

**CORONARY CARE UNIT SURVEY
AT AIN SHAMS UNIVERSITY HOSPITAL**

Thesis

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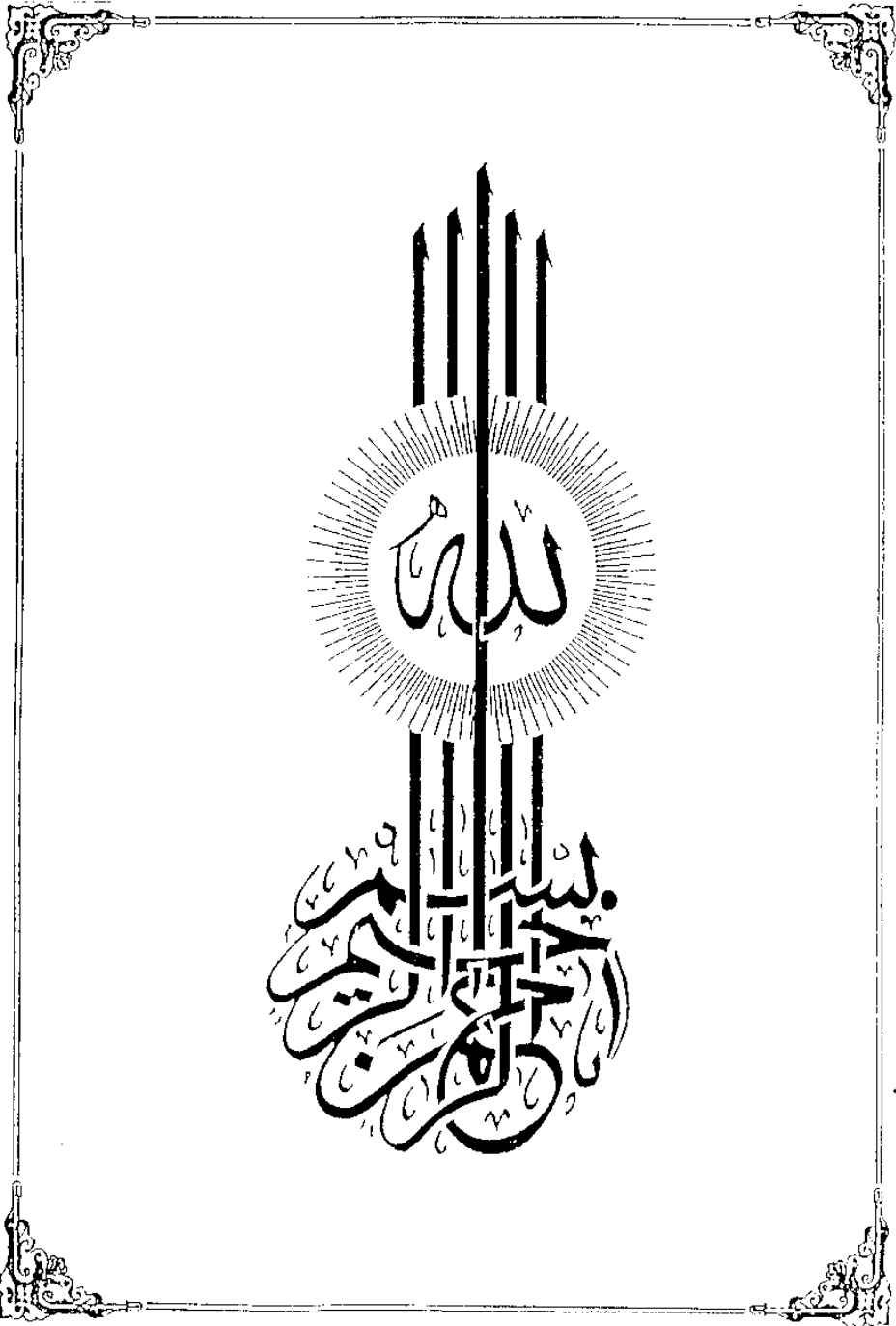
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INTRODUCTION

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Patients with acute cardiovascular insult who were admitted to coronary care unit are critical group of patients, with high incidence of mortality and morbidity.

The role of coronary care unit is obvious, it decreased the incidence of mortality and morbidity for this group of patients in comparison to patients managed at home or in hospital i.e. outside the coronary care unit.

Although the original purpose of the coronary care unit was to reduce mortality from acute myocardial infarction due to arrhythmias, physicians treating patients with AMI increasingly try to limit infarct size and salvage jeopardized myocardium to improve prognosis.

The interventions involved, such as thrombolysis, intra aortic balloon counter pulsation, and emergent revascularization, dominate coronary care (Lee and Goldman, 1988).

**REVIEW
OF
LITERATURE**

CORONARY CARE UNIT SERVICES

In the past, the home care trials of (Mather et al., 1971) and (Hill et al., 1978) suggested that non-coronary care unit acute myocardial infarction care could be as effective as hospital based-coronary care unit care.

Prof. Dr. Attia, 1979 study (from 1950 to 1978) treating 2506 patients with acute cardiac infarction at home. He said that, most of the patients and or their relative refuse to go to hospital. And coronary care units were available only in Ain Shams Hospitals in 1975, hence treatment at home was the rule. From this clinical study, it was obvious that the results were very encouraging indeed and did not differ at all from hospital treatment, conversely they are better and more convenient to the patients.

Also, Morris, et al., 1983 study did not reveal statistically significant differences between urban (C.C.U) and rural (non C.C.U.) hospital mortality.

But in recent years, the mortality of patients with acute myocardial infarction treated in coronary care unit hospitals with good left ventricular function is less than half that in non coronary care unit hospitals (Lee and Goldman, 1988). And cardiopulmonary resuscitation success rates are always

higher specially in the first 6 to 12 hours after myocardial infarction (Morris et al., 1983).

The complications of myocardial infarction can often be prevented or effectively treated with such modalities as : thrombolytic therapy, after load reduction, intra aortic balloon counter pulsation and diagnostic and therapeutic coronary angiography procedures which are being integrated into the coronary care unit structure (Lee and Goldman, 1988).

Coronary care units are also commonly used for patients who have syndromes that may represent myocardial infarction. These "rule-out myocardial infarction" cases now constitute up to 70 percent of the admissions to many units (Fineberg et al., 1984).

Because of fear of the consequences of missing patients at high risk, emergency room physicians are encouraged to admit patients to "rule-out myocardial infarction" if the diagnosis is uncertain (Goldman et al., 1982).

The high overadmission rate represents a serious misallocation of scarce resources. Physicians judgment remains the best mode for making this complex (medical-ethical and legal) decision.

The "art of clinical diagnosis" has remained until recently the only land of the mast clinician or physicians to improve

their diagnostic accuracy and admission decision (Pozen et al., 1980).

Advantages of coronary care unit :

- 1 - All patients admitted to the coronary care unit are allowed to be continuously monitored and ECGs are performed on admission and again at least daily (Goldman et al., 1982).
- 2 - Echocardiography also is done and diagnostic and therapeutic catheterization is done for some selected patients.
- 3 - Detection of transient or less symptomatic arrhythmias are more (Morris et al., 1983).
- 4 - there is full intensive care services with highly trained nurses. As patient : nurse ratio is no higher than 2:1 but the patient: nurse ration of 4:1 or higher will not permit intensive nursing care (Fineberg et al., 1984).
- 5 - Presence of efficient personnel and specialized equipment (defibrillator, pace maker,.....) and drugs available for rapidly use.

Type of patients admitted to CCU :

All patients with acute and critical cardiac insults need continuous monitoring and contact observation (Goldman et al., 1982).

Time stay at CCU :

Early recognition of patients with a low likelihood of infarction can permit shorter length of stay in intensive care unit or perhaps avoidance of intensive-care admission (Fineberg et al., 1984).

Lau et al., 1980 suggested that the care of patients with suspected or documented infarction could be made more cost effective by early discharge from the hospital of patients with uncomplicated infarction.

The average length of stay in Fineberg et al., 1984 study was 5.2 ± 0.72 days for patients with myocardial infarction. Patients admitted to coronary care unit without an infarction remained average of 2.33 days and then received intermediate care for 0.6 days.

THROMBOLYTIC THERAPY IN ACUTE MYOCARDIAL INFARCTION

Introduction :

Occlusive thrombus within a coronary artery plays a central role in acute myocardial infarction. To salvage myocardium which would otherwise be permanently lost, the restoration of the arterial blood supply must occur early. The pharmacological dissolution of blood clots "thrombolysis" depends on the activation of the fibrinolytic system which comprises a pre-enzyme plasminogen which is converted by tissue plasminogen activators to a proteolytic enzyme plasmin which lysis fresh fibrin clots into soluble fibrin degradation products (Littler, 1994).

Historical note :

Clinical experience with thrombolytic therapy was initially gained in the treatment of deep venous thrombosis and pulmonary embolism using urokinase and streptokinase. Several studies were executed in early 1970 using streptokinase in the treatment of acute myocardial infarction. The results were conflicting, most likely due to importantly the fact that the drug was administered late (>12 hours) (Yusuf et al., 1988).

Thrombolytic agents :

It is well established that complete thrombotic coronary occlusion occurs in the most patients presenting with acute myocardial infarction. This is due to ruptured vascular endothelium at the site of an atherosclerotic plaque. In response to vessel injury, platelets adhere to the damaged endothelium and activate coagulation factors, which results in fibrin formation and thrombotic coronary occlusion. Although their precise mechanisms of action differ, all thrombolytic drugs act by activation of plasminogen to the active enzyme plasmin which digests the clot's fibrin component.

Streptokinase :

Streptokinase is an indirect activator of human plasminogen and combines with both circulating and thrombus bound plasminogen to form a complex that actively splits plasminogen to produce plasmin.

Because streptokinase is a product of beta hemolytic streptococci, it is antigenic and may produce allergic reaction in patients with recent streptococcal infections. The recommended dose of streptokinase (1.5 million units) is usually sufficient to overcome the neutralizing effect of antibodies. Antibodies develop approximately 5 days after streptokinase therapy and persist for 6 months; therefore, it

is recommended that patients not be retreated with streptokinase (or its derivative, APSAC) during that time interval. The incidence of anaphylaxis is approximately 0.1%. Although the pharmacologic half-life of streptokinase is 30 minutes, depletion of fibrinogen usually lasts for 24 hours.

Hypotension caused by vasodilatation occurs in approximately 10 to 15% of patients given streptokinase. The advantages of streptokinase include its ability to improve left ventricular function, its decreasing risk for CNS bleeding and its low cost in relation to the other thrombolytic agents. Its disadvantages include the potential for allergic reactions and hypotension (although some believe that afterload reduction is beneficial after an MI).

Tissue plasminogen activator (t-PA, activase) :

Tissue plasminogen activator is a naturally occurring human protein that is non antigenic and may be readministered immediately in the event of reinfarction. Derived by recombinant DNA technology, t-PA is "fibrin-specific". Therefore, t-PA selectively binds to the fibrin of fresh clots, and the resulting complex converts neighboring plasminogen to plasmin, producing more localized thrombolysis.

The short half-life of t-PA (5 minutes) may result in a higher rate of infarct vessel reocclusion and requires the concomitant use of intravenous heparin infusion.

The recommended dose of t-PA is 100 mg over 3 hours (60 mg, 20 mg, and 20 mg over hours 1, 2, and 3, respectively). Patients with small body size have been shown to have an increased risk of bleeding complications with t-PA therapy. Therefore, in patients who weigh less than 65 kg, a total dose of 1.25 mg/kg is administered over 3 hours.

Advantages of t-PA include its lack of antigenicity, lack of allergic reactions, and no hypotension during infusion. Acute reperfusion rates have been demonstrated to be higher than in streptokinase therapy, however, reocclusion may also be higher and clinical end points of left ventricular function and long term patency have been quite similar between the two agents.

Disadvantages include the complicated dosing regimen, the need for concomitant heparin administration, and its cost.

Acylated Plasminogen Streptokinase Activator Complex (APSAC, Eminase) :

Anisoylated plasminogen streptokinase activator complex (APSAC) is a promising new second generation thrombolytic agent that has been recently approved for intravenous use. This