

THROMBOLYSIS ON FIRST CONTACT SAVES MINUTES AND MYOCARDIUM

Muhammad Irfan¹, Muhammad Saad Jibran², Sher Bahadar Khan³,
Adnan Mahmood Gul⁴, Zohab Ullah Zahid⁵, Syed Atif Gillani⁶

¹⁻⁶Department of Cardiology, Lady Reading Hospital Peshawar - Pakistan

Address for Correspondence:

Muhammad Irfan,
Department of Cardiology, Lady Reading Hospital Peshawar - Pakistan

Emails:irfanlrh@gmail.com

Date Received: March 20, 2017

Date Revised: June 11, 2017

Date Accepted: June 21, 2017

Contribution

MI, MSJ & SBK Conceived, Designed and wrote the manuscript. AMG, ZUZ & SAG helped in data Collection, analysis & did review of manuscript. All the author contributed equally to the manuscript.

All authors declare no conflict of interest.

This article may be cited as: Irfan M, Jibran MS, Khan SB, Gul AM, Zahid ZU, Gillani SA. Thrombolysis on first contact saves minutes and myocardium. Pak Heart J 2017; 50 (03): 180-3

ABSTRACT

Objective: To compare the door to needle time (DNT) for thrombolysis in acute myocardial infarction at the new chest pain clinic at emergency room with the old CCU at the Cardiology Department of Lady Reading Hospital, Peshawar.

Methodology: This was a retrospective study conducted at Lady Reading Hospital, Peshawar. Two data sets were acquired from hospital records. One for CCU at the cardiology department covering the span from 1st July, to 30th September, 2010. The other for the chest pain clinic emergency department covered the span from 1st April to 15th May, 2017. All the patients having ST elevated acute myocardial infarction eligible for thrombolytic therapy were included in the study. Door to needle time was calculated in both the groups. Comparison of DNT between both groups was made by using student t-test with $p \leq 0.05$ taken as significant. Comparison between other base line qualitative characteristics was made by using chi square test with $p \leq 0.05$ taken as significant.

Results: Total of 140 patients were enrolled in CCU group with mean age of 57.96 ± 13.5 years. Out of these 60% were male. While 209 patients were enrolled in ED group with mean age of 58.85 ± 6.9 years. Of these 65.1% were males. Mean DNT in CCU group was 72.42 ± 50.85 minutes while in ED was 31.96 ± 16.6 minutes with $p=0.0001$ with a reduction of 41.30 minutes in the DNT. DNT of <30 minutes and between 30-60 minutes was achieved in 7.1% and 62.8% in CCU group while in ED it was more than 60 minutes. In ED group the DNT achieved was <30 minutes in 70.8% and 30-60 minutes in 29.2% of patients while none fell in category of >60 minutes.

Conclusion: The door to needle time for thrombolytic administration for acute myocardial infarction was significantly less at the chest pain clinic at emergency room than at the CCU at cardiology department.

Key Words: Thrombolysis, First contact, Myocardium Infarction, CCU

INTRODUCTION

Early intervention either by PCI or with thrombolysis is the primary treatment for patient having ST elevated myocardial infarction (STEMI). The benefit of early reperfusion therapy is mainly time dependent. The early the coronary flow restoration, the more the myocardium benefits. Randomized clinical trials have shown that early thrombolysis reduce 17 to 25% 30 days mortality, while first hour thrombolysis reduces late mortality by 6.5% which decreases to 2.5% at fourth hour. As symptoms to door time cannot be controlled by medical team of a hospital, our main emphasis should be on decreasing the door to needle time (DNT) which is the time from the first medical contact to delivery of thrombolytic therapy in patient of STEMI. Since thrombolysis occurs within hospital, the DNT can be reduced with proper training of medical and nursing staff. DNT is one of the important parameter for checking hospital performance. According to ACC/AHA and ESC guidelines, patients of STEMI should be thrombolysed within the 30 minutes of the first emergency contact with medical system. Most hospitals fail to achieve this DNT because of unavailability of thrombolysis in Emergency department (ED). The objective of this study was to compare the DNT for thrombolysis in CCU cardiology unit vs Emergency department in our hospital.

METHODOLOGY

This was a retrospective study conducted at Lady Reading Hospital, Peshawar. Two data sets were acquired from hospital records. One for CCU from 1st July to 30th September,

2010. Other for emergency department from 1st April to 15th May, 2017. Prior to January 2017, patients were thrombolysed in CCU, cardiology unit. After January 2017, thrombolysis site was shifted from CCU to ED. All patients presented to Lady Reading Hospital with acute ST elevated myocardial infarction within 12 hours of onset of chest pain and without any contraindication for thrombolysis were included in the study. Patients with delayed presentation, subtle ECG changes and contraindications to thrombolysis were excluded from the study. Data including demographic features, comorbidities, DNT and indication of thrombolysis was obtained. The whole data was recorded in a predesigned proforma. Data was analyzed in SPSS version 20. Continuous variables like age, DNT were expressed in mean SD. Categorical variables like gender, were expressed as percentages. Comparison of DNT was done by using student t-test and p-value <0.05 was taken significant. Rest of the comparison for parameters was done by using Chi-square test.

RESULTS

A total of 140 patients were enrolled in CCU group while 209 patients were enrolled in ED group. Base line characteristics are given in Table 1. Indications for thrombolysis are given in Table 2.

Door to needle time was calculated for both groups and comparison was done by using paired t-test. Also categories for thrombolysis in different times were made and comparison was done between the two groups. (Table 3)

Table 1: Base Line Characteristics of patients Enrolled in Study

Variables	CCU Group	ED Group	p-Value
Total no of patients (n)	140	209	0.025
Male	84 (60%)	136 (65.1%)	0.17
Female	56 (40%)	73 (34.9%)	0.24
Diabetes mellites	42 (30%)	88 (42.1%)	0.21
Hypertension	62 (44.3%)	113 (53.6%)	0.21
Dyslipidemia	31 (22.14%)	100 (47.8%)	0.20
Smoking	27 (19.3%)	112 (53.6%)	0.05

Table 2: Indications of Thrombolysis in both Groups

Indications	CCU Group n=140 n(%)	ED Group n=209 n(%)
Inferior MI	60 (42.9%)	24 (9.3%)
Anterior MI	52 (37.1%)	32 (12.4%)
Antero Lateral MI	20 (14.2%)	29 (11.2%)
Antero Septal MI	1 (1.4%)	4 (1.15%)
Inferior Mi + Rv infarct	4 (2.9%)	8 (3.1%)
Lbbb	1 (1.4%)	9 (93.5%)
Extensive Anterior MI	-	33 (12.7%)
Infero Lateral MI	-	20 (7.7%)
Infero Posterior MI	-	25 (9.7%)
Lateral Wall MI	-	13 (5.0%)
Others	-	12 (4.6%)

Table 3: Comparison of DNT In CCU and ED Patients Thrombolysed in Different Time Categories

Variables	CCU Group	ED Group	p-Value
DNT in mins:	72.42±50.85%	31.96±16.6	0.0001
<30mins	7.1%	70.8%	0.0001
30-60 mins	62.8%	29.2%	0.05
>60 mins	30.1%	-	-

DISCUSSION

Since the revolutionary advancement in medical technologies, per cutaneous coronary intervention (PCI) is the main stay of treatment for patients with STEMI. However still in developing countries where resources are limited and facilities of primary PCI are not available, primary thrombolysis is the main stay of treatment for AMI patients.

Earlier thrombolysis benefit the patients of acute STEMI. In this study shifting the thrombolysis site significantly reduced DNT from 72.42mins: to 31.96 mins : which follows the international guide lines. Our results are quite better than other studies having mean DNT of 45.4 mins:, 56.71 mins: and 72.42 mins.

The primary reason in our study for the delay in the administration of thrombolytic therapy in CCU came out to be logistic reasons i.e. the time taken for shifting the patients from ED to CCU, followed by lack of trained ED staff and cardiologist consultation. The reason for delay has been shown in following flow chart.

The result of our study from ED are far better than documented results of the other studies. As we thrombolysed 70.8% of patients in <30 mins: while Zed et al documented this percentage as 24.3%.

A study conducted in Punjab Institute of Cardiology had DNT of 55.13+ 71.04 mins¹⁸ with only 30% of patients being thrombolysed in <30mins:. In a study conducted in our unit by Ali J et al in 2010 mean DNT was 72.42±40.58 mins with the biggest factor responsible for delay as logistic reasons i.e. transportation of patients from ED to CCU.¹⁹ In our study we have over come this factor with the shift of thrombolysis site from CCU to ED and achieved the DNT of 31.96±16.9 mins.

So by changing the thrombolysis site from CCU to ED, we have saved not only the precious time of patients but also improved the hospital efficiency.

CONCLUSION

Establishment of the new chest pain clinic in the ER with the provision of thrombolytic therapy by trained staff proved to be a very effective strategy for reducing the DNT.

REFERENCES

1. McNamara RL, Herrin J, Wang Y, Curtis JP, Bradley EH, Magid DJ, Rathore SS, Nallamothu BK, Peterson ED, Blaney ME, Frederick P. Impact of delay in door-to-needle time on mortality in patients with ST-segment elevation myocardial infarction. *The American journal of cardiology*. 2007 Oct 15;100(8):1227-32.
2. Jollis JG, Mehta RH, Roettig ML, Berger PB, Babb JD, Granger CB. Reperfusion of acute myocardial infarction in North Carolina emergency departments (RACE): study design. *American heart journal*. 2006 Nov 30;152(5):851-61.
3. Yaliali YT. Door-to-needle times in acute myocardial infarction. *Asian Cardiovascular and Thoracic Annals*. 2010 Apr;18(2):122-6.
4. Hourigan CT, Mountain D, Langton PE, Jacobs IG, Rogers IR, Jelinek GA, Thompson PL. Changing the site of delivery of thrombolytic treatment for acute myocardial infarction from the coronary care unit to the emergency department greatly reduces door to needle time. *Heart*. 2000 Aug 1;84(2):157-63.
5. Schull MJ, Vermeulen M, Slaughter G, Morrison L, Daly P. Emergency department crowding and thrombolysis delays in acute myocardial infarction. *Annals of emergency medicine*. 2004 Dec 31;44(6):577-85.
6. Authors/Task Force Members, Van de Werf F, Bax J, Betriu A, Blomstrom-Lundqvist C, Crea F, Falk V, Filippatos G, Fox K, Huber K, Kastrati A. Management of acute myocardial infarction in patients presenting with persistent ST-segment elevation: the Task Force on the Management of ST-Segment Elevation Acute Myocardial Infarction of the European Society of Cardiology. *European heart journal*. 2008 Dec 1;29(23):2909-45.
7. Masoudi FA, Bonow RO, Brindis RG, Cannon CP, DeBuhr J, Fitzgerald S, Heidenreich PA, Ho KK, Krumholz HM, Leber C, Magid DJ. ACC/AHA 2008 statement on Performance Measurement and Reperfusion Therapy: a report of the ACC/AHA Task Force on Performance Measures (Work Group to address the challenges of Performance Measurement and Reperfusion Therapy). *Journal of the American College of Cardiology*. 2008

- Dec 9;52(24):2100-12.
8. McNamara RL, Herrin J, Bradley EH, Portnay EL, Curtis JP, Wang Y, Magid DJ, Blaney M, Krumholz HM, NRM Investigators. Hospital improvement in time to reperfusion in patients with acute myocardial infarction, 1999 to 2002. *Journal of the American College of Cardiology*. 2006 Jan 3;47(1):45-51.
 9. Wilmshurst P, Purchase A, Webb C, Jowett C, Quinn T. Improving door to needle times with nurse initiated thrombolysis. *Heart*. 2000 Sep 1;84(3):262-6.
 10. Maharaj RC, Geduld H, Wallis LA. Door-to-needle time for administration of fibrinolytics in acute myocardial infarction in Cape Town. *SAMJ: South African Medical Journal*. 2012 Apr;102(4):241-4.
 11. Panduranga P, Al-Zakwani I, Sulaiman K, Al-Habib K, Al Suwaidi J, Al-Motarreb A, Alsheikh-Ali A, Al Saif S, Al Faleh H, Almahmeed W, Asaad N. Clinical profile and mortality of ST-segment elevation myocardial infarction patients receiving thrombolytic therapy in the Middle East. *Heart views: the official journal of the Gulf Heart Association*. 2012 Apr;13(2):35.
 12. Al-Zakwani I, Zubaid M, Al-Riyami A, Alanbaei M, Sulaiman K, Almahmeed W, Al-Motarreb A, Al Suwaidi J. Primary coronary intervention versus thrombolytic therapy in myocardial infarction patients in the Middle East. *International journal of clinical pharmacy*. 2012 Jun 1;34(3):445-51.
 13. Abba AA, Wani BA, Rahmatullah RA, Khalil MZ, Kumo AM, Ghonaim MA. Door to needle time in administering thrombolytic therapy for acute myocardial infarction. *Saudi medical journal*. 2003 Apr 1;24(4):361-4.
 14. Corfield AR, Graham CA, Adams JN, Booth I, McGuffie AC. Emergency department thrombolysis improves door to needle times. *Emergency Medicine Journal*. 2004 Nov 1;21(6):676-80.
 15. Zed PJ, Abu-Laban RB, Cadieu TM, Pursell RA, Filiatrault L. Fibrinolytic administration for acute myocardial infarction in a tertiary ED: factors associated with an increased door-to-needle time. *The American journal of emergency medicine*. 2004 May 31;22(3):192-6.
 16. Rasmussen JN, Chong A, Alter DA. Relationship between adherence to evidence-based pharmacotherapy and long-term mortality after acute myocardial infarction. *Jama*. 2007 Jan 10;297(2):177-86.
 17. Huynh T, O'loughlin J, Joseph L, Schampaert E, Rinfret S, Afilalo M, Kouz S, Cantin B, Nguyen M, Eisenberg MJ, AMI-QUEBEC Study Investigators. Delays to reperfusion therapy in acute ST-segment elevation myocardial infarction: results from the AMI-QUEBEC Study. *Canadian Medical Association Journal*. 2006 Dec 5;175(12):1527-32.
 18. Jehangir W, Daood MS, Khan M, Mallick NH. Evaluation of the door-to-needle time in patients undergoing fibrinolytic therapy after acute myocardial infarction. *Pak J Physiol*. 2009;5(2):38-9.
 19. Ali J, Ahmad I, Faheem M, Irfan M, Gul AM, Hafizullah M. Factors associated with delaying of fibrinolytic therapy administration in patients with acute myocardial infarction. *Khyber Med Univ J* 2012;4(3):129-32.