NEUROPSYCHIATRIC COMPLICATIONS FOLLOWING OPEN HEART SURGERY

THESIS

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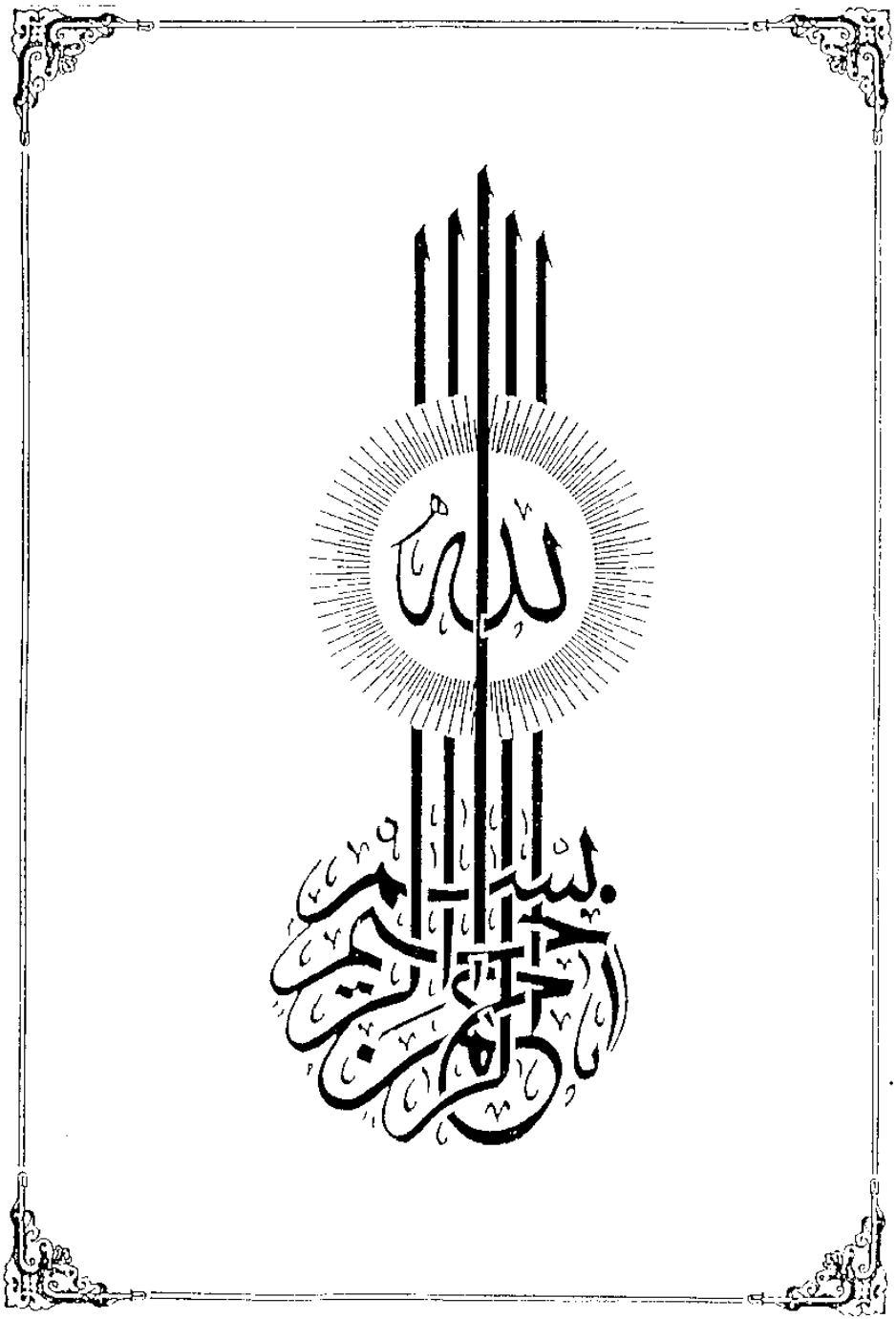

TO THE MEMORY OF MY FATHER
AND TO MY FAMILY

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INTRODUCTION

INTRODUCTION

The development and application of extracorporial circulation in the early I950s opened an era in which many new repairative operations for cardiac diseases were developed and concomitantly many new post-operative complications became apparent, many of which are complications of the extracorporial procedure itself. Among the fearful complications are those that affect the functions of the central nervous system.

Post-operative cerebral complications have repeatedly been decreasing as more efficient and safe extracorporial circulation devices have been developed (Hill, I970 & Aberg, I977). But since total elimination of complications is unlikely (Russel, I978 & Sotaniemi, I980) they will pose a continuing challenge to technical and surgical advances.

The exact etiological and pathophysiological mechanisms that result in the impairment of brain function following the utilization of extracorporial circulation are not known.

Two perspectives have prevailed in the earliest reports of such impairments; one has focussed primarily on manifestations of abnormalities in behaviour, or psychometric profiles and the proponents of such perspectives have the tendency to explain the high incidence of delirium or psychosis following open heart operations as a manifestation of psychological variables, that result in severe stress inducing decompensation of the patient's pre-operative personality and behaviour (Abram, I966; Kornfeld and Heller, I974). The psychological variables primarily involve the pre-operative psychological state of the patient. This includes the patient's ability to adapt himself to the stress caused by the operation, the specific psychopathology existing prior to the operation, the patient's preparedness to meet a difficult operation and the actual risk of death involved in it. It also includes the patient's domestic reactions and his own attitude towards life as well as his wish to go on living. Post-operatively, the psychological factors include the treatment after the operation in the recovery room and intensive care unit with the effect of sensory deprivation, the atmosphere of frightening examinations and machines, deprivation of sleep and physical immobilization.

The other perspective focussed on overt manifestations of brain damage as presented by manifest post-operative neurological defects (Tufo et al., I970 & Lee et al., I97I). This organic factor mainly involves the organic insults caused by the surgical procedure itself. It may be due to heart lung machine, alterations in the electrolytes, serum proteins, catecholamine metabolism, malnutrition and hypoxia or anoxia of the brain as well as microembolism.

In the latest reports, however, efforts have been made to take both psychological and organic variables into consideration. Zaks (I959) stated that a psychological stress alone did not account for post-operative psychic complications. His opinion was that anxiety could not explain the symptoms and he believed that there were organic factors behind the symptoms. His study dealt with closed cardiac operations. Davenport et al.,(I959) were among the first to study open heart surgery. They observed that in their material, all patients exhibited E.E.G. changes immediately after the onset of extracorporial circulation. According to the writers, this was a sign of cerebral malnutrition. They were surprised because at

that time, attention was mainly paid to the psychological variables trying to predict the post-operative complications.

There is a wide variation in the reported mechanisms of neuropsychiatric complications following open heart surgery, ranging over the last twenty years from I0 to 60% in the various centres throughout the world. Such a variation depended upon how the investigator was inclined to evaluate the neuropsychiatric outcome. Post-operative disorders have most commonly been studied with either neurologic, psychologic or E.E.G. methods alone. Combined investigations are rare.

Incidence of Psychiatric Complications:-

As early as I954, Fox reported an incidence of psychiatric complications in I9% of patients undergoing mitral surgery. Bliss (I966) found that 33% of a group of 37 patients developed personality changes after mitral operations. Kaplan (I966) in his study, found that the incidence was I7%. In I958, Blickenstorfer reported in his study that 3% of his patients showed post-operative psychosis.

The same incidence was reported by Bloton & Bailey (I956). In Meyer's study, the incidence was 46% while Denker (I966) found an incidence of II.5%. Egerton and Kay (I963) stated that 3I% of patients undergoing open heart surgery showed transient psychiatric disturbances. Blachly and Starr (I964) reported delirium in 57% of patients surviving open heart surgery. Abram (I965) stated that 20% of patients experienced post-operative psychosis. Gilman (I965) described an incidence of 33% in a group of 35 patients. Kornfeld et al.,(I965) compared two diagnostic methods with each other. They determined post-operative psychosis in one group on the basis of hospital chart reviews only,while the other group underwent a psychiatric interview. On the basis of the review, the incidence was 27%, while in the second group the incidence was 70%. Kornfeld claimed that chart reviews alone do not give a reliable impression on the incidence of psychiatric symptoms as these symptoms are very intermittent and psychiatric competence is necessary for their assessment.

In general, in examinations based on chart reviews only, the incidence of post-operative psychosis has been lower (Gilberstadt, I967; Lajarus & Hagens,I968 & Layne,I97I)

than in those in which the psychiatric interview has been applied (Egerton & Kay, I964; Blachly, I967; Freyhan, I97I; Blacher, I972 and Kimbal, I972). Heller (I970) believed that an improvement in surgical procedures would have resulted in a decrease in post-operative psychoses. He examined I50 patients and found cases of post-operative psychosis in 36%, while in an earlier study by the same team, the percentage was 70%(Kornfeld et al., I965).

Incidence of Neurological Complications:-

It is also variable from below I0% reported in some studies (Aberg et al., I977; Branthwaite, I975) to 30% or up to 53% reported in other studies (Gilman, I965 & Tufo et al., I970). Branthwaite (I972) reported an incidence of I9.2% but in I975, it was 7.4%; in Aberg et al.'s study (I974) the incidence was I4.5%. Javid et al.(I969) reported an incidence of 53% while Lee et al.(I970) mentioned 3I% with central nervous system disturbances. In a recent study done by Sotaniemi et al.(I98I) the incidence of post-operative neurologic disorders was 47%.

Nature of Psychiatric Complications:-

Post-operative complications of open heart surgery