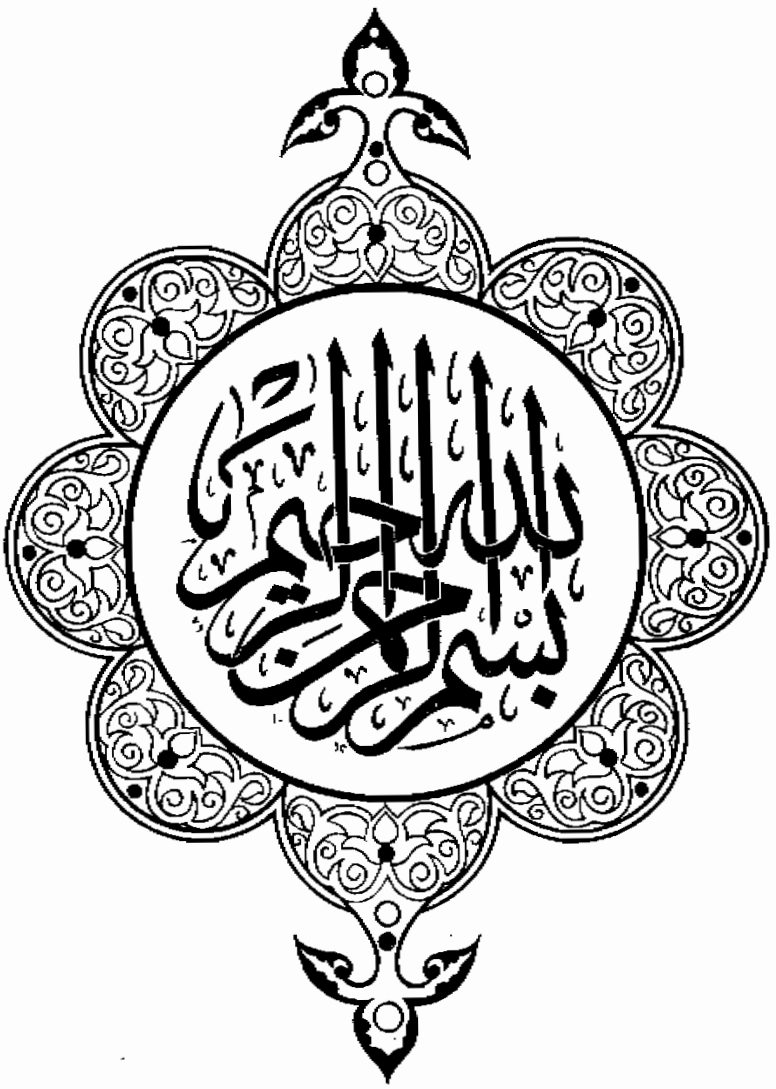

AN ESSAY

ON

IATROGENIC DISORDERS CONSEQUENT TO INTENSIVE CARE MANAGEMENT FOR NEONATES AT RISK

Submitted for Partial Fulfillment of
the Degree of MS in Pediatrics

Presented by
Nouran Ahmed Kamal El-Deen Mahran
M.B.B.Ch.

Under Supervision of Professor
Dr. SALAH AWWAAD HOSSIEN
Professor of Pediatrics
Faculty of Medicine
Ain-Shams University
CAIRO

السادة أعضاء لجنة مناقشة الرسالة

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أ.د. [illegible] (ممتحنا داخليا) : [illegible]

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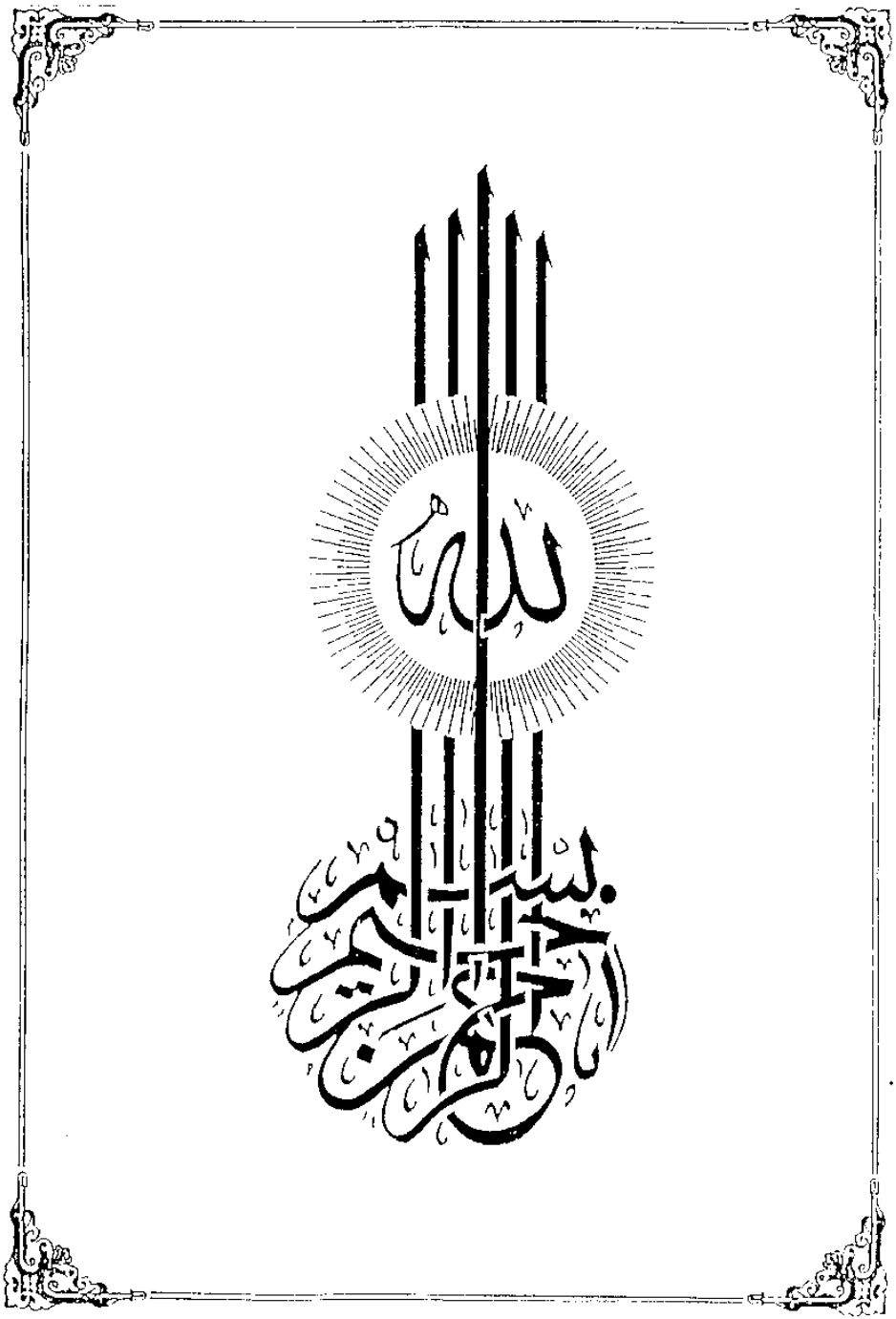

TO MY FATHER'S SPIRIT

TO MY MOTHER

TO MY BROTHER

AND TO ALL WHOM I LOVE.

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INTRODUCTION AND HISTORICAL BACKGROUND

The historical review of this subject would be rather a brief one since neonatal intensive care is a relatively recent development. It is difficult to tell exactly when intensive care of the neonates has begun. However, it probably started in the 1940s, with the introduction of modern incubators, as prior to that, very little was done for the newborn at risk.

In 1930s a primitive incubator "The Hess Bed" was used. It resembled the lower half of the boiler used to wash clothes at an earlier era. Heat was supplied by hot water and oxygen could be piped into the incubator, but its cover was so poorly fitted and so often left off, and so, it was impossible to achieve high concentrations of O_2. It was this defect which spared many infants from retrolental fibroplasia, a disease which we began to see when modern glass incubators with close fittings, replaced "Hess Bed".

The edematous appearance of the premature and his poor suckling led to the concept that he deserved to be dried out and so he received nothing by mouth for 48 - 72 hours after birth. On the other hand, if he became feverish and dehydrated he was given fluids by hypodermicolysis. Intravenous administration of fluids to the newborn did not come into use until the early 1940s, and cut-downs followed shortly after. Soon later, acidosis was recognized and

sodium bicarbonate was given, very gingerly. Since there were no sterile I.V preparations, the bicarbonate was measured directly from a box of baking soda and dissolved in distilled water.

The bulb syringe was all that was available in delivery rooms to clean the upper airway of newborns and the use of catheters to suck mucus from nasal passages and pharynx did not become popular until the late forties. Its deleterious effect on respiration, inducing apnea in a number of newborns, has only recently been recognized.

Administration of a teaspoonful of castor oil in an attempt to blow out meconium was a routine in a number of delivery rooms in the 1930s. Apparently no harm was done except to those newborns with oesophageal atresia or intestinal obstruction. Aspiration of castor oil by these unfortunate infants might be listed as one of the first iatrogenic problems resulting from neonatal intensive care.

Hemorrhagic disease of the newborn was a very common condition that troubled pediatricians in the 1940s and its prevention was simply carried out by administration of whole blood intramuscularly to the newborn. Since there was no awareness of the Rh factor, numerous Rh negative female infants were sensitized to the Rh factor from the blood most

readily available for I.M. injection, that from the Rh positive fathers. Such female infants upon reaching child bearing age have given birth to a first child with full-blown erythroblastosis fœtalis.

It was not before 1944 when vitamin K started to be routinely given prophylactically to prevent hypoprothrombinemia of the newborn, and it was not until the late 1950s and the early 1960s that it became known that water soluble vitamin K could in large doses produce hemolysis of RBCs and thus increase hyperbilirubinemia and kernicterus. It took quite some time to learn that 1 - 2 mg of vitamin K are sufficient for the newborn.

The most frightening iatrogenic disorder which started to emerge with the development of intensive care units and the improvement in survival among low birth weight infants (LBWI) is retrolental fibroplasia (RLF) or "Boston disease".

Dr. Terry is the ophthalmologist who first described the disease in 1942. He noted an infant with leukokoria and found that the lens was clear but that there was a dense fibrovascular mass occupying the posterior chamber.

The following years were associated with increased numbers of RLF cases. Great interest in the etiology brought numerous speculations. Terry believed that the main cause was

precocious exposure to light. Together with the early observations that this disorder was pronounced with the free use of O_2 and the application of new equipments which permitted high O_2 concentration, the period between 1952 and 1957 was characterized by increased numbers of controlled studies confirming oxygen as a factor in the pathogenesis of retinopathy of prematurity (ROP) particularly when administrated in high concentration for longer periods of time. This led some investigators to conclude that curtailment of oxygen therapy was essential.

Another scourge of the early liberal use of oxygen for the management of respiratory problems particularly hyaline membrane disease (HMD), together with the widespread use of assisted ventilation and endotracheal intubation in intensive care units, is a condition known as bronchopulmonary dysplasia (BPD) or the"respirator lung" which was first described by Northway, Rosan and Porter in 1967.

It was not before 1936, the year during which clinical trials with sulfonamides succeeded in treatment of infections, when the adverse effects of various medications started to be considered. The widespread use of sulfonamides since then, to prevent infections particularly in newborns prompted various studies which demonstrated the relationship between this drug and the development of kernicterus. It also increased the awareness to other dangerous drugs as novobiocin,

salicylates and injectable diazepam. This have caused most neonatologists to avoid their use in neonates. It took some time since the discovery of chloramphenicol in 1947, to relate the clinical signs of "grey baby syndrome" occuring in infants unable to metabolize and excrete the drug, to high blood levels of chloramphenicol. This problem represented the prime example of the need to monitor blood levels of drugs given to neonates (Gellis, 1976).

No body knows exactly when necrotizing enterocolitis (NEC) has been observed. However, it is quite evident that it is an entity that has emerged as a prominant factor in neonatal morbidity with the advent of neonatal intensive care. The early practice of shifting from withholding calories from the sick neonate to offering him hyperosmolar feeding as an attempt to arrive at an optimum nutrition, seemed to contribute to the development of necrotizing enterocolitis. Later on, the presence of NEC in many neonatal centers and its absence in others strongly suggested the multifactorial and perhaps the iatrogenic nature of the disease. The presence or absence of nursery factors and nursing routines including exchange transfusion, umbilical artery catheterization .... etc, have been subsequently implicated in the increased incidence and occurance of NEC.

Total parenteral nutrition was first tried by Helfrick and Abelson in 1944, but it was not until 20 years later when Dudrick and his co-workers were able to achieve adequate growth in puppies, that its use in newborn infants was proposed. Since then, the multiple hazardous effects of this technique have been observed.

Cancer of the thyroid is another disaster which was found by Duffy and Fitzgerald in 1950 to be associated with irradiation of thymus. The history of this endeavor began with status thymicolymphaticus with its large thymic shadow, a condition considered in the '30s and '40s to be the cause of sudden infant death syndrome. The shrinking of the thymus with x ray has been recommended by physicians to prevent such deaths, and the x ray treatment applied to the neck and chest of newborn became a routine in most hospitals at that time (Gellis, 1976).

Another area which started to gain concern as early as the 1940s and in which intention has contributed to development of problems, is the emotional field. The first observation by Dr. Marshall Klaus and Dr. John Kennell that the development of increasingly invasive medical intervention and the accompaning isolation techniques, though succeeded in decreasing the morbidity and mortality of low birth weight infants, it was unfortunately associated with

increased mother - infant separation which in turn had serious effects on the mother's behavior as well as her infants behavioral and cognitive development. Also the discovery that the incidence of abused children was increased among those who were known to be born prematurely or of low birth weight, has turned attention to the premature's need for being touched and held, and perhaps, an even greater need to the formation of close relationship with his parents.

AIM OF THE WORK