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Effect of intravenous supplemental glutamine and clinical outcomes in burn patients receiving enteral nutrition

Thesis
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LIST OF ABBREVIATIONS

°C	Degree Celsius.
®	Registered.
%	Percentage.
<	Less than.
>	More than.
α	Alpha.
β	Beta.
γ	Gamma.
δ	Delta.
-NH_2	Amino group.
-COOH	Carboxyl group.
AA	Amino acid.
ABA	American Burn Association.
Ala	Alanine.
ala-gln	L-alanyl L-glutamine dipeptide.
ALI	Acute Lung injury.
ALT	Alanine aminotransferase.
AMPLE	**A**llergies, **M**edications, **P**ast medical history, **L**ast meal and **E**vents/**E**nvironment related to injury
APACHE	Acute Physiology and Chronic Health Evaluation.
ARF	Acute Renal Failure.
ARDS	Acute respiratory distress syndrome.

ASPEN	American Society for Parenteral and Enteral Nutrition
AST	Aspartate aminotransferase.
ATP	Adenosine triphosphate.
BEE	Basal Energy Expenditure.
BP	Blood pressure.
BW	Body weight.
Cal	Calorie.
CBC	Complete blood picture.
Cc	Cubic centimeter.
CHO	Carbohydrates.
Cm	Centimeter.
CNS	Central nervous system.
CO	Carbon monoxide.
CO_2	Carbon dioxide.
COPD	Chronic obstructive pulmonary disease.
CR-BSIs	Catheter-related bloodstream infections.
CRP	C-reactive protein.
CSF	Cerebrospinal fluid
DNA	Desoxyribonucleic acid.
DOB	Date of birth.
DVT	Deep venous thrombosis.
Dl	Deciliter.
e.g.	Example.
EAD	Enteral Access Devices.

EN	Enteral nutrition
ESPEN	European Society for Clinical Nutrition and Metabolism.
FiO_2	Fraction of inspired oxygen.
FO	Fish oil.
G	Gram.
g/L	Gram per liter.
G-ve	Gram negative.
G+ve	Gram positive.
GABA	Gamma amino butyric acid.
GCS	Glasgow Coma Score.
GFR	Glomlular filtration rate.
GI	Gastrointestinal.
GLN	Glutamine.
GLU	Glutamic acid.
GRV	Gastric residual volume.
GS	Glutamine synthetase.
GSH	Glutathione (reduced form).
GSSG	Glutathione (oxidized form).
H^+	Hydrogen.
H_2O	Water.
Hb	Hemoglobin.
$HCO3^-$	Bicarbonate.
HIV	Human Immunodeficiency Virus.
Hr	Hour.

HSP	Heat shock proteins.
ICU	Intensive Care Unit.
IDC	Indirect calorimetry.
Ig A	Immunoglobulin A.
IL-1ß	Interleukin-1 beta.
IL-6	Interleukin 6.
INR	International Normalized Ratio
IV	Intravenous.
K^+	Potassium.
Kcal	Kilocalorie.
Kg	Kilogram.
m^2	Meter square.
MAP	Mean arterial pressure.
MCT	Medium chain triglycerides.
Mg	Milligram.
mg/dL	Milligram per deciliter.
mL	Milliliter.
mL/kg/day	Milliliter per kilogram per day.
mmHg	Millimeter mercury.
mm^3	Cubic millimeter.
mmol/L	Millimole per liter.
MODS	Multiple organ dysfunction syndrome.
MOF	Multiple organ failure.
mosmol/L	Milliosmole per liter.
N	Number.

Na^+	Sodium.
NET	Nasoenteric tube.
NG	Nasogastric.
NH_3	Ammonia.
NO	Nitric Oxide.
NPCal:N_2	Ratio of Non protein calories to nitrogen.
NS	Non-significant.
ONS	Oral Nutritional Supplements
PaO_2	Partial pressure of oxygen.
Ph	Power of hydrogen.
PN	Parenteral nutrition
PT	Prothrombin time.
PTSD	Post traumatic stress disorder.
PU	Peptic ulceration.
RBP	Retinol Binding Protien.
RBS	Random blood sugar.
REE	Resting energy expenditure.
RFS	Refeeding syndrome.
ROS	Reactive Oxygen Species.
S	Significant.
SD	Standard deviation.
SIRS	Systemic inflammatory response syndrome.
SNS	Specialized Nutrition Support
SOFA	Sepsis related Organ Failure Assessment.

SPSS	Statistical Program for Social Science.
TBSA	Total burn surface area.
Temp	Temperature.
TF	Tube feeding.
Th2	Type 2 helper T-cell.
TLC	Total leukocytic count.
TNF-α	Tissue necrotizing factor – α.
UOP	Urine output.
UUN	Urinary urea nitrogen.
VAP	Ventilator acquired pneumonia.
V/Q	Ventilation-perfusion.
WBC	White blood cell.
WHO	World health organization.
µg	Microgram.
µmol/L	Micromole per liter.

INTRODUCTION

Burns are a serious and debilitating injury. Thermal injury is the traumatic event with the highest metabolic response in critically ill patients **(Machado et al., 2011).**

Effective nutritional therapy in burn patients involves an understanding of the physiologic and metabolic alterations that accompany traumatic thermal injury. Nutritional support is recognized as one of the most significant aspects of care for the burned patient. Burns cause a hypermetabolic state where the patient is at risk for malnutrition ***(Chan et al., 2009)*.**

Aggressive, early and the preferred enteral nutritional support is required to meet metabolic demands, to prevent the depletion of body energy, accelerate wound healing and decrease incidence of infection ***(Prelack et al., 2007)***.

After burn injuries, there are significant changes in amino acids (AA) metabolism and plasma levels and many immunologic functions may be dependent on the availability of certain amino acids. Significant depletion of plasma and muscle glutamine has been documented in acute burn injury and is thought to contribute to muscle wasting, weight loss and infection ***(Chan et al., 2009)*.**