Extent of Malnutrition in Egyptian Neonatal Intensive Care Unit

Thesis
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Abstract

Extrauterine growth restriction is an identifiable marker of severe nutritional deficit during the first weeks of life. Nutrition is becoming a key factor not only for the growth of the newborn infants during their hospital stay but also for their long well being.

The two strategies, aggressive early PN and minimal enteral nutrition should enhance the overall nutritional health of the preterm infants as evidenced by less postnatal weight loss, an earlier return to birth weight, and improved over all postnatal growth and outcome.

Key words :

Amino Acid - Blood Urea Nitrogen – Chloride .

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List of Abbreviations

AA	Amino Acid
AAP	American Academy of Pediatrics
ALk phos	Alkaline Phosphatase
ARA	Arachidonic acid
BPD	Bronchopulmonary dysplasia
BUN	Blood Urea Nitrogen
Ca	Calcium
CL	Chloride
CLA	Conjugated linoleic acid
CLD	Chronic lung disease
CMV	Cytomegalovirus
CPAP	Continuous Positive Airway Pressure
CS	Caesarian section
DHA	Docosahexaenoic acid
EBM	Expressed breast milk
EGA	Estimated gestational age
EGF	Epidermal growth factor
EGR	Extrauterine growth restriction
EHMF	Enfamil Human Milk Fortifier
ELBW	Extremely low birth weight
Fe	Iron
FL	Fluoride
FT	Full term
FTF	Full term formula
GER	Gastroesophageal reflux
GI	Gastrointestinal
GRV	Gastric residual volume
HIV	Human immunodeficiency virus
HM	Human milk
HMF	Human milk fortifier
I	Iodide
Ig A	Immunoglobulin A
IGF	Insulin growth factor
IUGR	Intrauterine growth restriction
K	Potassium
LBW	Low birth weight
Lc-PUFAs	Long chain polyunsaturated fatty acids

LE	Lipid emulsion
LSRO	Life Sciences Research Office
MAS	Meconium Aspiration Syndrome
Mb	Molybdenum
MCT	Medium chain triglycerides
MEN	Minimal Enteral Nutrition
MFGM	Milk fat globule membrane
Mg	Magnesium
MVI	Multi vitamin infusion
Na	Sodium
NAS	National Academy of Sciences
NEC	Necrotizing enterocolitis
NG	Nasogastric
NGF	Nerve growth factor
NICU	Neonatal Intensive Care Unit
NPO	Nothing per os
NVD	Normal vaginal delivery
OG	Orogastric
P	Phosphorus
PCVC	Percutaneous venous catheters
PN	Parenteral Nutrition
PO4	Phosphorus
PPAR	Peroxisome proliferators receptors
PrHM	Preterm Human Milk
PT	Preterm
PTE	Pediatric trace element
PTF	Preterm formula
PUFAs	Polyunsaturated fatty acids
RDA	Recommended daily allowance
RDIs	Recommended dietary intakes
RDS	Respiratory distress syndrome
Se	Selenium
SHMF	Similac Human Milk Fortifier
SIMV	Synchronized Intermittent Mandatory Ventilation
SNC	Similac Natural Care
TPN	Total parenteral nutrition
Trig	Triglycerides
TTN	Transient Tachypnea of newborn
USA	United States of America

VLBW	Very low birth weight
VZIG	Varicella-zoster immunoglobulin
VZV	Varicella-zoster virus
WHO	World Health Organization
Zn	Zinc

Introduction

Nutritional practice varies dramatically among NICUs. In many institutions nutrition is introduced only gradually over the first weeks of life because of concerns of nutrient intolerance by the preterm or ill infants who are fed intravenously and the risk of necrotizing enterocolitis (NEC) in preterm infants who are fed enterally. Extrauterine growth restriction is a major clinical problem for prematurely born neonates especially those who are critically ill. Moreover malnutrition in the NICU remains common **(Thureen, 1999).**

There are numerous perceived risks to initiation of adequate nutritional support. Current nutritional support does not prevent extrauterine growth restriction and there is evidence that changes in nutritional support may have a positive influence on growth. These include early administration of intravenous amino acids and lipids, minimal enteral nutrition as well as supplementary formula and human milk (**Clark et al, 2003a).**

Child health and development are contingent on sound nutrition during the neonatal period. The nutritional needs of all infants include adequate intake of fluid and energy; a balance among proteins, carbohydrates, and fats; and proper vitamin and mineral intake. Preterm infants have similar nutritional requirements but demand more frequent assessment of nutritional health and ongoing adjustment of nutritional intake throughout the neonatal period to ensure appropriate growth and development. Evidence-based nursing practice calls for an update on the specific nutritional requirements of infants, special nutritional needs of preterm infants, and the most recent changes in the composition of infant formula **(Gregory, 2005).**

The nutritional assessment of newborns is a difficult but is a necessary task in the NICU, especially when dealing with preterm infants, since they are born

before the somatic growth is completed with its deposition of nutrient as glycogen, proteins, fats, vitamins, microelements and minerals.

Overall growth is predominately monitored in infants by anthropometry, the measurement of body weight, length, head circumference and to a lesser extent skin fold thickness and arm circumference. Anthropometry is a rapid, inexpensive, and noninvasive means to monitor growth, detect growth abnormalities, and assess nutritional status in infant **(Anderson, 2002).**

Evidence-based practice guidelines are essential in managing critically ill infants. This might allow establishing a practical feeding guideline avoiding complications and making best use of available resources **(Smith, 2005).**

Aim of the work

The aim of this work was to assess the nutritional status of admitted newborns in the NICU (Abu Elrish Elmounira Hospital) and the extent of malnutrition in the neonatal intensive care unit by using the anthropometric measurements of the admitted newborn infants, in order to evaluate our practical feeding protocol in the NICU.

Enteral Nutrition

Well infants of gestational age > 34 weeks are usually able to coordinate sucking, swallowing, and breathing, and so establish breast or bottle feeding. In less mature infants, oral feeding may not be safe or possible because of neurological immaturity or respiratory compromise **(McGuire et al., 2004).**

Premature birth is a major disruption at a time when the fetus should be growing rapidly, with all body systems maturing and the brain developing at its fastest rate. Premature infants are often subjected to additional metabolic stressors and have higher energy and nutrient requirements than full-term infants **(Bennett, 2005).** Growth patterns among premature infants also differ depending on gestational age, sex, weight, genetics, and coexisting morbidities. Definitions of "catch-up" growth vary, but it is generally considered to be achieved when the infant reaches between the fifth and 10th percentile on a standard growth chart **(Bennett, 2005).** Healthy premature infants typically demonstrate catch-up growth first in head circumference and then in weight and length **(Carlson**, **2005).**

Many believe that the newborn was in a nil per os (NPO) state in utero since the majority of fetal nutrition is obtained from the placenta. While it is recognized that the fetus swallows amniotic fluid, few appreciate the metabolic significance of swallowed amniotic fluid to the developing fetal gut. In addition to swallowing up to 760 milliliters (mL) of amniotic fluid per day, the human fetus derives approximately 20 kilocalories per kilogram per day (kcal /kg /d) of energy from digestion of amniotic fluid substances. At birth, the newborn gut is an experienced organ that is physiologically active and primed for the activities of food assimilation. Putting the newborn on NPO creates an abnormal physiologic situation and predisposes the infant to the negative consequences of no enteral nutrition (**Strodtbeck et al., 2003).**