Complications of Streptokinase during Infusion in Acute Myocardial Infarction

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Background: Myocardial infarction is one of the most common causes of death worldwide. The cornerstone of therapy is thrombolytic therapy. Coronary thrombolysis helps restore coronary patency, preserves left ventricular function and improves survival. The most common thrombolytic agent used is streptokinase. But thrombolytic therapy is at times associated with some complications. This comparative study was aimed to find out the complications occurring during streptokinase infusion in patients presenting with acute myocardial infarction in Mayo Hospital, Lahore. **Material & Methods:** Two hundred patients with definite diagnosis of acute myocardial infraction, who presented to East Medical Ward, Mayo Hospital, Lahore, were included in this study. All patients presenting with AMI were considered for SK therapy. Those who were actually given SK constituted the SK group and those who were not fit for SK, but otherwise SK was indicated, constituted the control group. In SK group 100 patients were given standard treatment of acute myocardial infarction including streptokinase. In control group 100 patients were given standard treatment of acute myocardial infarction except streptokinase due to non-eligibility. Patients with typical chest pain of at least 30 minutes duration, serial ECG changes and serial cardiac enzyme changes were entered in the study. **Study design:** Comparative / interventional **Results:** Post SK changes in blood pressure were significant (p= 0.011). There was post SK hypotension in 48 (24%) and post SK hypertension in 20 (10%) patients. Allergic reaction was present in 4 (2%) only (p=0.044). Arrhythmias were significantly less prominent in SK group (p=0.000). Post SK bleeding occurred in 3 (1.5%) only (p=0.082). 37 patients died (18.5%) in total, out of which 5 (2.55) patients died in SK group and 32 in control group (p=0.000). CVA occurred in 1 SK group patient only, which was found to be hemorrhagic on CT scan (p= 0.31). **Conclusions**: Early administration of SK lowers in-hospital mortality (p= 0.000). Major complications during SK therapy are Hypotension (p= 0.011), Arrhythmias (p= 0.000), Allergic reactions (p= 0.044)

Key words: Streptokinase, acute myocardial infarction, complication

The term myocardial infarction means the development of a defined area of myocardial necrosis caused by local ischaemia[1]. Mostly acute myocardial infarction is caused by coronary artery thrombosis previously narrowed by atherosclerosis. Progression of atherosclerotic lesion to the point where thrombus formation occurs is complex process related to vascular injury. In majority of cases infarction occurs when atherosclerotic plaque ruptures, fissures or ulcerates[2].

Large placebo controlled clinical trials have consistently demonstrated reduced mortality in patients receiving thrombolytic therapy within six hours of onset of an acute myocardial infarction. In comparison with conventional medical therapy, thrombolytic therapy reduces the 35 days mortality by 21%. In contrast patients with ST–segment depression, T-wave inversion or no ECG changes have not been shown to benefit from thrombolytic therapy[3]. Complications of thrombolytic therapy are antibody mediated resistance to streptokinase in most patients, fever, allergic reactions seen in 1.7%, hypotension and bleeding complications are common[4].

Aims and Objectives:

This study would be aimed at to find out and manage the most common complications occurring during streptokinase infusion in acute myocardial infarction patients in Mayo Hospital Lahore.

Material & Methods

Two hundred patients with definite diagnosis of acute myocardial infraction, who presented in Mayo Hospital, Lahore, were included in this comparative study from cardiology unit and all four medical units of Mayo Hospital, Lahore. Patients were divided into two groups, SK group and control group. All patients presenting with acute MI were considered for Streptokinase therapy, those who were actual given SK constituted the SK group and those who were no fit for SK (but otherwise SK was indicated) constituted control group.

Diagnostic criteria:

- Typical chest pain of at least 30 minutes duration
- The electrocardiographic criteria used for diagnosis of AMI included ST-segment elevation of 1mm or more in any of the two limb leads or 2mm or more in any of the two consecutive precordial leads or new onset LBBB.

The patients with new onset chest pain and fresh or new left bundle branch (LBBB) were considered as a patient of acute myocardial infarction.

Cardiac enzymes: Cardiac enzyme studies included CK total, CK - MB, AST & LDH. A positive Trop-T by kit method or the value of CK total more than double of the normal value or with CK-MB 6% of the total CK were considered diagnostic of transmural myocardial infarction.

Eligible patients for streptokinase therapy

If the patient fulfilled the following criteria they were included in the study

I. Typical changes in ECG with ST-segment elevation of more than 1mm in any of two limb leads or more than 2mm in any two consecutive precordial leads.
II. If the duration of chest pain was less than 12 hours.
III. If the patient had no absolute contra indication to SK therapy such as pregnancy, CVA within 2 months, surgical procedure within 10 days, invasive procedures within 10 days, previous treatment with SK and allergy to SK. These patients included in control group.

Streptokinase group:

In all Patients following treatment regimens was used. i. Tab. Disprin-300 mg chewed immediately, ii. Inj. Morphine IV (5-lOmg) if no contra-indication, iii. Streptokinase infusion (1.5 million units) in one hour, iv. Nitrates for 24 hours, v. IV Heparin (1000 lU/hour) if the patient developed post infarction angina, 6 hours after SK therapy, vi. Beta blockers if no contraindication, vii. ACE inhibitors if contraindication, viii. Anxiolytics

Control group:

i. Tab. Disprin - 300 mg chewed immediately, ii. Inj. Morphine (5-lOmg/IV), iii. IV Nitrates for 24 hours, iv. IV Heparin (1000 IU/ hour) for 3 days then S/C (5000 , IU/8 hourly, v. Beta blockers if no contraindication, vi. ACE inhibitors if no contraindication, vii. Anxiolytics

Statistical analysis:

Student's t-test was applied and P value estimated. P value less than 0.05 was taken as significant (S).

Results:

100 patients were included in SK group and given all the standard treatment of acute myocardial infarction including SK, in control group 100 patients were included which were given all the standard treatment of myocardial infarction except SK due to non-eligibility.

Out of 200 patients, 135 (67.5%) were male and 65 (32.5%) were female. In SK and control group male to female ratio was 71:29 and 64:36 respectively. Out of 200 patients 139 (69.5%) present with chest pain, 41 patients (20.5%) presented with dyspnea and 20 (10%) with chest pain and dyspnea.

At presentation 145 (72.5%) had normal pulse, 38 (19%) had bradycardia and 17 (8.5%) had tachycardia. 140 (70%) patients were normotensive, 34 (17%) were hypotensive and 26 (13%) were hypertensive at presentation. 36 (18%) patients had raised JVP. Second heart sound was abnormal in 12 (6%) patients. There were added heart sound in 13 (6.5%) patients. At the time of presentation there were basal crepitations in 30 (15%) patients. On 12 lead ECG 123 (61.5%) had anterior wall myocardial infarction, 38 (19%) had inferior wall myocardial infarction, 20(10%) had posterior wall myocardial infarction, 14 (7%) had right ventricular myocardial infarction and 5 (2.5%) patients presented with new onset LBBB. Out of 200 patients nausea, vomiting occurred in 17 patients (8.5%). During SK infusion nausea, vomiting occurred in 5% patients.

Cardiac enzymes were abnormal in 175 (87.5%). Pulse after SK infusion was normal in 135 (67.5%) patients. There was bradycardia in 34 (17%) patients and tachycardia in 31 (15.5%). Post SK blood pressure was normal in 132 (66%) patients. There was post SK hypotension in 48 (24%) and post SK hypertension in 20 (10%) patients. Post SK allergic reaction was present in 4 (2%) only.

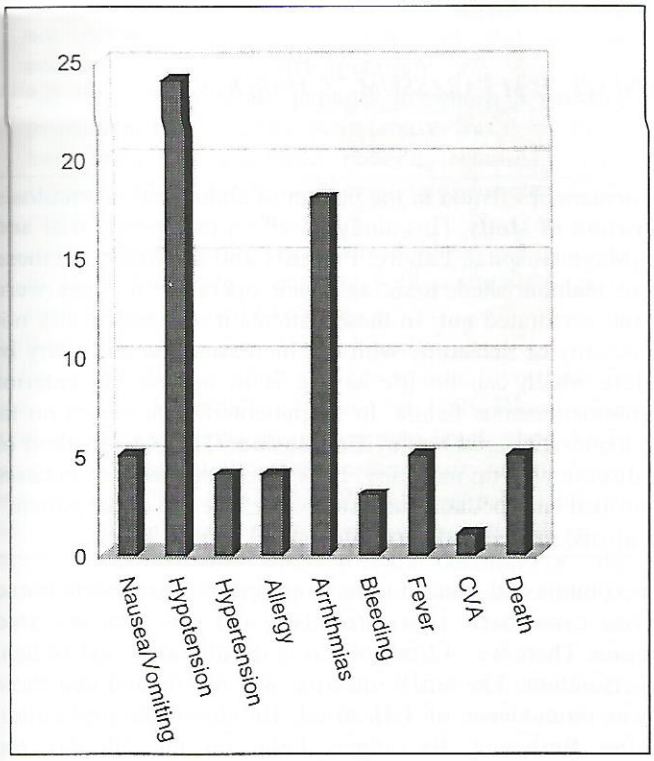
Arrhythmias were not present in 144 (72%) patients out of 200. VPCs were present in SK and control 82:60, SVT in 5:8. Ventricular fibrillation in 5:4, third degree heart block in 4:12, RBBB in 1:2, LBBB in 1:4, AIVR in 1:4 respectively. Post SK bleeding occurred in 3 patients (1.5%) only. 37 patients died (18.5%) in total, out of which 5 (2.55) patients died in SK group and 32 in control group. Past history of ischaemic heart disease was positive in 33 (16.5%) patients only.

Among risk factor 25 (12.5%) were diabetic, 17 (8.5%) were hypertensive, 5 (2.5%) were obese, 18 (9%) were smokers, 6 (3%) were hyperlipidemic, family history was positive in 13 (6.5%) and any above two risk factors in 41 (20%), any above three risk factors in 37 patients (18.5%), any above four risk factors in 38 (19%) patients. Fever occurred in 5 patients after giving SK and 8 patients in control group. CVA occurred in 1 SK group patient only, which was found to be haemorrhagic on CT scan.

Table 1: Comparison of complications in SK and control group

Complications		SK group (n = 100)	Control group (n = 100)
Pulse	Tachycardia	3	28
	Bradycardia	6	28
Arrythmias	No	84	60
	VPCs	5	8
	SVT	5	4
	VF	4	12
	3rd degree heart block	1	2
BP	Normal	72	60
	Hypotension	24	24
	Hypertension	4	16
Allergic reactions		4	0
Bleeding		3	0
Mortality		5	32
Fever		5	8
CVA		1	0

Fig. 1: Complications of Streptokinase as studied



Discussion:

In our study 135 patients (67.5%) out of 200 were male, which is comparable with Samad et al (71%), Niazi et al (79%), Maiman et al (77%)[5,6,7]. Our study showed the incidence of chest pain was 69.5%, which is comparable to Samad et al (66%).[5] In our study we had 61.5% patients with anterior wall myocardial infarction, 19% with inferior wall myocardial infarction, 10% with posterior wall myocardial infarction, 20% with right ventricular myocardial infarction and 2.5% patients presented with new onset of LBBB.

In a study by Juarez et al 53% were with anterior wall myocardial infarction, in a study by Chaudhry et al 52% with anterior wall myocardial infarction, 47% with inferior wall myocardial infarction and 1% was with posterior wall myocardial infarction. [11, 10] Nausea, vomiting occurred in 8.5% patients, out of which 5% were in SK group, in a study carried out by Chaudhry et al vomiting occurred in 1% patients receiving SK[10].

Cardiac enzyme were found raised in 87.5% patients which is comparable with Juarez et al (83%)[11]. Post SK hypotension occurred in 24% patients, while Chaudhry et al noted this complication in 11% patients. Post SK allergic reactions were found in 2% patients, which is comparable with study by Chaudhry et al (2%)[10]. Arrhythmia in SK group occurred in 18%, which is comparable with study by Chaudhary et al (8%).[10] Bleeding occurred in 3 (1.5%) patients after SK, which is quite low as compared to Juarez et al's (11%)[11].

Total mortality was 37 (18.5%) patients, out of which 5 patients died in SK group and 32 patients in control group, while mortality in a study by Samad et al 3.13%, Maiman et al 20.7%, Gardezi et al 6.5% in SK group and 9.4% patients in control group[5,7,8]. Regarding CVA in SK group 1 patient (0.5%) developed haemorrhagic stroke, which is quite comparable with Juarez et al 0.4%, Conred 0.1-1.4% and GISSI trial 0.2%[11,9,12]. The comparison of side effects in control and SK group (Table 1).

Conclusion

Early administration of SK lowers in hospital mortality (p=0.000) Major complications during SK therapy are:

- Hypotension (p=0.011)
- Arrhythmias (p=0.000)
- Allergic reaction (p=0.044)

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