**Review Article**

**Nutrition management for a patient with COVID 19 in ICU**

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**Abstract:**

Nutrition therapy is the main principle therapy for the management of a patient with COVID 19 in the intensive care unit. Based on the clinical observation, Irrespective of all age groups patients can infect and will be a significant nutritional risk because of catabolism and nutritional deficit. So nutritional management is the first-line treatment and should follow the standard of practice and if it is not followed it may go for poor prognosis. Five Step method diet plus nutrition education, oral nutritional supplementation, tube feeding, supplementary parenteral nutrition, and total parenteral nutrition is followed for better recovery of the patient, due to the high demand in the intensive care unit (ICU). Patients need more energy and protein than normal requirements. Along with long-chain fatty acid, vitamin C, immune nutrientsare administered to increase the immune system. Routine supplements like multivitamins and minerals, vitamin B complex, zinc, and selenium are also to be administered.

**Keywords:**COVID 19, intensive care unit, Oral nutritional supplementation, Tube feeding, parenteral nutrition, PPE

**Introduction**

Nutritional management is one of the most therapeutic principles for the treatment measure for a patient with COVID 19, especially in ICU. Based on clinical observation, patients with infection, malnourishment, low immunity, and chronic diseases have higher mortality and poor prognosis. This result shows the importance of nutritional status and considered first-line treatment for a patient with COVID 19 especially in ICU.

**Why give importance to Nutritional Management of a patient with COVID 19 in ICU?**

* Patients most likely need of ICU support tend to be older, more than 60 years and around 25-40% have at least one co morbidity such as diabetes, hypertension, heart disease or chronic obstructive pulmonary disease and obese patients
* Around 95-98% of patients present with fevers. So need of around10-13% extra nutrition per every 1°C.
* An aggressive pro-inflammatory immune response is as expected, leading to an increase in glucocorticoid and catecholamine production, increase insulin sensitivity, poor glycemic control, and protein catabolism.
* PatientswhodevelopARD, thosewith ongoing hypoxemia and to optimize ventilation strategies, high level of sedation and neuromuscular blocking agents (NMBA) are recommended to facilitate protective lung ventilation. The use of deep sedationandNMBAmayhaveeffects on gastrointestinal (GI) function and muscle wasting
* Around 27-50% of patients receiving a prone position. The prone position is having the consequence of the increased prevalence of delayed gastric emptying and the risk of vomiting
* COVID-19 presents several unique physiological symptoms likely to impact oral intake including a loss of taste, smell, and GI symptoms around 10% of cases having diarrhea, nausea, vomiting and 62% of general ICU survivors experience dysphasia.
* Additional operational barriers to oral intake may impact menu selection, limitations with meal delivery, feeding assistance, fewer nursing staff, restrictions on family visitations, less frequent reviews due to staffing levels and restrictions on foodservice management systems(1).

**Criteria steps of Nutritional Therapy**

Nutritional management should be based on five steps management

* Diet plus nutrition education,
* Oral nutritional supplementation (ONS)
* Tube feeding
* Supplementary parenteral nutrition (SPN)
* Total parenteral nutrition (TPN)

The first choice of treatment should be oral administration with Oral nutritional supplementation (ONS). When ONS is insufficient then prescribe artificial nutrition (AN)withENorPN (parenteral nutrition). The transition between ONS, EN, and PN should be smooth, following the principle that when the EN can meet the 50% of the target demand, PN can be gradually reduced and subsequently stopped; when the ONScanmeet the50%oftargetdemand, they can be progressively reduced and then stopped.

* For the critical patient in ICU and last longer than 48 hours the nutrition therapy should be started and start enteral feeding if it is not contraindicated. If it is contraindicated to EN feeding PN should be started within 3 to 7 days, overfeeding must be avoided.PN can be started slowly on day 3 if the patient is already malnourished and gradually increase the rate of infusion up to the 7th day(2).

ICU Admission for Intubation Staying for less than 48 hrs.in the ICU

Staying for more than 48 hrs.in the ICU don’t start artificial nutrition

No Contraindication to EN Yes

Start early external nutrition within 48 hrs. Start parenteral nutrition at 72 hrs. Set target infusion rate at 10 ml/hour within 3-4 days

After 6 hrs.GRV >500 Yes Start target infusion rate

(or) 3 hrs. GRV > 200

No Administer Prokinetics After 24 hrs. if permissive

clinical Infusion rate

Target infusion rate in 3-4 days Gastric intolerance resolution Reach the target infusion rate

is there then place jejunal tube 3-4 days

& if it not then start PN

If no contraindication to EN then gradually

reduce PN & start EN

If contraindicated to EN then continue PN

until permissive clinical condition

**Figure 1.**Nutrition management for critically ill patients.

**Nutritional recommendation**

Patients with COVID 19 need more energy than normal and moreover avoid overfeeding or underfeeding, it is recommended to supply 84-126 kj/kg/day. For every 10c increase in body temperature the energy consumption to be increased by 10% (3).

Protein requirement is increased to 1.3g/kg/day to prevent muscle loss and to enhance the strengthening of respiratory muscle (4).The fat requirement is 1.5g/kg/day. The sugar/fat ratio is 50-70/50-30 (5). Essential fatty acids play an immune response so increase in the proportion of ω-3 fatty acid and ω-9 fatty acids. Carbohydrate requirement is limited in the critically COVID-19 patient with respiratory failure (6).

Maintain the fluid balance in critically COVID 19 patients and give special consideration to kidney failure patients. For stable adult patient give 30 ml /kg/day of fluid and for elder 28ml/kg/day. Supplement 3-5ml extra fluid for an increase of every 10c temperature (7).

Along with long-chain fatty acid, vitamin C, immune nutrients are administered to increase the immune system. Routine supplements like multivitamins, minerals, vitamin B complex, zinc, and selenium are also to be administered (8).

Micronutrient should be assessed if vitamin D level is less than 12.5mg/ml, administer cholecalciferol 1, 00,000 IU solution within a week for a maximum of 500000 IU. Administer high dose vitamin D 3-5 g/dl, it is more effective for ARDS and decreases the mortality. Other micronutrients can be administered at a higher level in case of any deficiency (9).

**Special considerations**

For Polymorbid patients aged above 65 years, the calorie requirement is 27kcal /kg body weight/day and the protein requirement is > 1 gm. protein /kg/day. Fat and carbohydrate ratio 30:70

* For Severely underweight Polymorbid patients the calorie requirement is 30 kcal /kg body weight/day
* Fat and carbohydrate ratio 50:50 should be maintained for Ventilated patient (7).

**Nurses responsibilities**

* Perform and document a nutrition assessment. Nutritional assessment by physical assessment, monitoring of hematochemical parameters like blood count, PCR, total proteins, serum protein electrophoresis, prealbumin, ferritin, sideremia, folic acid, B12 vitamin, blood sugar, electrolytes, and liver function indices, swallowing ability, and daily diet intake assessment (10).
* Cluster care method to be performed to limit clinical exposure of patient touch.
* Perform proper hand hygiene techniques and wear PPE to protect themselves and limit the number of staff providing care to limit exposure and preserve PPE
* To prevent infection and to preserve the PPE limit the number of staff providing care
* Assessment and documentation can be done by using telehealth or videoconference.
* Assist in Placing large bore nasogastric or gastric feeding tube at time of intubation. Confirm tube placement with chest X-ray and timing to be monitored.
* Check for patient tolerance and If the patient has GI intolerance parenteral nutrition is preferred over enteral nutrition
* Monitor tolerance of diet with daily physical examination and passage of stool and gas
* keep the patient in a prone position to tolerate enteral nutrition
* Keep head of the bed elevated to 10-25degree to decrease risk of aspiration of gastric content, facial edema, and intra-abdominal hypertension (11).
* Provide passive exercises
* Provide attractive food after extubation (10).

**Conclusion**

Good nutrition not only provides the body with immunity to diseases, including COVID-19 but is also the primary guarantee for promoting disease recovery

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