EFFECTS OF THROMOBOLYTIC THERAPY IN THE PATIENTS OF MYOCARDIAL INFRACTION

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Abstract
Objective: *To minimize the response reperfusion time through the administration of drugs – Thrombolytic Therapy.*
Methods: *The study was conducted from January 2017 to October 2017 at Allied Hospital Faisalabad. Initially patients were brought to the hospital by Rescue 1122 service to reach the hospital emergency department (ED) in time. Secondly, emergency CPU was given task to carry out reperfusion with drug administration. A specific form intended for the information of patients was filled for each subject. The form included the information such as TT, DTN time, reperfusion criteria and complications observed. The groups were compared and a p value <0.005 was declared statistically significant.*
Results: *To analyze the objective, 291 patients were selected. 15 were brought in to emergency department by Rescue 1122 service whereas the rest reported at their own. The average age of the patient was 51 years. Among 291 patients, 245 were males. The patients were provided reperfusion through drug administration – Thrombolysis at CPU (10.23%), CCU (74.22%) and emergency department (15.46%). DTN time was considerably minimized in Chest Pain Unit (CPU). EMS had a minimum total time with p value = 0.0001.*
Conclusion: *The total time had significantly reduced by using the emergency rescue services (EMS) of 1122, The DTN time was set to an acceptable level by formulating the CPU at the hospital emergency department. The reduction in TT and DTN will surely result in low perfusion time with thrombolytic therapy. The formation of such Chest Pain Units and efficient medical services is strongly recommended at all local health care facilities.*
Keywords: *Emergency medical services, Chest pain units, Thrombolytic therapy.*

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INTRODUCTION:

Thrombolytic therapy is used to restore the blood flow to the heart when an acute blockage takes place. Reperfusion is done with either drug administered therapy such as fibrinolytic therapy or intervention techniques in which stents are used to remove the blockage and maintain a steady blood flow to the heart. PCI techniques are not common in our country so the main focus for reperfusion in our case is fibrinolytic therapy. The therapy when applied during 3 hours of identification of heart attack had reduced the mortality rate up to 50%. Its application during 1st hour had outstanding results [1].

Due to lack of cardiac facilities in remote/rural areas of Pakistan, the treatment of choice is Thrombolytic therapy. The therapy when given in time yields outstanding outcomes but its timely application is compromised by a number of factors. The factors include inability to recognize the symptoms by the patient, casual behavior at first aid or general practitioner, distance and mode of transport used for the patient. These factors add up to increase the total time for the treatment of the heart attack and often have severe outcomes in the shape of death. Rescue 1122 is perhaps first of its kind emergency medical service based on international standards in our country. The efficient role of the EMS (1122) has certainly saved many victims from losing their lives [2].

It is worth highlighting that at time patients reach the emergency department well in time but cannot get priority treatment which causes the DTN (door to needle) time higher than recommended. Furthermore, emergency departments (EDs) of general care hospitals in Pakistan, like most of the developing countries, are not providing prompt fibrinolysis and, hence, door-to-needle time (DNT) is higher than suggested [9].

The pioneer CPU was formed in 1981 for patients who come up with chest pain. The performance of Chest Pain Unit (CPU) was good enough in sense of patient's admissions, reduced readmissions, follow ups etc. but it was not being used for thrombolytic or fibrinolytic therapies [3]. The current study was aimed at to reduce the TT by reducing the transportation time. Secondly,

Chest Pain Units were established to reduce the DN time in patients who suffer from chest pain (a major symptom for STEMI).

METHODS:

All patients with heart attack due to STEMI were selected for the study. The patients were brought to emergency department of Allied Hospital Faisalabad for treatment. It was done in two parts. In first part, efforts were made to reduce the total time by speedy transportation of patients to the emergency department. The coordination between the rescue and emergency staff was vital. The victims were injected streptokinase (SK) at Coronary Care Unit or in general emergency.

In the second place, a separate room was prepared and equipped with all monitoring machines and resuscitation equipment. It was given the name of CPU (Chest Pain Unit). Cardiac surgeon and para medical staff from cardiology department were deployed at CPU to reduce the DN time. The patients were shifted to Coronary Care unit after stabilization through fibrinolytic therapy at CPU. The time from the start of indication till start of treatment is called total time TT. Door to needle is the time delay between the reporting at hospital facility and start of treatment. The patients were investigated about different characteristics according to a pre-set proforma. The SPSS (Ver 16) was used for data analysis and p-value <0.05 was referred as statistically significant.

Results

The subjects were selected for drug administered therapy having STEMI indications. Fifteen patients (5.15%) were rescued by 1122 emergency services. Remaining patients were either referred by a practitioner or showed up themselves with heart related problems. The subjects were between the ages of 22-90 years. The mean of 51 ±11.5 years was calculated for the sample. Most of the patients of the study were males 245 (84%). 43 % of the sample was uneducated. A hundred and thirty-six patients out of two hundred and ninety-one were from urban areas and only 1% was highly educated.

Table-1: Effect of mode of presentation on timings		
Presentation	**Total Time**	**DN Time**
Rescue 1122	**2:20**	**1:01**
Self	**5:25**	**1:22**
GP/Cardiologist	**5:03**	**0:57**
P. Value	**P<0.001**	**P<0.05**

DNT: Door-to-Needle Time.

Table-2: Effect of venue on timings		
Venue	**Total Time**	**DN Time**
CCU	**5:29**	**1:26**
ED	**4:55**	**1:17**
CPU	**3:52**	**0:28**
P. Value	**P 0.01**	**P < 0.0001**

CCU: Coronary Care Unit. ED: Emergency Department.
CPU: Chest Pain Unit.

The patients rescued by 1122 had the least total time TT whereas least DNT was observed in the patients who were referred by cardiologist (Table-1).
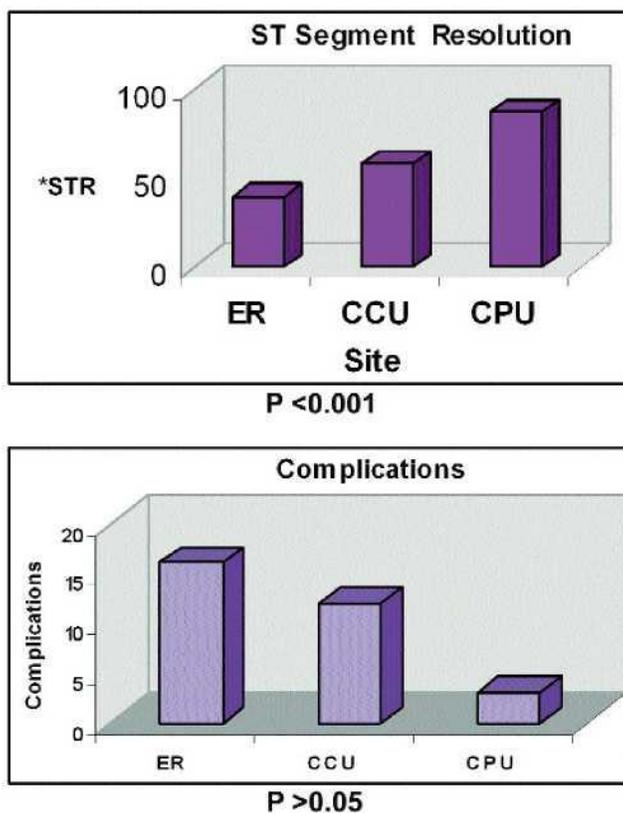

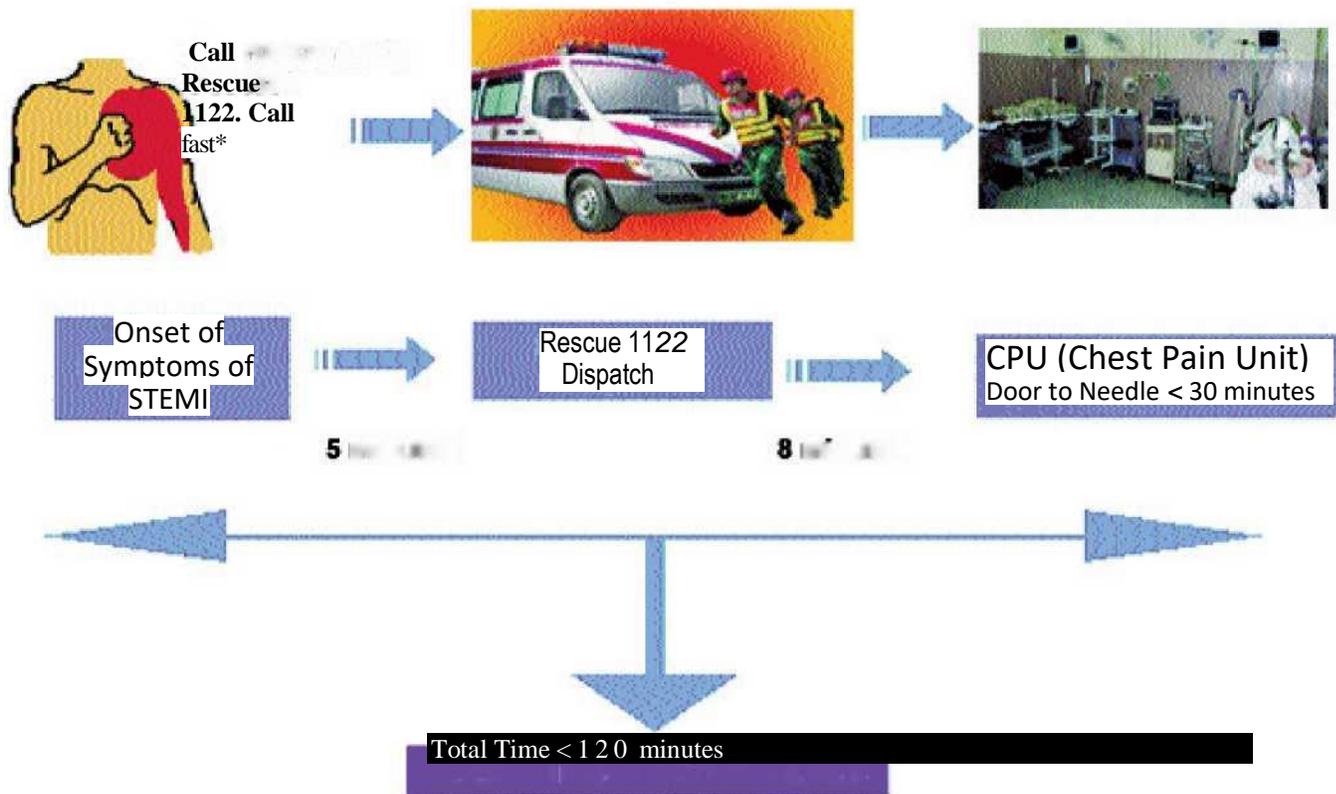**Figure-1:** Effect of Venue on STR & Complications.

Figure-2: Model for speedy delivery of thrombolytic treatment in Pakistan.

Total time was remarkably minimized in patients rescued by EMS (3:05 hours). Thrombolytic therapy was carried out at different stages, (10.30%) patients were treated at Chest Pain Unit, (74.22%) were treated at Coronary Care Unit and 45 (15.46%) at Emergency Department of the hospital. Factors like gender, literacy rate, awareness and remote locations were increasing the TT sufficiently. Total time of 3 hours or greater was observed with associated complications [4].

Door to needle time measured in case of CPU was 28 minutes, 1.17 hours for CCU patients and 1.26 hours for patients at ED. The door to needle time was ideal in case of CPU patients (<30 min, Table-2).

DISCUSSION:

The reduction in total time was achieved by the efficient medical emergency services of Rescue 1122. The TT was almost double in rest of the cases. The door to needle time in all set ups was having similar readings with slight differences. However, the total time was significantly different owing to transportation time required by the patient to reach the facility [5]. The rescue team has saved many lives by reducing the total transportation time with their efficient and quick EM services. The rescue team not

only ensures timely delivery of patients at the facility but also provide necessary first aid during transportation. The reduction in transportation time and first aids are missing in case of patients reporting at their own [6]. In some advanced countries the EMS are even more efficient and reliable. They transmit the patients' situation to nearest hospital so that the door to needle time is kept very low [7]. The patient on arrival does not have to wait for paperwork and initial checkup for assessment rather he can get immediate medical care which is a necessity in situations like heart attack [8]. The increase in TT does not necessarily depend only on the delayed transportation time. There are other factors which can lead to the increase in TT. These include low or no knowledge, location and condition of the patient, Distance from the hospital and gender related problems. These factors have got the potential to increase the total time to an alarming level [9].

The other major aspect of our research was the setting up of Chest Pain Unit (CPU). It was first established in United States in the emergency departments of the hospital for the purpose of quick diagnosis of STEMI (heart attack), reduction in hospital stay and was economical. In developed countries, a number of non-cardiac hospitals are equipped with latest equipment in their Chest Pain

Unit [10]. The concept of CPU is new in our country but it is getting popularity due to its effective working. In this study, it was possible to reduce the Door to Needle time to less than 30 minutes because of CPU. This reduction in DNT is the ideal acceptable timeline recommended all over the world [11]. The patients after diagnosis at CPU need immediate thrombolytic therapy at Coronary Care Unit. The time wasted in formalities for shifting of patients from overcrowded emergency department to CCU is often associated with high mortality rate. Due to the limited medical staff and doctors dealing with equally serious patients in emergency, it seems difficult that chest pain patients will get the thrombolysis within the recommended time [12]. The solution to cater this situation is to start thrombolytic therapy at CPU and shifting of patient to CCU when the patient is a little stable. All these efforts were made to reduce the DTN time which is directly associated with mortality [13].

The overall TT was reduced to 4 hour and 8 minutes by utilizing the EMS of 1122 and establishment of CPU at hospital's emergency department. Such reduction in TT was certainly helpful in the treatment of STEMI patients [14]. We recommend the use of Emergency Medical Service and also the formation of Chest Pain Unit at emergency department of the general hospitals to retaliate the death rate occurring in the STEMI patients. Moreover, the EMS can be improved in recognition of symptoms, ECG interpretation and other technologies being used by the EMS of developed countries around the globe [15]. A procedure should exist with which EMS can maintain a link with the emergency department of the nearest hospital and exchange the patient's information so that the DNT time is reduced to minimum. Awareness regarding the use of Emergency Medical Services and its benefits should be created through television and print media [16]. Moreover, establishment of CPU at emergency department has reduced the DNT to less than 30 minutes which is a milestone of our study. The DNT less than 30 is internationally recommended in these situations. We also ensured that the patients were given the drug administered therapy at CPU. In some cases, where the patients were stable and can wait for the shifting to Coronary Care Unit were delayed the therapy [17]. The establishment of CPU with trained staff and up to date medical facilities is recommended in emergency department of general hospitals. If we are able to create the CPU environment in the hospitals, we will surely be able to efficiently handle the STEMI patients nationwide [18]. Our study was limited in the sense that we did not know the sample size prior to the study. All the

patients satisfying the criteria between the tenure of the study were selected.

CONCLUSION:

The total time had significantly reduced by using the emergency rescue services (EMS) of 1122, The DTN time was set to an acceptable level by formulating the CPU at the hospital emergency department. The reduction in TT and DTN will surely result in low perfusion time with thrombolytic therapy. The formation of such Chest Pain Units and efficient medical services is strongly recommended at all local health care facilities.

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