Feasibility and Outcome Of Primary PCI in Patients With Acute Myocardial Infarction In Sudan

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Abstract:

Primary Percutaneous Coronary Intervention (1ry PCI) is the reperfusion therapy of choice in patients presenting with acute myocardial infarction within 12 hours of the onset of chest pain 1-5. The procedure has to be done in a timely manner with a desirable door to balloon time of less than 90 minutes.

The procedure is associated with several challenges including the presence of an experienced team, logistic challenges and availability of adjunctive medical therapy and necessary equipment.

Aim of the Study:

Is to test the feasibility, success and short term angiographic and clinical outcome of primary PCI in a subset of patients presenting with acute myocardial infarction in Sudan.

Study protocol:

This is a retrospective study conducted in Sudan Heart institute during a 12 month period of cath lab work in 2011-2012. Included patients are those patients with an acute myocardial infarction (AMI) presenting within the re-perfusion time window.

Results:

During this 12 month period, 15 patients presenting with AMI underwent primary PCI. 80 %(12) were males and 20% (3) females. Average age of patients was 55.7 years.

TIMI 3 flow was attained in 14 patients (93%), all of them were stented successfully. Emergency bypass surgery was performed in one patient. There was no reported in-hospital mortality.

Conclusion and recommendations:

Performance of primary PCI in Sudan is feasible with a high successes rate. Logistics and other challenges should not be an obstacle to deny eligible acutely sick patients such vital and life saving procedure.

Key words: Acute myocardial infarction, Primary Percutanoues Coronary, Re-perfusion Therapy

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Introduction:

Primary PCI is the treatment of choice for patients with AMI presenting within the first 12 hours of the onset of chest pain. The procedure is associated with significant mortality and morbidity benefit compared to thrombolytic therapy 1-5.

Performance of 1ry PCI is much challenging than routine elective procedures: These challenges are pertaining to patients' factors and hospital setup and readiness.

Patients' factors involve dealing with the acutely sick and unstable patient who is also not well primed by medical therapy especially anti-platelet therapy.

Hospital and team readiness is another challenge which includes the availability of standby cathlab and skilled personnel. Availability of adjunctive therapy such as emergence cardiac pacing, suction catheters, intra aortic balloon pump (IABP) and strong anticoagulants such as GP2b3a is another challenge.

The procedure has to be done by a specialized cardiac centre with onsite interventional team and standby catheterization laboratory. The centre has to thrive to attain a door to balloon time of less than 90 minutes. If this desirable door to balloon time is not feasible due to the lack of suitable required logistics, then thrombolysis therapy should be the alternative reperfusion strategy.

Practice in Sudan Heart Institute (SHI):

SHI is the first cardiac centre in Sudan, and is one of the major cardiac hospitals that offer this service in the country. The hospital is equipped with one cardiac catheterization laboratory which performs both pediatric and adult procedures.

Elective procedures are done on daily basis, which renders the room occupied most of the time for the unexpected emergency procedures. Primary PCI is performed at the discretion of the operating consultant if the patient would present at a time when the cath lab is vacant and excessive time delay is not anticipated, otherwise thrombolytic therapy should be the immediate alternative treatment. Primary PCI is performed off working hours if the patient was not suitable or contraindicated to thrombolytic therapy or should adverse reactions to

thrombolysis necessitate discontinuation of therapy. In this case the offsite on call cardiac catheterization team should be called to perform the procedure as an emergency case.

To our knowledge, there are no published studies addressing the feasibility and outcome of this vital procedure in Sudan.

Objectives:

1/ To examine the feasibility of 1ry PCI in patients with acute MI in Sudan

2/ To study the rate of success of the procedure

3/ to analyze the short term in-hospital clinical and angiographic outcome of patients.

Inclusions:

All Patients who underwent 1ry PCI in SHI during 12 working months period of the cath lab in the years 2011 and 2012 were included. We included all patients regardless of age, sex or time of presentation.

Exclusions:

Since the number of cases done was small, we did not exclude any patient.

Study type and Protocol:

This is a retrospective single center study.

In this study we examined the cath lab log book for procedures labeled as 1ry PCI during the study period. Patients' file numbers were noted and clinical notes were retrieved. Medical files were checked for patients' demographic and clinical data and procedure details. Angiography films were reviewed to check timings and assess angiographic outcome. Cath lab procedure reports were also examined to fill any missing information.

The procedure was done in a standard fashion and all patients were loaded with 600 mg s of Clopidogrel and 300 mgs of asprin. The non culprit vessel was injected first and if was found to be diseased is left for another later elective procedure as per standard recommendations. The usage of GP2b3a, IABP and suction catheters was left to the discretion of the performing physician.

Findings:

In this study a total of 15 patients with acute myocardial infarction underwent 1ry PCI in a standard fashion. The decision to perform primary PCI rather than thrombolysis was left to the

discretion of the physician when the logistics are favorable and excessive delay in performing the procedure is not anticipated.

Clinical characteristics of study population: (table 1)

In those patients with 1ry PCI, the male to female ratio was 80 %(9) and 20 %(3) respectively. The mean age of patients was 55.7 years.

Most patients were fairly high risk with a prevalence of diabetes of 42%, 3 patients with complete heart block and required temporary pacing. 3 patients with hypotension (BP less than 100 mmhg systolic), one of these 3 patients was in cardiogenic shock. 47% of patients presented with anterior MI.

		%(N0)
Sex	male	80%(12)
	female	20%(3)
mean age		55.7
DM		42%
HPTN		33%(5)
Family history		33%(5)
smoking		60%(9)
hyperlpidemia		20%(3)
type of MI	Anterior	47%(7)
	inferior	40%(6)
	other	13%(2)
arrhythmia at presentation	CHB	20%(3)
	V Fib	7%(1)
	Other	13%(2)
hypotension	yes	20%(3)
	no	80%(12)

Tabel 1: Patients Clinical characteristic at presentation

Clinical and Angiographic outcome: (Table2)

In 53% (8) of patients the culprit vessel was the LAD, while the RCA and the LCX were the target in 40% and 7% of the cases respectively.

TIMI3 blood flow was attained in 93%(14) of patients, all of them were stented successfully. In one patient, stenting was not possible and the patient underwent emergency bypass surgery. In this patient the final TIMI flow was 0.

The door to balloon time was calculated in 12 patients while in 2 patients it was not possible to estimate it with reasonable accuracy. The shortest door to balloon time was attained in 80 minutes and the longest was 150 minutes. The mean door to balloon time was 100 minutes.

All patients were discharged from hospital alive with no excessive in-hospital stay.

		%(No)
vessel treated	LAD	53%(8)
	RCA	40%(6)
	LCX	7%(1)
final TIMI flow	TIMI 3	93%(14)
	TIMI 0	7%(1)
mean door to balloon time		100 min
50% ST Resolution	yes	93%(14)
	no	7%(1)
Stented	yes	93%(14)
	no	7%(1)
type of stent	BMS	60%(9)
	DES	40%(6)
GP 2b3a	yes	40%(6)
	no	60%(9)
Balloon pump	yes	13%(2)
	no	87%(13)
Temporary pacing	yes	20%(3)
	no	80%(12)

Table 2: Clinical and angiographic outcome

Discussion:

The study is a small one with few patients involved. One of the reasons for this is that the vast majority of patients with AMI present late and outside the reperfusion window 6. Another reason is the lack of a dedicated 1Ry PCI team and program and this is mainly due to the lack of a second cath lab for the performance of this procedure and the availability of enough standby personnel. Since there is only one cath lab room which serves both adult and pediatric

procedures, the room is occupied most time of the working hours and this should result in excessive delay of the procedure should vacancy of the cath lab is awaited. The rate of primary PCI is 30% (not shown in this study) compared to a thrombolysis rate of 70% in those patients presenting within the reperfusion window and hence the rate of performance of 1ry PCI is relatively high compared to thrombolysis in the subset of patients suitable for the procedure.

The rate of success is high and comparable to international standards.

Though clot suction equipment is available, but there was none used in the procedures as was felt un necessary by the operator . Cost issues were also considered as a cause of reduced utilization of the suction catheters. However at the end the underuse of these catheters did not affect the success rate of the procedure and the final TIMI flow.

On the other hand the use of other adjunctive therapeutic options was high, with the rate of administration of the anti-platelet GP2b3 of 40% and the rate of insertion of IABP of 13%.

The door to balloon time matched international standards. The procedure was associated with high success rate and no major in hospital morbidity or mortality

Conclusion and Recommendations:

From this small study we conclude that performance of 1ry PCI is feasible in spite of the logistic difficulties and lack of resources in terms of abundance and availability of cath labs and dedicated team with 24/7 coverage. The success rate is high and there was no excessive delay in the door to balloon time. Logistic difficulties and scarcity of resources did not affect the overall outcome of this procedure and patients' safety was not compromised.

We think that all efforts should be exerted to allow 1ry PCI to be the therapeutic option of choice for those patients who present within the reperfusion time window. Availability of resources should not be an excuse to deny eligible patients this life saving procedure and local 1ry PCI programs should be encouraged to increase the volume of procedures done which in turn should enhance the success rate and further shorten the door to balloon time for better patient's outcome.

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