

## Evaluation the Efficacy and Complication of Nutrika Supplement in Intensive Care Unit of Ghaem Hospital-Mashhad

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### ABSTRACT

**Introduction:** Malnutrition is a general problem in hospitalized patients. Enteral feeding in Intensive Care Unit (ICU) has been stated to decrease the metabolic response to stress, decline bacterial translocation, and preserve gut mucosal integrity. To assess the efficacy and complications of Nutrika supplement for enteral feeding in Intensive Care unit.

**Materials and Methods:** Nutrika is an enteral nutritional supplement. 12 patients (six male, six female) who received Nutrika supplement through Nasogastric Tube (NGT) in ICU department of Ghaem Hospital were studied. Evaluating gastrointestinal tolerance, biochemical tests, daily calorie intake and the measurement of arm circumference were done daily. Mean admission duration of these hospitalized patients was ten days and it should be noted that the average amount of received gavage was 200 ml/2h.

**Results:** four patients (two male, two female) had diarrhea when they received this supplement in consecutive meals. Two patients (female) experienced abdominal pain after consuming this supplement; however the prevalence of all gastrointestinal intolerance symptoms among patients were not statistically significant ( $P=0.25$ ,  $P=0.50$ ,  $P=0.50$ ). Albumin and Urea level alter significantly during supplementation ( $P=0.001$ ,  $P=0.002$ ). Rest of the laboratory values did not change significantly. In two patients (one male, one female) who were completely intolerant to this solution, arm circumference had two cm decrease.

**Conclusion:** Although this supplement has some complication including distension and diarrhea, however it is strongly suggested to use due to severe malnutrition in ICU ward and plays a significant role in improving general condition of these patients.

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### Introduction

Malnutrition is a general problem in hospitalized patients. About (40%) of adult patients are extremely malnourished at the time of their admission, and two thirds of all patients experience deterioration of their nutritional status during their hospital stay (1).

Moreover, malnutrition has been linked with poor consequences among hospitalized patients, including prolonged mechanical ventilation, increased risk for infection, and higher mortality (2, 3). Critically ill patients commonly receive insufficient nutritional support during their Intensive Care Unit (ICU) stay because doctors underestimate the nutritional

requirements of patients and the initiation of nutritional support is frequently postponed (4). Furthermore, nutritional care has a vital role in prevention and management of nutritional deficiencies in ICU patients (5). Enteral feeding has been stated to decrease the metabolic response to stress, decline bacterial translocation, and preserve gut mucosal integrity; nutritional intake through the digestive tract has been strongly suggested (6). However, enteral and parenteral nutritional support in ICU patients may be problematic due to gastrointestinal intolerance and fluid overload, respectively, and they are linked with severe iatrogenic

complications including aspiration pneumonia and catheter-related infections (7).

Nutrika is a nutritional supplement that has been specialized for enteral feeding. This supplement has been produced by Chika Sepahan Company in Isfahan-Iran. This solution contains lactose-free pasteurized milk, pureed chicken, water, lactose-free milk powder, hydrated rice, pureed apple, malt dextrin, pureed potato, vegetable oil, pureed banana, pureed carrot, pureed tomato and inulin. The osmolality of this solution is 350mOsmol/kg and it is unusable as parenteral nutrition. It should be noted that this solution is lactose and gluten free. Nutritional value in one serving of this solution (260ml/270gram) is shown in tabale-1.

**Table 1: Energy density of Nutrika solution is 260Kcal/260ml**

Total fat	16 gram
Satu.fat	3 gram
Trans.fat	0 gram
Cholesterol	12 mg
Sodium	140 mg
Potassium	450 mg
Total. carbohydrate	18 gram
Fiber	0.5 gram
Sugars	0 gram
Protein	11 gram

The aim of this study was evaluating the efficacy and complications of Nutrika supplement in Intensive Care unit.

## Materials and Methods

In this study, 12 patients (six male, six female) who received Nutrika supplement in Neurosurgery ICU of Ghaem Hospital were studied. These patients were recruited under the supervision and permission of medical staff including specialists and nurses. They hospitalized due to brain stroke, Subarachnoid Hemorrhage (SAH), guillain-barre syndrome, Myasthenia gravis, seizure and status epilepticus.

Nutrika solution was administered by means of Nasogastric Tube (NGT) as a daily hospital gavage under the supervision and advice of nutritionist.

Evaluating gastrointestinal tolerance, biochemical tests, daily calorie intake and the measurement of arm circumference were done daily and evaluation forms were completed every day. Mean admission duration of these hospitalized patients was ten days and it should be noted that the average amount of received gavage was 200 ml/2h.

The evaluation forms contained assessment of prevalence of gastrointestinal intolerance to the Nutrika solution including diarrhea, Gastro Intestinal (GI) residue over (60%), abdominal pain, nausea and distension, also evaluating biochemical tests (Albumin, Total Protein, Calcium, Phosphor, Magnesium, Urea, and Creatinine), evaluating arm circumference, the mean of daily received calorie and its comparison with required calorie. The gathered data were analyzed by

SPSS Version 22 Bootstrap paired samples T-Test and McNemar Test were used to assess quantitative and non-parametric data respectively.

P-value less than (0.05) was considered significant.

*Ethical consideration:* The informed consent was obtained from the medical staff particularly specialists as well as each patient's family.

## Results

These results were obtained from the follow-up of these 12 patients (six male, six female) who consumed Nutrika supplement in Intensive Care Unit of Ghaem Hospital.

The mean age of these patients were 52 years old. Glasgow Coma Scale (GCS) median of these patients were 12. It should be stated that the GCS is a neurological scale that aims to give a reliable, objective way of recording the conscious state of a person for initial as well as subsequent assessment (8).

*Evaluation of the prevalence of gastrointestinal intolerance:* In this follow-up, two male patients had gastrointestinal residue over (60%), so they were not able to consume this supplement.

Three patients (one male, two female) had diarrhea when they received this supplement in consecutive meals; however limited gavage of this supplement (four times a day) resolved this problem.

Two patients (female) experienced abdominal pain after consuming this supplement; moreover they complained about the smell and taste of Nutrika thus they were not able to continue consuming this solution.

Rest of the patients consumed and tolerated this solution well in desired volume.

McNemar Test was performed in order to statistically compare these intolerance symptoms before and after the supplementation table 2.

**Table 2: McNemar Test for Gastrointestinal intolerance symptoms before and after the supplementation (n=12)**

Symptom	P-Values
Diarrhea	0.25
Abdominal pain	0.50
GI residue	0.50

P-Value < 0.05 considered as significant.

As it shown in table 1, the prevalence of all gastrointestinal intolerance symptoms among patients were insignificant.

*Evaluation of nutritional status:* The gathered data from biochemical indices during this study was analyzed by Bootstrap paired samples T-test (Table 3).

As it represented in table 3, Albumin and Urea level alter significantly during supplementation (P=0.001, P=0.002). Rest of the laboratory values did not change significantly.

**Table 3: Bootstrap paired sample T-test of Biochemical indices**

Biochemical indices	Before Supplementation	After Supplementation	P-values
Albumin	3.88±0.14	4.38±0.15	0.001
Total protein	7.11±0.10	7.11±0.11	0.984
Calcium	9.68±0.15	9.64±0.10	0.514
Phosphor	3.96±0.12	3.97±0.20	0.887
Magnesium	1.60±0.15	1.79±0.14	0.520
Urea	45.00±2.13	38.00±2.10	0.002
Creatinine	1.22±0.21	1.25±0.25	0.536

Data are expressed as mean ± standard deviation

*Evaluation of arm circumference and calorie requirement and intake:* In two patients (one male, one female) who were completely intolerant to this solution, arm circumference had two cm decrease. The mean energy requirement of these patients were 1750Kcal, however the average calorie intake of these patients in ICU was 1020Kcal. The mean energy intake from Nutrika supplement was 50% during a day.

## Discussion

The main finding was that nutritional supplementation in ICU patients plays a significant role in improvement of general condition of the patients due to severe malnutrition that has been seen in this department. This supplement helps these patients to meet their daily energy and calorie requirement.

Barr's stated that the implementation of an evidence-based nutritional management protocol rise the likelihood of ICU patients receiving enteral nutrition and reduces their duration use of mechanical ventilation.

Moreover, this strategies help patient to meet their energy requirement. Furthermore, Patients receiving enteral nutrition had a (56%) reduction in their risk of death compared to patients receiving parenteral nutrition or no nutritional support (9).

Inconsistency with our finding, Krishnan's reported that ICU patients were inadequately fed in comparison to goals set by American College of Chest Physicians (ACCP) guidelines. However, the relationships between caloric intake and clinical outcomes measured in this study suggest that daily ACCP caloric targets may overestimate needs since caloric intake of (65%) of recommendations (approximately 18kcal/kg/d) was

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associated with excess morbidity and mortality (10-13).

It can be conferred from this study, that Nutrika Supplementation maintain lean mass and prevent weight loss. Steven stated that data supporting their use to augment lean mass and strength gains in these patients (14). However, there are some complications besides using this solution and these problems are unavoidable due to patients' diseases.

Another aspects that should be taken into account in nutritional supplementation in hospital is the cost effectiveness of these solutions. Several studies have been carried out in this field in order to evaluate this aspect (15-18). Pradelli's reported that supplementation of omega-3 fatty acids would be cost effective in hospitals especially in European countries; moreover they reported that alanyl-glutamine dipeptide supplementation is more effective and less costly than standard Total Parenteral Nutrition (TPN) in ICU patients (15, 17). Furthermore, Jolliet P revealed that enteral nutrition should be preferred to parenteral nutrition whenever possible due to lower costs. They also strongly suggested that these enteral solutions are more cost effective according to the beneficial effects of enteral nutrition supplementation (18).

However, the price of Nutrika supplement in this study is more than other routine hospital solutions, therefore the cost of this solution can be considered as a negative point for providing and consuming this product for hospitalized patients. It would be suggested that one of the main issues that health authorities should consider in improving the nutritional condition of Iranian patients in hospitals is assessment of producing cost effective supplements in order to use and consume routinely in health centers particularly Intensive Care Units.

## Conclusion

Although this supplement has some complications including distension and diarrhea, it is suggested to use it due to severe malnutrition in ICU and its' significant role in improving general condition of these patients.

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