



## PACKAGE OF MEASURES FOR ENTERAL NUTRITION IN ADULT INTENSIVE CARE UNIT: CONVERGENT ASSISTANT RESEARCH

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### ABSTRACT

**Objective:** to create and to implement collectively bundles for the management of enteral nutrition in an adult intensive care unit. **Method:** it is a convergent care research developed in an adult intensive care unit, with 13 professionals: nurses, doctors, nutritionist and nursing technicians who worked in this place. There were discussion groups based on scientific evidence to build bundles for the management of enteral nutrition, implementing it in the studied scenario and in another similar sector of the institution. Three meetings were held with the participants to elaborate the instruments. **Results:** The bundles are composed by recommendations for: feeding catheter care, initiation and progression of enteral nutrition therapy, daily activities, extubation, tracheostomy, management of gastric residual volume, and episodes of diarrhea. **Conclusion:** the method favored the collective construction of the package of measures and its implementation, valuing each professional category in the adequate nutrition of critically ill adults.

**Keywords:** Enteral nutrition. Patient care bundles. Critical care. Evidence-based practice. Intensive care units.

### INTRODUCTION

It's been a long time that critically ill patients admitted to the Intensive Care Unit (ICU) have been known to be in a condition of metabolic stress, in which muscle-skeletal degradation occurs to meet the energy needs required in this condition. This causes rapid protein-calorie depletion and, because of this, some national and international guidelines recommend that they receive oral feeding; enteral feeding should be instituted as an option. Thus, nutritional support is provided for the maintenance of substrates such as lipids, proteins and glucose, avoiding malnutrition<sup>(1)</sup>.

Well-established Enteral Nutrition (EN) also contributes to a shorter hospital stay and a decline in comorbidity and mortality rates associated with ICU admission, as well as a reduction in health care-related infections and their complications<sup>(2-3)</sup>.

However, caloric-protein adequacy is often a challenge in the hospital environment, as there are certain divergences between the prescribed

and actual nutrition volume received by patients. There are many problems related to this, such as fasting for exams, procedures and complications<sup>(2-3)</sup>. Such practice can greatly contribute to the hospital outcome of patients, since it increases their probability of mortality even after ICU discharge, as evidenced in a prospective observational study, which showed that survival is more common in patients who had fewer interruptions in their diet than those ones who developed malnutrition<sup>(4)</sup>.

Regarding the implications of EN in the scenario in question, most of these patients have reduced body mobility, which favors the appearance of Pressure Injuries (PI), with a high incidence in the first week of hospitalization<sup>(5)</sup>. It is well known that the proper nutritional process is significantly associated with a decreased probability of incidence of this problem, as well as with the improvement of tissue healing in its occurrences<sup>(6)</sup>.

Knowing all this importance of the EN, there is the need for multidisciplinary teams composed of nurses, doctors, pharmacists and nutritionists,

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to perform the proper management of energy supply to hospitalized patients. Allied to this, it is argued that it is essential for the reduction in errors related to the EN, the creation of health policies that contemplate the security of its administration and its management. Therefore, it is recommended the inclusion of nurses as agents for the elaboration and implementation of protocols and policies on this subject, pharmacists to properly administer medication by the enteral catheter and nutritionists with daily visits during the multiprofessional visit to evaluate and change the daily caloric intake of patients on nutritional therapy<sup>(7-8)</sup>.

Based on the considerations mentioned above and, based on evidence-based practices for the preparation of clinical recommendations, we seek to build protocols, named in this package study, that guide enteral nutritional therapy. The package of measures is the set of scientific recommendations that, together, help in the decision making of daily care in search of better results<sup>(9)</sup>.

Although there are numerous protocols and guidelines that support the clinical practice of EN, none of them uniquely direct their management. Thus, in order to provide adequate nutritional therapy for critically ill patients, it is considered that the implementation of a package of measures is an important strategy to increase the effectiveness of management by a multidisciplinary team, especially, if constructed collectively, by the professionals involved<sup>(1)</sup>. Based on this premise, the present study aimed to collectively develop and implement a package of measures for the management of EN in an adult ICU.

## METHOD

This is a qualitative study based on the Convergent Care Research (CCR), which seeks the resolution of problems identified in care practice<sup>(10)</sup>. It occurred in one of the adult intensive care units of a public university hospital located in the northern state of Paraná, Brazil.

The participants were selected for convenience by the first author of this study after identifying the social actors of the ICU multiprofessional team, who had leadership and active

voice, with the potential to multiply the knowledge built along the methodological path. Thus, three doctors (two residents in intensive care and one intensive care on duty), one nutritionist, six nursing technicians (two from the morning team, one in the afternoon, one of the even nights and two of the odd nights), three nurses (one staff in the morning, one in the afternoon and one of the odd nights), making up a total of 13 professionals.

The following inclusion criteria were considered: to be part of the staff of the intensive care team and, in the case of medical professionals, to be a resident of the intensive care area. Those who were on vacation or leave for any reason during the meetings to discuss the bundles for the management of enteral nutrition in the ICU were excluded.

The research occurred from December 2017 to November 2018 and was operationalized according to the phases of the CCR, and, in the conception phase, concerns emerged from the care practice that resulted in the following question: what are the behaviors supported by evidence-based practice for the management of enteral nutrition therapy in an adult intensive care unit?

In the instrumentation phase, we sought scientific evidence available in related literature that could contribute to elucidate the questioning that emerged in the conception phase as the driving force of the entire investigation. It was also defined that the care convergence of the findings in the literature would be made possible through the holding of Discussion Groups (DG) composed of different members of the multiprofessional team. Thus, the sample of the participants was composed.

The scrutiny phase was conducted by DG, which took place on the premises of the institution, in three afternoon meetings, on August 15, September 5 and September 13, 2018, lasting two hours each. According to the ICU management summit, the participating professionals who were out of their working hours received a workload computed in a time bank and those who were on their working day were exempted from their activities to be present in the DG.

In an initial meeting, before the first DG, aiming to sensitize the professionals, were

presented the partial data from a quantitative study carried out in the same sector (still ongoing) that evidenced the fact that the real nutritional profile of patients was below ideal. Then, it was explained about the specificities of the CCR, agreeing how this process would occur and valuing the participation of each one there.

During the first DG, the literature review materials previously presented by researchers on various topics related to nutritional therapy were presented and a discussion was triggered in order to compare the clinical practice performed in that ICU with the recommendations from the literature, pointing out which were the nodes to be adjusted so that the customer EN was ideal. In the second DG, the issues and questions emerged in the first discussion were resumed and the topics addressed by the group were listed in a framework for decision making and for the construction of the package of measures. The third and last DG was developed to validate the final wording of the collectively constructed bundles so that it could start with its implementation in the ICU.

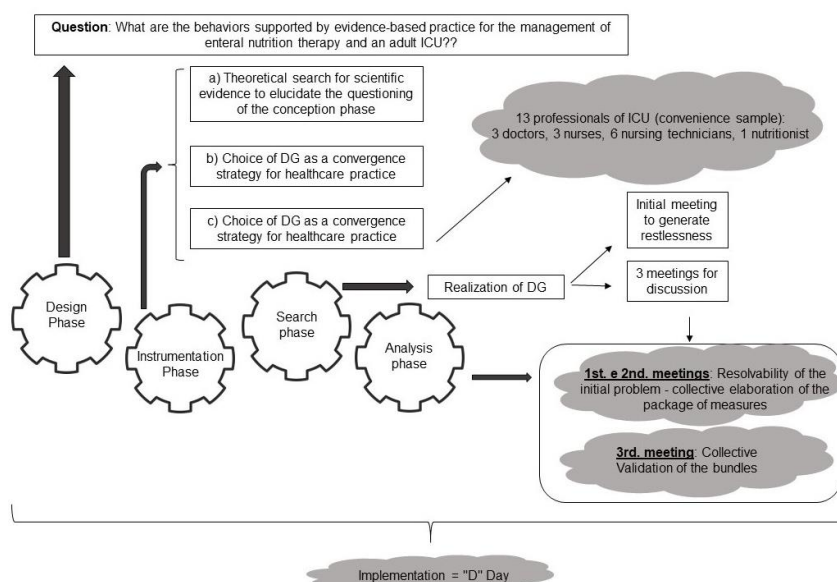
The implementation involved all members of the ICU under study and professionals from another adult ICU of the institution, through educational activities developed on the so-called

“D-Day” (allusive to the fight against “Malnutrition”), whose details are explained in the section of results.

Data analysis was intertwined with the scrutiny phase and became expressed by the elaboration of the blunders during the DGs, which is the largest product of collective construction. This is because CCR has one more step regarding the analysis and interpretation of the data and reinforces that all the described steps are interrelated.

Thus, the analysis and interpretation phase comprised: a) the moment when the researchers were observing in the assistance field with the purpose of understanding the context of their research object, understanding at that moment the process of apprehension of the phenomenon under study; b) the synthesis stage, in which the main doubts arising from the DG were first structured; c) the theorization of knowledge that emerged in DGs, with the purpose, finally, to achieve the translation of knowledge that, in this study, was identified as a package of measures.

The graphic representation of Figure 1 summarizes the operationalization of the CCR described here, seeking to clarify to the reader the main points of the methodological trajectory.



**Figure 1.** Operationalizing the elaboration and implementation of a bundle for the management of enteral nutrition in an adult intensive care unit through Convergent Care Research – Londrina, PR, 2017-2018

In the development of the study, the recommendations of Resolution No. 466/2012 of

the National Health Council<sup>(11)</sup> were followed, which establishes guidelines and ethical

standards for research involving human beings, with the approval of the research ethics committee of the institution, under opinion no. 2,673,845, in 2018. The professionals signed the Informed Consent Form before the beginning of their participation.

## RESULTS

In the group of discussion there were 13 professionals, all women. The largest professional category was nursing technicians, with six participants. In this category, the time spent in ICU ranged from one to 30 years. In regard to the nurses, there were three participants, working in ICUs from one to 17 years. In addition, three doctors were included in the DG, all with 11 years of experience in intensive care. The participating dietitian, in turn, worked in ICU for about two years.

A review of the related literature was carried out, using the evidence presented by the most current national and international guidelines on the subject. However, due to the complexity of the problem and the genesis of several complementary questions, other scientific articles were also used to support the elaborated conducts<sup>(1,9)</sup>.

During the construction of the bundles, it was decided to maintain the level of scientific evidence adopted by the guidelines cited in the previous paragraph, which is based on the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) system, separating it into “high”, “moderate”, “low”, “very low” and “expert opinion”<sup>(1,9)</sup>.

Thus, Table 1 presents the bundles for the management of EN that was collectively constructed through the phases of the CCR, as well as the level of evidence for each of the recommendations contained therein.

**Table 1.** Package of measures for the management of enteral nutrition in an adult intensive care unit - recommendations and respective levels of evidence. - Londrina, PR, 2018

Feeding Catheter Care	Level of evidence
Gastric feeding catheter is recommended	Experts' opinion
In special situations (impossibility of insertion/progression; high levels of gastric residual volume/vomiting refractory to clinical treatment without the possibility of progressing nutritional therapy or individualized situations to be evaluated by the team), the use of upper digestive endoscopy is recommended for feeding catheter insertion in post pyloric position	Moderate/high
It is recommended to start nutritional therapy after epigastric auscultation, not delaying waiting for x-ray.	Opinion of DG*
When there is doubt in epigastric auscultation (absence of noise or decreased auscultation), start nutritional therapy only after x-ray catheter localization	Opinion of DG*
To check the routine chest catheter x-ray ** daily for the location of the feeding catheter. If there is doubt about the placement, request abdominal x-ray	Opinion of DG*
When the patient is admitted to the ICU **, pay attention to the insertion of the feeding catheter when the patient is without and, when recommended, insert it before admission X-ray.	Opinion of DG*
Intubated patients admitted to the operating room without a feeding catheter and no extubation within two hours should receive such a device.	Opinion of DG*
To evaluate gastric residue only at each diet pouch change for a maximum of 15 minutes, not delaying the start of another pouch or when the patient has nausea, vomiting and/or bloating.	Opinion of DG*
<b>Initiation and progression of enteral nutrition therapy</b>	
It is recommended that the total enteral diet volume be divided by 22 hours rather than 24 hours *	Opinion of DG*
After calculating the enteral nutrition, start it with 1/3 of the stipulated goal, progressing in the same proportion until the third day.	Opinion of DG*
The period of evaluation, reassessment and progression of the infusion will be performed during the daily multi-professional visit; record progression in the patient safety chart.	Opinion of DG*
It is established that, in hemodynamically unstable patients, only trophic nutrition will be maintained, that is, the diet with infusion pump flow rate of 10 ml/h. If the patient experiences an episode of gastric residual volume, administration will be suspended until clinical improvement and hemodynamic stabilization.	Experts' opinion
<b>Daily activities</b>	
When performing respiratory physiotherapy (including endotracheal suctioning), the enteral diet should be paused and the enteral catheter should remain connected to the diet equipment. The catheter should only be opened if the patient has episodes of nausea and/or vomiting during the procedure.	Opinion of DG*
During oral hygiene, the diet will not be interrupted unless the patient experiences episodes of nausea and/or vomiting.	Opinion of DG*
When bathing in bed, the infusion of the diet will not be interrupted, except if the patient presents episodes of nausea and/or vomiting.	Opinion of DG*

Continua

<b>Extubation</b>	
Remain fasting with an open catheter during the extubation procedure and for the next six hours. After this interval, return to the diet at its current flow rate.	Opinion of DG*
<b>Tracheostomy</b>	
To start fasting 3 hours before the tracheostomy surgical procedure, keeping the catheter open for drainage during the intraoperative period.	Low
<b>Gastric residual volume management</b>	
If the episode of gastric residual volume above 500 ml suspends the diet for 6 hours, optimize prescribing prokinetics, reassess the patient and initiate enteral nutrition at 50% of the flow rate, progress to the target after 6 hours.	Opinion of DG*
If there is gastric residual volume less than 500 ml, restart nutritional therapy at the infusion target on the day	Opinion of DG*
In patients with abdominal distension, evaluate the clinical condition and other symptoms before discontinuing the diet.	Experts' opinion
Keep metoclopramide if necessary on prescription; initiate metoclopramide in case of gastric residual volume above 200 ml; If residual episodes persist, prokinetics should be re-evaluated.	Opinion of DG*
<b>Diarrhea cases</b>	
Always check the validity of the diet and the diet equipment. Always change in every 24 hours.	Opinion of DG*
Do not interrupt nutritional therapy in episodes of diarrhea	Experts' opinion
In cases of diarrhea, discontinue use of prokinetics and evaluate prescription laxatives.	Opinion of DG *
To evaluate the use of symbiotics, fibers and <i>Saccharomyces boulardii</i>	Opinion of DG *
If you do not have effective answers, replace the prescribed diet with hydrolyzed diet.	Opinion of DG *
Subsequently, if it is not effective, evaluate the possibility of <i>Clostridium difficile</i> infection.	Opinion of DG *
Ultimately, reduce the flow to the diet in 70% of the current goal.	Opinion of DG*

\***Opinion of DG:** readings and discussions based on scientific articles were performed, however, because there is no consensus in the literature on how to proceed, the group created their definitions based on the needs of the ICU in question, relating them to the literature cited in the discussion section.

\*\***ICU:** Intensive Care Unit

The present recommendations were raised in the discussion group and elucidated according to the evidence in the literature, combined with the experiences of each participant in their clinical practices in intensive care.

## DISCUSSION

Given the problematic of gastric or enteric positioning of the feeding catheter, based on their clinical experience the group recommends that starting EN with the catheter in the gastric position is acceptable and does not pose a risk to patients. Additionally, it is concluded that only in situations of difficult catheter or dietary progression, with constant presence of high gastric residual volume, the catheter will be inserted in the post-pyloric position using upper digestive endoscopy<sup>(1,12)</sup>. It is also noteworthy that systematic literature reviews and meta-analyses did not show any association between the gastric feeding catheter and pneumonia or bronchoaspiration in critically ill patients with mechanical ventilation<sup>(1,12)</sup>.

After several deliberations on the methods for verifying the correct position of the feeding

catheter in the stomach, the DG decided to maintain confirmation with epigastric auscultation and then immediately initiate EN administration. It is emphasized that this will not be the only method employed, since the literature brings its caveats about the use of a single technique. The use of chest x-ray to monitor the position of the gastric tube will be considered, however, it will be performed only on admission to the unit and daily in the morning<sup>(13-14)</sup>.

However, if there are any doubts or discrepancies in noise, EN should not be infused until proven correct x-ray catheter location. If this chest x-ray is not sufficiently effective, it is defined that an abdominal x-ray will be performed for better visualization. It is known that more than one method is important for the location of the feeding catheter; however, considering the operational issues of the radiology service of the institution, there may be a delay in the examination. In view of this, it was decided in the group not to delay the onset of EN by waiting for the said imaging examination.

Regarding Gastric Residual Volume (GRV), there is no evidence to support the need to observe it routinely in the case of continuous infused diets. As this is an inaccurate question and without exact recommendation in the specialized literature, the group considered the possibility of using gastric residue verification, establishing that it would be done only during diet packaging changes and determined that the maximum length of stay of the open catheter for drainage would be 15 minutes<sup>(1,15)</sup>.

Given this recommendation on residual verification, adherence to gastrointestinal intolerance monitoring was adhered to by observing and analyzing the symptoms associated with it, aiming at reducing interruptions during the infusion of nutritional therapy<sup>(1,15)</sup>.

The practice of opening the EN system and pausing diet infusion permeated all contexts of daily care activities of the ICU in question and, to minimize it, it was considered unnecessary to check the GRV during physical therapy, oral hygiene and the shower in bed. Thus, the group agreed that the catheter would no longer be open, however, for patient manipulation nutrition would be paused in the infusion pump, with the purpose of avoiding the chances of catheter contamination, reducing the time of its opening to drainage and, concomitantly, increase the caloric-protein supply<sup>(1,15)</sup>.

Additively, aware that the indiscriminate use of medication has its usual risks and, because it is not a collective need, but individual, the components of the DG concluded that, for the use of prokinetics, gastrointestinal intolerance should be considered, such as those of high and persistent GVR, reducing the risk of tachyphylaxis<sup>(1,9,16)</sup>.

EN in hemodynamically unstable patients is a point of disagreement among the authors of publications on the subject. They choose as the main demotivating topic of the continuation of EN in these patients the risk of paralytic ileum, but emphasize that this same problem is the rarest to happen. In contrast, experts in the field claim that discontinuation of EN would increase the likelihood of bacterial translocation, worsening the hemodynamic picture. In view of all the considerations and debates, the DG considered it coherent to maintain the EN in

these cases, however, with a flow for stimulation only of the enteral tropism, keeping it at 10 ml/h in the continuous infusion pump<sup>(1,9,17)</sup>.

Regarding fasting time in patients with enteral nutrition, there are currently no definitions in the literature for procedures such as extubation and tracheostomy. There is evidence indicating prolonged fasting time in these patients, which makes it difficult to reach the caloric-protein goal. Thus, as the group did not have exact specifications, it was recommended that during the extubation procedure the feeding catheter be opened and thus kept for drainage for six hours (during which time the patient may need to be intubated again), after this interval, the diet at its current flow rate.

To perform tracheostomy, the group defined fasting three hours before surgery (pausing the diet, keeping the catheter closed and opening it only at the time of surgery for drainage of the RVG) and starting immediately after the end of the operative time<sup>(18-19)</sup>.

Regarding the management of enteral nutrition in cases of diarrhea, during the performance of the DGs, it was verified that there was no consensus of definition by the participants. In view of this, the World Health Organization was recommended, which considers diarrhea as the occurrence of three episodes of liquid stools within 24 hours<sup>(20)</sup>. However, there is evidence in the literature correlating little connection between diarrhea and the use of enteral nutrition. The publications associate this occurrence with: a) large-scale antibiotic use; b) use of medications that promote inhibition or activation of the gastrointestinal system, such as proton pump inhibitors or laxatives; c) ease of bacterial infection by *clostridium difficile*, due to the fragility of the intestinal membranes due to the lack of natural microbiota that was lost during hospitalization due to the therapies mentioned in topics a and b<sup>(1,9,20-21)</sup>.

## CONCLUSION

The use of CCR in various constituent phases was an essential factor for the success in the collective construction of the enteral nutrition management package in intensive care adults.

Moreover, this method was relevant to the translation of knowledge on the subject, so as to value each member of the multidisciplinary team as essential for proper nutrition of the clientele in question, instigating continuing education in that environment.

Even the specific literature in the area of enteral nutrition with consensus gaps, the use of discussion groups made it possible to elect, not the best scientific evidence for the construction

of the package of measures, but those that best fit the clinical practice in that institution.

Although limitations are acknowledged in the research now completed, it is clear that the information provided here may support other realities to strengthen collective multi-professional participation, in the act of making efforts to adequate nutritional support for critically ill adults, moving away from the empiricism of this practice and aiming for safe and comprehensive patient care.

## PACOTE DE MEDIDAS PARA NUTRIÇÃO ENTERAL EM UNIDADE DE TERAPIA INTENSIVA ADULTO: PESQUISA CONVERGENTE-ASSISTENCIAL

### RESUMO

**Objetivo:** elaborar e implementar, de modo coletivo, um pacote de medidas para o manejo da nutrição enteral em uma unidade de terapia intensiva adulto. **Método:** pesquisa convergente-assistencial desenvolvida em uma unidade de terapia intensiva adulto, com 13 profissionais, sendo eles: enfermeiros, médicos, nutricionista e técnicos de enfermagem que trabalhavam neste local. Foram compostos grupos de discussão embasados em evidências científicas para construir um pacote de medidas para o manejo da nutrição enteral, implementando-o no cenário estudado e em outro setor semelhante da instituição. Foram realizadas três reuniões com os participantes para elaboração dos instrumentos. **Resultados:** o pacote apresenta recomendações para: cuidados com o cateter de alimentação, início e progressão da terapia nutricional enteral, atividades diárias, extubação, traqueostomia, manejo do volume residual gástrico e episódios de diarreia. **Conclusão:** o método favoreceu a construção coletiva do pacote de medidas e sua implementação, valorizando cada categoria profissional na adequada nutrição de adultos em estado crítico.

**Palavras-chave:** Nutrição Enteral. Pacotes de Assistência ao Paciente. Cuidados Críticos. Prática Clínica Baseada em Evidência. Unidades de Terapia Intensiva.

## PAQUETE DE MEDIDAS PARA LA NUTRICIÓN ENTERAL EN UNIDAD DE CUIDADOS INTENSIVOS PARA ADULTOS: INVESTIGACIÓN CONVERGENTE ASISTENCIAL

### RESUMEN

**Objetivo:** elaborar e implementar, de modo coletivo, un paquete de medidas para el manejo de la nutrición enteral en una unidad de cuidados intensivos para adultos. **Método:** investigación convergente-asistencial desarrollada en una unidad de cuidados intensivos para adultos, con 13 profesionales, siendo ellos: enfermeros, médicos, nutricionista y técnicos de enfermería que trabajaban en este local. Fueron compuestos grupos de discusión basados en evidencias científicas para construir un paquete de medidas para el manejo de la nutrición enteral, implementándolo en el escenario estudiado y en otro sector semejante al de la institución. Fueron realizadas tres citas con los participantes para la elaboración de los instrumentos. **Resultados:** el paquete presenta recomendaciones para: cuidados con el catéter de alimentación, inicio y progresión de la terapia nutricional enteral, actividades diarias, extubación, traqueotomía, manejo del volumen gástrico residual y episodios de diarrea. **Conclusión:** el método favoreció la construcción colectiva del paquete de medidas y su implementación, valorando cada categoría profesional en la adecuada nutrición de adultos en estado crítico.

**Palabras clave:** Nutrición enteral. Paquetes de Atención al Paciente. Cuidados Críticos. Práctica Clínica basada en evidencia. Unidades de Cuidados Intensivos.

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