ICU nutrition: Treatment and problem solving

Module 18.4

Clinical priorities for solving ICU nutritional problems

Irina Grecu

Learning objectives:

- To build a nutrition plan for an ICU patient;
- To adapt this to dynamic changes in the patient’s clinical status;
- To be able to promote adequate nutrition on a daily basis;

Content:

1. Introduction
2. Case study
3. Summary
4. References

Key messages:

- In daily practice, there are several impediments to provision of adequate nutrition support;
- These impediments are often not noticed and are difficult to eliminate;
- Prolonged hypocaloric feeding is deleterious and should be avoided;
- An important method to avoid this is to develop a nutritional care plan for each patient;
- The initial nutritional care plan should be flexible, dynamically adapted to each change in clinical situation.

1. Introduction

Despite the huge body of evidence that nutrition support is essential in critically ill patients, in practice, there are a lot of impediments to providing early (within 24 hours from admission) and adequate (equal or close to requirements) nutrition support. Throughout the patient journey in the ICU, beside the “first hit” which constitutes the reason for ICU admission, there are several commonly occurring “second hits”: acute metabolic derangements, reoperations, bleeding, infections, etc. (Fig. 1). These subsequent challenges, on the one hand increase even more the metabolic demands, and on the other may represent per se impediments to the provision of adequate nutritional support (enteral intolerance, abdominal hypertension, reoperations, remote diagnostic procedures, etc). Often this causes prolonged hypocaloric feeding and increases the calorie/protein debt (the difference between calorie/protein requirements and provision). Moreover, due to the development of sophisticated ICU treatment strategies and equipment, we increasingly often encounter patients who spend several weeks or months in the ICU, the so-called chronic critically ill.

In this chapter, using a clinical case presentation, we will identify some of the most common nutritional problems in ICU patients and learn the best options to correct metabolic derangements, and develop a flexible nutritional care plan adapted to individual changes throughout the ICU journey, in order to provide adequate nutrition.
The recently issued or updated European and Canadian guidelines for nutrition in the critically ill constitute useful tools for this (1,2,3).

**Figure 1.** The multiple hit theory in critically ill patients: even if the patient survives the first hit (which is the reason for ICU admittance), he might be later exposed to subsequent “second” hits, leading to “late” multiple organ failure; this might occur several times during ICU stay, prolonging the hospitalization in ICU and eventually leading to fatal outcome.

### 2. Case study

- 36 year old male, IT officer, obese for 5 years, no other previous medical history;
- recent weight loss of 15% over 3 months with a strict diet; family declares he weighed 125 kg before starting the diet and is thus now about 106 kg; he measures 175 cm;
- car crash, driver

Diagnosis on admission: multiple trauma, ISS (Injury Severity Score) 32, chest trauma with left pulmonary contusion and pneumothorax, abdominal trauma with haemoperitoneum, incomplete laceration of the spleen, complex pelvic fracture with retroperitoneal haematoma, left femoral fracture, haemorrhagic and traumatic shock.

He is initially managed in the emergency room (X-ray, CT scan), then goes to the operating theatre (external fixation of the pelvis and left femur, laparotomy for haemoperitoneum, suture of the mesenteric laceration, enterectomy (30 cm of the ileum). A triple lumen tube with the distal lumen beyond the ligament of Treitz was inserted at the end of the surgery, for simultaneous enteral nutrition provision (jejunal) and gastric decompression. In the emergency and operating departments, 9 units of packed red cells, 6 units of fresh frozen plasma and 4 units of platelets were transfused, together with 5L of crystalloid and 2L of colloid.

After surgery (approx. 2.5 hours duration), the patient is transferred to the ICU.

Copyright © by ESPEN LLL Programme 2011
He is intubated and ventilated, under continuous sedation and analgesia, BP 75/38 mmHg, HR 120/min, CVP 4 cmH₂O, ScvO₂ 55%, noradrenaline 0.4 µg/kg/min, pH 7.18, BE –12 mEq/l, lactate 6.4 mmol/l, urinary output 100 ml over the last 3 hours, haematuria.

Q1: Would you start nutrition NOW in this patient?

1. No, he is obese and therefore is not at nutritional risk.
2. Yes, he is a critical patient and needs nutrition as soon as possible.
3. No, he needs resuscitation first.

Right answer is 3:

There is enough evidence leading to recommendation not to start nutrition in patients with acute haemodynamic instability (1,3,4), until macro- and microcirculation resuscitation has been accomplished. Delivery of nutrients into the small bowel may result in gut ischaemia, if splanchnic blood flow is inadequate (5), possibly leading to one of the most severe complications of enteral nutrition, ischaemic bowel necrosis (6). The question remains if parenteral nutrition should be early started in patients with shock, as the literature does not furnish much relevant evidence in this field. The AKE (Austrian Society of Clinical Nutrition) recommendations stipulate that parenteral nutrition should not be initiated in patients with lactate > 3 mmol/L or pH < 7.20 (7). Lactic acidosis in shock patients is a sign of inadequate peripheral perfusion, leading to insufficient oxygen delivery and anaerobic glucose metabolism (8). Enthusiastic parenteral nutrition in such conditions could aggravate lactic acidosis and other metabolic disturbances common in states of shock.

Q2: When would you start nutrition?

1. When he has adequate BP (MAP > 65 mmHg) with decreasing or stable dose of vasopressors and is expected to need no surgical intervention in the next few hours.
2. After the first 48 hours, because it is unlikely he could be stabilized before then.
3. After he is weaned completely from vasopressors (noradrenaline).

Right answer is 1:

Early nutrition support (within 24 hours from ICU admission) has been shown to improve the outcome in critically ill patients and is therefore strongly recommended by the guidelines (1,3,4). Specifically, early enteral nutrition has been proved to have better effects on morbidity than both delayed enteral (9) and early (10) or delayed parenteral nutrition (11). If enteral nutrition cannot be initiated within 24 hours, then parenteral nutrition should be started, as mortality was lower in patients receiving early PN than delayed EN (12).

In practice, it’s rather difficult to start nutrition within the first 24 hours from injury, because of surgical interventions, remote diagnostic procedures, inadequate resuscitation, lack of enteral access, etc. Last but not least, also because of the still prevalent concept that nutrition is not a first line therapy, but merely an adjuvant. This concept still exists because the consequences of not providing nutrition are not immediately apparent, as would be the case if ventilatory support or vasopressors were omitted. Even in one current set of guidelines for ICU treatment, the Surviving Sepsis Campaign, nutrition support is not specifically emphasized (13).

The use of vasopressors was formerly considered a contraindication for enteral nutrition, as some of these drugs (e.g. dopamine) may provoke splanchnic vasoconstriction. Today, it is accepted that the use of norepinephrine in stable or decreasing dose is not a contraindication for the initiation of enteral nutrition (1,6,14).
Moreover, a recent observational study including 1,174 nonsurgical mechanically ventilated patients and receiving one or more vasopressors (15) showed decreased hospital mortality in patients receiving early (within 48 hours from admission) versus late enteral nutrition (33.9% vs 42.6%, p=0.01).

The result was still significant after adjusting for confounding factors such as severity of the disease scores, age, sex, ethnicity, etc. Further subgroup analysis showed that the beneficial effect of early feeding is more evident in the sickest patients, i.e. patients receiving multiple vasopressors and in those requiring vasopressors for 2 or more days (15).

The next morning (14 hours from admission), he is still sedated and mechanically ventilated, \( \text{paO}_2/\text{FiO}_2 \) 225 mmHg (30kPa), BP 100/55 mmHg, HR 95/min, urinary output 70ml/h, noradrenaline 0.2 µg/kg/min, pH 7.37, lactate 1.8 mmol/l, blood glucose 178 mg/dl (9.9 mmol/l).

Q3: Would you start nutrition now? If yes, what should the energy target be in this patient?

1. No, he is still on vasopressors.
2. Yes. 25 kcal/kg adjusted body weight/day
3. Yes. 25 kcal/kg ideal body weight/day

Right answer is 2:

Indirect calorimetry is the gold standard for determining energy requirements in ICU patients. In practice it is not available in all centres, nor at all times even in those which have it, being rather expensive both in capital and personnel. Predictive equations however over- or underestimates requirements (16). Fortunately indirect calorimetry studies have shown that, in most situations, a “magic number” of 25 kcal/kg/day can be used to estimate energy requirements. This is also recommended by ESPEN (1,2).

A common problem arising in ICU patients is which body weight to use in the calorie calculation. In non-obese patients, actual body weight (ABW) is recommended, but even if patients are weighed, this tends to be an overestimate, because of oedema, occurring early in the disease course (fluid resuscitation, increased capillary permeability). The best option would be to know the actual body weight before injury, but this is often difficult to obtain from the patient or from the relatives. In practice, unless the patient is obviously undernourished or obese, we often use the ideal body weight (IBW) determined by actual height, sex and age.

In obese patients, it is recommended that “adjusted” body weight, i.e. IBW + 25%(ABW-IBW) is used. In our patient, IBW is 70 kg, which means an adjusted body weight of 70 + 0.25(106-70) = 79 kg, corresponding to approximately 2000 kcal/day.

In fact, review of the literature on obese critically ill patients, indicates that it is common to provide 50% of resting energy expenditure as glucose, with nitrogen (corresponding to 2 g/kg/day protein) (17). On the other hand, prolonged (> 96 hours) hypocaloric feeding may be deleterious by aggravating energy debt (18), although this has not yet been specifically demonstrated in a prospective, controlled trial in obese patients.

Moreover, it was nicely shown in a famous RCT that a cumulative energy deficit of 10,000 kcal within the first week in the ICU worsens outcome, by increasing infectious complications, and the number of days on mechanical ventilation, in ICU and in the hospital, although it didn’t have a significant influence on mortality (19).

Q4: Which route would you choose to administer nutrition?

1. Oral, after stopping sedation and extubation.
2. Only parenteral, because he has an enterectomy.
3. Combined enteral and parenteral nutrition.
Right answer is 3:

The combination EN + PN has been recently advocated in critical care patients as opposed to the classic concept of hypocaloric feeding (delivery of 0.5 – 0.9 x REE, usually enterally). There are few data supporting the combination (20), and in patients tolerating enteral nutrition in amounts close to requirements, it is not necessary to add parenteral nutrition (1,3). A meta-analysis published in 2004 did not show any benefits in favour of the combination (21). However, more and more European ICUs have adopted this measure as standard care in patients with prolonged intolerance to GI feeding; the rationale behind this practice is to provide enough energy and nitrogen to the body, while still maintaining minimal enteral nutrition in order to prevent gut atrophy and bacterial translocation. Several on-going RCTs are testing the benefits of this approach and will also show if there are any benefits from starting the combination earlier, right from the beginning (22,23).

The problem most often arises in critically ill patients with previous undernutrition, in whom the ESPEN guidelines advocate early combination, while the meta-analysis mentioned above could not conclude, due to insufficient data. Our patient recently lost 15% of BW in 2 months, which means, according to ESPEN guidelines (24), he is undernourished (even if still obese, with a BMI > 30 kg/m²) and therefore needs combined early enteral and parenteral nutrition to meet energy requirements as soon as possible (1).

The patient has a total of 1700 ml gastric residual volumes on ICU day 2 and the abdominal pressure increases to 32 cm H₂O.

Q5: In your opinion, which are the reasons for the increased abdominal pressure?

1. Early enteral nutrition.
2. Postoperative ileus and enteral nutrition.
3. Aggressive fluid resuscitation and retroperitoneal haematoma

Right answer is 3:

In the resuscitation of acute critically ill patients, large volumes of fluids are required to restore the intravascular space, including the macrocirculation, but most importantly, the microcirculation. These large volumes, mainly crystalloids, are responsible for bowel oedema and increased abdominal pressure (25). Retroperitoneal bleeding, by causing ileus, in combination with bowel oedema may also contribute to the development of abdominal hypertension. Indeed, in his first hours in hospital, this patient received > 10L of diverse resuscitation fluids, including 5L of crystalloids. Especially in multiple trauma patients, who have multiple bleeding sites and who require surgery, aggressive fluid resuscitation is often unavoidable.

Administering high volumes of enteral (jejunal) nutrition in patients with abdominal hypertension or abdominal compartment syndrome could precipitate ischaemic bowel necrosis and is therefore contraindicated (Fig. 2). Equally, overenthusiastic jejunal nutrition in a patient with ileus could aggravate abdominal hypertension and should similarly be avoided.

Traditionally, the most common monitoring parameter for tolerance to enteral nutrition is the gastric aspirate or "residuals". It is merely associated with gastroparesis or inadequate gastric emptying however, a common situation in critically ill patients. The poor accuracy of this parameter is demonstrated also by the huge variability in the "accepted" limits for residual volume between different ICUs and its relevance in guiding enteral nutrition delivery has very little if any scientific support (26).

More importantly, monitoring intra-abdominal pressure by simple and cheap means, like the urinary bladder method might become a new gold standard for critically ill patients.
A value of 12 mm Hg or higher defines intra-abdominal hypertension (27). It has been shown that a value of 20 mmHg or higher is significantly associated with intolerance to enteral nutrition (28), and both these parameters are independent predictors of ICU mortality (29).

Coming back to our patient, the very low rate of enteral delivery we started with (10 ml/h) could not readily aggravate abdominal hypertension and certainly is not the cause of it. Also, the value of abdominal pressure is 32 cm H\(_2\)O, which means approx. 23 mm Hg, below the limit for surgical decompression. Nonetheless, it is a good reason to stop minimal enteral nutrition temporarily, at least until the abdominal pressure drops below 20 mmHg. Meanwhile, the patient receives TPN.

**Figure 2.** The relationship between jejunal nutrition and IAP (Increased Abdominal Pressure): overenthusiastic jejunal nutrition in the presence of increased intra-abdominal pressure could precipitate localized bowel ischaemia and even non-obstructive bowel necrosis.

On day 6, the patient is on combined enteral and parenteral nutrition, receiving 25 ml/h enterally (600 kcal/d, because of persistent intra-abdominal hypertension) and 1500 kcal/d parenterally. He is haemodynamically stable, with no vasopressors, still on mechanical ventilation. He is scheduled for internal fixation of the pelvic bone and femoral fractures.

**Q6: Will you stop nutrition before surgery? When? When will you start it again?**

1. Yes. Just before transportation to the operating theatre. Immediately after surgery, if the patient is in stable condition.
2. Yes. Enteral nutrition will be stopped 6 hours before surgery, to ensure gastric emptying, and can be resumed 6 hours after surgery.
3. No. Enteral and parenteral nutrition should not be stopped during surgery.

**Right answer is 1:**

Guidelines for preoperative management (30) stipulate that oral intake of food should be stopped 6 hours before surgery, and that intake of clear fluids can continue until 2 hours before surgery. In ICU patients, a common practice is to stop EN early in the morning before scheduled surgery and restart it late in the afternoon or evening and sometimes only the next morning. There is no evidence in the literature for such a practice. On the contrary, in intubated patients, with a secure airway, like our patient, it is enough to stop
jejunal nutrition and to suction the stomach just before transportation to the theatre. Parenteral nutrition should also be stopped just before transportation, although there are no specific indications to determine if it should be stopped or not during operation. Care should be taken to prevent occlusion of the nutrition lumen (saline flushes), or dislocation of the enteral tube.

Enteral and/or parenteral nutrition should be restarted immediately after surgery, if the patient is haemodynamically stable, with no important metabolic derangements.

On day 11, the patient is alert, but slightly agitated, has adequate parameters for extubation and receives continuous gastric nutrition (the triple lumen tube having been accidentally dislodged perioperatively) at a rate of 80 ml/h, and parenteral alanyl-glutamine 10%, 200 ml/d.

Q7: Would you stop enteral nutrition before extubation? If yes, for how much time? Will you try the oral route for nutrition?

1. Yes. Until the patient is alert, with good airway reflexes. Yes.
2. Yes. Together with endotracheal tube, we will remove the gastric tube and provide oral nutrition.
3. No, we will administer continuous gastric feeding.

Right answer is 1:

Before extubation, gastric nutrition should be stopped and the stomach should be aspirated. Removal of the tracheal tube is a delicate manoeuvre, especially if the patient is not fully cooperative, which is often the case in long term mechanically ventilated patients. Aspiration of the gastric content into the airways is a very serious complication and should be avoided by all means. The head of the bed to an elevation of 30- 45° should be done in all the patients receiving enteral nutrition (3). As previously discussed, interruption of nutritional support, if unavoidable, should be for as short a time as possible. In recently extubated patients, this can, unfortunately, last longer than we expect, due to incomplete cooperation, impaired airway reflexes, or anticipated need for reintubation. Oral nutrition should be tested in such patients, if they are alert and cooperative, but usually it takes days until this is fully resumed.

A recent trial (31) confirmed that, in practice, nutritional support has frequent interruptions in ICU patients, due to reoperations, remote or bedside procedures, personal hygiene, delayed pharmacy supply, weaning, etc. (Fig. 3) The interruptions are more likely to occur for enteral than parenteral nutrition and lead to provision of just approximately 50% of the calorie goal within days 2 to 10 from ICU admission (31) (Fig. 4). This obviously contributes to the increased calorie and protein debt that has been proven to influence outcome negatively. Therefore interruptions should be minimized as much as possible (19).

Within the next 24 hours, the patient required 3 sequences of facial mask CPAP (continuous positive airways pressure) of 2 hours each.

Q8: Will you stop enteral nutrition during mask CPAP?

1. Yes. We will switch to total parenteral nutrition for 24 hours.
2. No, if CPAP pressure is not too high.
3. Yes, only during the CPAP sequences. We will associate this with complementary parenteral nutrition.

Right answer is 1:

Post extubation mask CPAP is frequently required in long time intubated and ventilated patients and represents an efficient and widely used non-invasive method of weaning.
There are no clear recommendations in the literature about enteral nutrition delivery during mask CPAP or BIPAP. Most ICU practitioners will continue enteral nutrition administration, providing the maximum applied CPAP pressure does not exceed 10 – 15 mbar, the head of the bed is elevated at 45° and gastric aspirates are repeatedly low. If these conditions cannot be fulfilled, it may be safer to stop enteral nutrition during CPAP sequences and associate this with temporary supplemental parenteral nutrition.

**Figure 3.** Most common reasons for interruptions in enteral nutrition in critically ill patients (31).

**Figure 4.** Total calories delivered (% from target calorie intake) to critically ill patients throughout their ICU stay (31).
On day 13, the patient develops fever and leucocytosis, alveolar infiltrates in the right lower pulmonary lobe and again requires ventilatory support. He develops septic shock and multiple organ failure and over the following 2 weeks he receives vasopressors, tracheostomy and mechanical ventilation, renal replacement therapy, etc. During this time, he receives combined EN + PN, because of protracted enteral intolerance, at levels close to requirements, but with frequent interruptions.

Finally, after 36 days, the patient is discharged from ICU and after 42 days from the hospital. He now weighs now 78 kg, reaching a normal BMI.

Q9: What recommendations will you give at discharge? Does he need nutritional counselling or any nutritional support at home?

1. He needs home enteral nutrition.
2. He needs nutritional counselling and supplements.
3. He needs no nutritional supplements, in order not to become obese again.

Right answer is 1:

Despite our nutritional support more or less in accordance with guidelines and recommendations, the patient lost 28 kg in 7 weeks of hospitalization, which means approx. 25% of body weight. This is a frequent situation in prolonged critical illness (32) and, even if now he has reached a normal BMI, he is severely undernourished. The lean body mass is especially depleted during serious illness, and immune depression persists for several months after injury. Micronutrient deficiency is also a common finding. Unfortunately, these patients sometimes leave the hospital without any nutritional counselling and receive no nutritional supplements, exposing them to a potentially lethal course from any new injury (infection, trauma, etc.).

The recommendations at discharge should include frequent meals, 2-3 daily snacks, a target energy intake of 30 - 35 kcal/kg/d, high protein intake (2 g/kg/d), vitamins and trace element supplements. Physical exercise (in this patient according also to orthopaedic recommendations), together with a high protein - high calorie intake, are the most important elements for body protein accretion and full recovery.

**Nutritional care plan** (10 steps to successful nutrition support)

1. **Think nutrition from ICU admission and include a nutrition prescription in the first therapeutic plan**
   One of the reasons for delayed nutrition in ICU patients is that initial drug prescription does not include any recommendation regarding nutrition support. Moreover, ICU general management guidelines don’t include nutrition as first line therapy (13).

2. **Correct haemodynamic instability, check for early surgical interventions**
   Inadequate resuscitation should be corrected using fluids ± vasopressors. When inserting central vein catheters, think if these might also be used for parenteral nutrition (insert a multi-lumen one, keep one dedicated lumen for PN).

3. **If BP ≥ 90 mmHg and vasopressor dose is stable or decreasing, start nutrition**
   If macro- and microcirculation is restored, even if vasopressors are required, but their dose is not further increasing or is decreasing, enteral nutrition may be started (1,6,14). Care should be taken when starting parenteral nutrition in patients with lactic acidosis, which is often the case in inadequately resuscitated patients.

4. **Estimate/calculate requirements and need for special substrates**
   Even if indirect calorimetry is the gold standard for calculating energy requirements in ICU patients, its availability in daily practice is low. Therefore, the guidelines recommend using an approximate value of 25 kcal/kg/day in acute critically ill patients (1,2).
There is a problem arising in which weight to use in the calculations. See the case discussion regarding this issue. Critically ill patients have increased requirements of special substrates, e.g. glutamine, or antioxidants. Special recommendations are available for their dosage (1-3), but most important is that their administration should start early, from the first day of nutrition.

5. Obtain enteral/parenteral access.

Intragastric nutrition is tolerated in most critically ill patients and therefore is recommended as the first option (1). Jejunal nutrition should be used if the patient required recent laparotomy, or in case of established gastric intolerance.

In the ICU, parenteral nutrition should be administered via central vein, preferably via a separate lumen of a multilumen catheter.

6. Start enteral and/or parenteral nutrition, and progress carefully to full energy target

Enteral nutrition, either intragastric or intrajejunal, should be started continuously, at a rate of 10-20 ml/h, using a standard, polymeric formula (this should be done within 24 hours from admission). The rate should be increased within the next 12-24 hours if no signs of intolerance are present (check abdominal pressure and gastric residual volumes). Full energy targets should be achieved in 3-5 days.

If enteral nutrition could not be started within 24 hours, start parenteral nutrition, also early, at a rate according to metabolic tolerance (usually approx. half of target kcal within first day).

If the patient is severely malnourished on admission, start combined enteral and parenteral nutrition, in order to meet requirements as soon as possible (within 2-3 days) (1,2).

7. Monitor intake and utilization of nutrients and check for complications

Artificial nutrition is a therapy and should be managed as such. Therefore, monitoring tolerance and efficacy and at the same time preventing related complications are of utmost importance.

Monitoring implies not only tolerance (enteral and metabolic), but also actual intake of nutrients, given the fact that, in daily practice, often there is a gap between estimated/calculated requirements, prescription and actual intake. Reasons for this gap are discussed above.

Tolerance to enteral feeding should be monitored frequently, by clinical signs, gastric residuals and intra-abdominal pressure. Metabolic tolerance and substrate utilization are monitored by plasma levels of glucose, BUN, triglycerides, electrolytes, arterial gases, pH.

Complication prevention or early treatment, together with adequate monitoring are the keys to successful nutritional care. Complications are related to route, administration mode, parenteral admixtures or enteral formulas, they can be infectious, metabolic (acute or long-term). Methods to prevent or treat these are discussed elsewhere.

8. Identify reasons for delayed or inadequate nutrition support and try to reduce/eliminate them

Particularly in critically ill patients, there are several reasons for delayed or inadequate nutrition support. These are related in the first place to the fact that nutrition is still not considered first line therapy, akin to ventilatory support, vasopressors, antibiotics, etc. It is mainly due to the lack of knowledge in the field among practitioners, lack of applying existing local/national/international guidelines, and lack of protocols for provision of nutritional support.

Secondly, initiation of nutritional support may be delayed or nutrition may be interrupted because of haemodynamic instability, surgical interventions, remote diagnostic procedures, personal hygiene, difficulty of jejunal access, delayed pharmacy supply and so on.

To reduce or even eliminate inadequate nutrition support, continual education of caregivers in the nutritional field is mandatory, together with protocols and individual nutritional care plans. In critical care patients, artificial nutrition should be started early and interruptions in nutrition delivery should be minimized as much as possible.
9. Consider long term nutrition strategies in case of prolonged critical illness

In the past decades, together with important medical knowledge and technological development, a new pathology has developed, described as chronic critical illness, or prolonged critical illness (32). This characterizes the patient with a long course of critical disease (> 3 weeks), developing serial complications, challenged by multiple hits and in a prolonged catabolic state. These patients lose a lot of weight, especially lean body mass, which is involved in body defence mechanisms and they therefore become very frail. They are very dependent on constant adequate nutrition support and they cannot usefully receive extra calories or extra protein, because they are not yet in an anabolic, healing phase.

10. Give recommendations for nutritional care after ICU/hospital discharge

One of the critical moments in the ICU patient nutritional care is discharge. It’s not a rare event that they leave the ICU or the hospital without any recommendations regarding nutrition in the longer term, a considerable problem and lost opportunity given that their body protein and energy reserves are not yet replenished and that it usually takes months until they fully recover. Therefore, they should receive proper recommendations, depending on their actual condition, ranging from nutritional counselling, supplements, home enteral or even parenteral nutrition if necessary. Long term nutrition monitoring of these patients is mandatory but this can usually be done via the properly briefed primary care physician.

3. Summary

Critically ill patients exhibit severe catabolic status and require early and adequate nutrition support in order to reduce the exhaustion of body reserves. National and international guidelines for nutrition in ICU patients are available and have been updated recently. Unfortunately, in daily practice there are many factors favouring delayed or inadequate nutrition in critical care patients, leading to prolonged hypocaloric feeding and a negative influence on their outcome.

Recognising and trying to eliminate or reduce these factors, together with building a solid nutritional care plan in each patient may ensure adequate nutrition in ICU patients. This plan should be anticipative and flexible, should have clear objectives/targets and include frequent monitoring and measures to prevent or treat complications.

4. References


Copyright © by ESPEN LLL Programme 2011