-to-balloon time on mortality in patients with ST-segment elevation myocardial infarction. *J Am Coll Cardiol*, 47, 2180-2186.
6. Berger PB, Ellis SG, Holmes Jr DR, Granger CB, Criger DA, Betriu A. (1999). Relationship between delay in performing direct coronary angioplasty and early clinical outcome in patients with acute myocardial infarction: results from the global use of strategies to open occluded arteries in Acute Coronary Syndromes (GUSTO-IIb) trial. *Circulation*, 100, 14-20.
7. Brodie BR, Hansen C, Stuckey TD, Richter S, Versteeg DS, Gupta N. (2006). Door-to-Balloon time with primary percutaneous coronary intervention for acute myocardial infarction impacts late cardiac mortality in high-risk patients and patients presenting early after the onset of symptoms. *J Am Coll Cardiol*, 47, 289-295.
8. Menees DS, Peterson ED, Wang Y, Curtis JP, Messenger JC, Rumsfeld JS. (2013). Door-to-balloon time and mortality among patients undergoing primary PCI. *N Eng J Med*, 369, 901-909.
9. Tsukui T, Sakakura K, Taniguchi Y, Yamamoto K, Seguchi M, Wada H. (2020). Association between the Door-to-balloon Time and Mid-term Clinical Outcomes in Patients with ST-Segment Elevation Myocardial Infarction. *Intern Med*, 59, 1597-1603.
10. De Luca G, Suryapranata H, Ottervanger JP, Antman EM. (2004). Time delay to treatment and mortality in primary angioplasty for acute myocardial infarction: every minute of delay counts. *Circulation*, 109, 1223-1225.
11. Madhavan MV, Gersh BJ, Alexander KP, Granger CB, Stone GW. (2018). Coronary Artery Disease in Patients ≥80 Years of Age. *J Am Coll Cardiol*, 71, 2015-2040.
12. Aggarwal A, Srivastava S, Velmurugan M. (2016). Newer perspectives of coronary artery disease in young. *World J Cardiol*, 26, 728-734.
13. Lokhandwala JO, Skelding KA. (2009). Sex differences in percutaneous coronary interventions. *J Cardiovasc Transl Res*, 2, 300-05.
14. Graham MM, Ghali WA, Southern DA, Traboulsi M, Knudtson ML. (2011). Outcomes of after-hours versus regular working hours primary percutaneous coronary intervention for acute myocardial infarction. *BMJ Qual Safety Health Care*, 20, 60-67.
15. Reddy K, Khaliq A, Henning RJ. (2015). Recent advances in the diagnosis and treatment of acute myocardial infarction. *World J Cardiol*, 7, 243-76.

16. Diamantis E, Kyriakos G, Quiles-Sanchez LV, Farmaki P, Troupis T. (2017). The Anti-Inflammatory Effects of Statins on Coronary Artery Disease: An Updated Review of the Literature. *Curr Cardiol Rev*, 13, 209-216.
17. Stokes W, Berenger BM, Singh T, Adeghe I, Schneider A, Portnoy D. (2021). Acceptable performance of the Abbott ID NOW among symptomatic individuals with confirmed COVID-19. *J Med Microbiol*, 70, 1372.

Cite this article:
Syed Masood Ahmed, Himaal Dev, VikramB Kolhari, PurvikB, Pradeep M. Venkategowda, Mr. Arun Kumar s.. A Retrospective Observational Study Of Door To Balloon Time In Patients Undergoing Primary Coronary Angioplasty At Tertiary Care Hospital During The Covid Pandemic *International Journal of Advances In Case Reports*, 2022, 9(1), 1-5.