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Nursing intervention bundle for enteral nutrition in intensive care: a collective construction*

BUNDLE DE INTERVENÇÕES E ENFERMAGEM EM NUTRIÇÃO ENTERAL NA TERAPIA INTENSIVA: UMA CONSTRUÇÃO COLETIVA

BUNDLE DE INTERVENCIONES DE ENFERMERÍA EN NUTRICIÓN ENTERAL EN LA TERAPIA INTENSIVA: UNA CONSTRUCCIÓN COLECTIVA

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ABSTRACT

Objective: The collective construction of a nursing intervention bundle for patients in critical care in the hospital receiving enteral nutrition therapy, supported by evidence-based practice. **Method**: A qualitative convergent-care study with 24 nursing professionals in an intensive care unit of a public hospital in Santa Catarina. Data collection was performed from May to August 2013, with semi-structured interviews and discussion groups. **Results**: Four interventions emerged that constituted the bundle: bedside pH monitoring to confirm the position of the tube; stabilization of the tube; enteric position of the tube; and maintaining the head of the bed elevated at 30° to 45°. **Conclusion**: The interventions chosen neither required additional professional workload nor extra charges to the institution, which are identified as improving the adoption of the bundle by nursing professionals at the ICU.

DESCRIPTORS

Enteral nutrition
Intensive care
Nursing care
Evidence-based nursing

RESUMO

Objetivo: Construção coletiva de um *bundle* de intervenções de enfermagem a pacientes internados em ambiente crítico sob terapia de nutrição enteral, sustentado pela prática baseada em evidências. **Método**: Pesquisa qualitativa do tipo Convergente Assistencial, que contou com a participação de 24 profissionais de enfermagem de uma Unidade de Terapia Intensiva de um hospital público de Santa Catarina. A coleta de dados ocorreu de maio a agosto de 2013, com entrevistas semiestruturadas e grupos de discussão. **Resultados**: Emergiram quatro intervenções que constituíram o *bundle*: pHmetria para confirmação do posicionamento da sonda à beira leito; fixação da sonda; posicionamento entérico da sonda; e manutenção da cabeceira elevada a 30°- 45°. **Conclusão**: As intervenções eleitas não demandam acréscimo à carga de trabalho dos profissionais, tampouco encargos financeiros extras à instituição, o que se aponta como potencializadoras na adoção do *bundle* pelos profissionais de enfermagem da UTI.

DESCRITORES

Nutrição enteral
Terapia intensiva
Cuidados de enfermagem
Enfermagem baseada em evidências

RESUMEN

Objetivo: Construcción colectiva de un *bundle* de intervenciones enfermeras en pacientes hospitalizados en ambiente crítico bajo terapia de nutrición enteral, sostenido por la práctica basada en evidencias. **Método**: Investigación cualitativa del tipo Convergente Asistencial, que contó con la participación de 24 profesionales de enfermería de una Unidad de Cuidados Intensivos de un hospital público de Santa Catarina. La recolección de datos ocurrió de mayo a agosto de 2013, con entrevistas semiestructuradas y grupos de discusión. **Resultados**: Surgieron cuatro intervenciones que constituyeron el *bundle*: pHmetría para confirmación de la posición de la sonda al borde del lecho; fijación de la sonda; posición entérica de la sonda; y mantenimiento de la cabecera elevada a 30°- 45°. **Conclusión**: Las intervenciones elegidas no demandan incremento de la carga laboral de los profesionales, tampoco gravámenes financieros extras a la institución, lo que las señala como potencializadoras en la adopción del *bundle* por los profesionales enfermeros de la UCI.

DESCRIPTORES

Nutrición enteral
Terapia intensiva
Cuidados de enfermería
Enfermería basada en la evidencia

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INTRODUCTION

Enteral Nutrition Therapy (ENT) plays a key role in the state of intense lipid and protein catabolism, also called metabolic response to stress, a common state in the critically ill patient, mainly present in the acute phase of the disease. This metabolic reaction is considered physiological, because it is through protein mobilization that the injury repair and energy supply occur for the maintenance of organic functions.

However, the nutritional depletion in intensive care leads to a negative clinical outcome, because it changes the tissue composition and the function of organs and structures, impairs the immune response, compromises the healing process, predisposes individuals to nosocomial infections, increases the incidence of pressure ulcers, and thereby results in greater morbidity and mortality in the intensive care unit (ICU) [1-2].

Therefore, adequate nutritional support for critically ill patients is essential for reducing the impact of physiological stress, prevention or treatment of malnutrition, the individual's long-term recovery, and improvement in quality of life[3].

Thus, nurses play a fundamental role in the therapeutic success, because they are responsible for accessing the gastrointestinal tract, for the maintenance of this route, dietary administration, and response to problems inherent in therapy.

It is clear, however, that the complications related to the gastrointestinal devices are still frequent, especially in the intensive care environment. Here we highlight the prospective cross-sectional study, conducted in a private hospital in the city of Rio de Janeiro, which evidenced an annual incidence of unplanned feeding tube removal of 56%. In this study, the main causes associated to the event were related to the patient himself, and to the obstruction of devices[4].

However, in a study conducted in the inpatient units of a high complexity hospital in Argentina, between 2008 and 2009, of the 43 patients receiving ENT, 79.10% received it inappropriately. The nursing team was the main cause in 35.85% of these cases, due to problems complying with the starting time of the ENT, lack of information and consensus on the management of ENT, and lack of knowledge in the management of infusion pumps[5].

In this sense, there are various scientific publications intended to assist the development of safer and more effective practices in relation to enteral nutrition, such as those coordinated by the European Society for Parenteral and Enteral Nutrition (ESPEN) and the American Society for Parenteral and Enteral Nutrition (ASPEN). The guidelines of these associations stand out due to an incipient stage of clinical trials on enteral nutrition, which are considered more credible due to their methodological rigor. Thereby, the opinions of experts in the field, such as in the guidelines, have a prominent position when it comes to scientific evidence[6].

In this same context, the popularity of bundles stands out, which bring together a small package of recommended interventions that are scientifically well supported. Moreover, the choice of interventions that should compose a bundle takes into account their applicability and the compliance of the care team, making this tool valuable for achieving results in the short, medium and long term, in addition to improving care indicators[7].

Therefore, aiming to improve the nursing practice in ENT, to promote the development of safer care, and to disseminate the experience of evidence-based practice (EBP), this study aimed to: collectively construct a nursing intervention bundle for critical care patients in the intensive care unit receiving enteral nutrition therapy, supported by evidence-based practice.

METHOD

This was a qualitative, convergent-care study (CCS). This type of method emerges from the questions in the healthcare field and aims to resolve and reflect upon these needs, either by promoting a change of reality, introducing innovations, or by reconstructing knowledge and practices. Moreover, the CCS has among its principles the involvement of the researcher and participants in the research and care process, and uses four consecutive and interrelated steps, which are: design, instrumentation, scrutinizing, data analysis and interpretation[8].

Design relates to the creation and treatment of the idea, formulation of the question and research objectives. Instrumentation is the methodological decision in conducting the study, whereas scrutinizing is detailing the strategies for data collection. Finally, analysis and interpretation of the data collected are performed using a method selected by the researcher[8].

In the instrumentation phase, the context of this research was the ICU of a public hospital in Santa Catarina, Brazil, and data were collected from the professional nursing staff in the sector, regardless of their level of training. This team consisted of a head nurse, 18 nurses directly involved in care, 54 nursing technicians, and six nursing aides. For data collection, we used the following inclusion criteria: having been a member of the ICU nursing team for more than six months and being in professional practice during the period of data collection. Therefore, 24 professionals from the morning, afternoon and night shifts who previously agreed to participate in the research were part of the research, formalizing

acceptance by signing the Terms of Free and Informed Consent Form (TFIC).

Data collection occurred in two stages from March to August 2013, after approval by the Ethics Committee on Research with Human Beings of the Federal University of Santa Catarina, process no. 232492/2013, as stipulated in Resolution no.466/2012, by the National Health Council(9). The first stage was performed using semi-structured interviews, and the second stage was performed by means of discussion groups (DGs).

In the first stage, 12 professionals participated (five nurses, six nursing technicians, and one nursing aide). The guiding question was: *Talk about the nursing care for patients receiving enteral nutrition therapy in the intensive care unit.* It should be noted that new collection was interrupted due to theoretical saturation, at which point the researcher analyzes and understands that his stored data is enough to achieve the desired theoretical reflection regarding the object of study, and that the repetition of information will not improve it[10].

The interviews were conducted in a private area of the ICU, with a mean duration of 30 minutes, recorded and later transcribed. The data obtained in this step were essential to guide the discussion in the second stage of data collection, in which cited nursing interventions were confronted with the existing literature and presented to the group.

The DGs aimed to socialize the interventions obtained in the interviews and to reflect upon them, having as a reference the interventions described in the literature, and classified according to their level of evidence. Furthermore, the objective was to collectively elect which interventions would compose the bundle, based on the classification of the highest level of evidence and applicability in the context of healthcare practice. For the classification of the level of evidence, the proposal by Polit and Beck was used[11] (Chart 1).

Chart 1 - Classification of the scientific evidence proposed by Polit and Beck[11] - Florianópolis, SC, 2014

Level of evidence		Type of study
I	a	Systematic Review of Randomized Clinical Trials (RCTs)
	b	Systematic Review of non-Randomized Clinical Trials
II	a	Individual RCT
	b	Non-randomized trial
III		Systematic Review of correlational/observational studies
IV		Correlational/observational study
V		Systematic Review of descriptive, qualitative, physiological studies
VI		Individual descriptive/qualitative/physiological study
VII		Expert opinion, expert committees

Source: Polit and Beck[11]

Three DGs were organized and distributed in the morning, afternoon and night shifts, according to the availability of participants. The meetings were held in a classroom attached to the ICU, with each group participating in one of these. The DGs lasted approximately 57 minutes. Two groups had the participation of five people, and the third group had four professionals, totaling 14 participants, two of whom were in the first stage of data collection.

It should be noted that there was difficulty in conducting this last stage of data collection, since the team members could not be approached after their shifts because they had two jobs. Therefore, we decided to perform data collection during the ICU shift, with the connivance of the head nurse in the sector.

RESULTS

Several interventions were listed in the discussion group, as shown in Chart 2. However, the bundle was composed of four interventions. The interventions, reported both in the interviews and in the DGs, either had greatly diverse levels of evidence, or had no proven clinical evidence.

Chart 2 - Nursing interventions according to the level of evidence and selection by the participants during the first stage of data collection - Florianópolis, SC, 2014

Nursing interventions	Level of evidence	Status
Bedside gastric auscultation to confirm the tube position	CI*	Chosen by the 3 DGs
Bubbling in a cup of water	CI*	Refused by the 3 DGs
Observation of gastric aspirate.	VII	Chosen by the 3 DGs
Bedside pH monitoring of gastric aspirate for confirmation of the tube position.	Ib	Chosen by 2 DGs
Radiological confirmation of tubes positioned in the stomach and intestine	IIb	Chosen by 1 DG
Radiological confirmation only for tubes positioned in the intestine.	PNS**	Chosen by 2 DGs
Tube fixation.	VII	Chosen by the 3 DGs
Enteric tube positioning for all patients, except when contraindicated.	Ia	Chosen by 2 DGs
Position in lateral decubitus after obtaining enteral access	PNS**	Chosen by the 3 DGs
Start irrigation with distilled water 10 mL/h in a continuous infusion pump for the promotion of peristalsis and enteric positioning.	PNS**	Chosen by the 3 DGs
Performing X-ray within 6 hours of obtaining enteric access.	PNR**	Chosen by the 3 DGs

Continued...

...Continuation

Nursing interventions	Level of evidence	Status
Irrigate the tube with 10mL of distilled water every 6 hours, when the diet starts and when the diet is interrupted, before and between drug administration, and 20mL after drug administration.	PNR**	Chosen by 2 DGs
Keep the head of the bed elevated between 30° and 45°.	IIb	Chosen by the 3 DGs
Pause the diet for performing procedures when the patient needs to stay in the supine position for a long period.	VII	Chosen by the 3 DGs
Check residual gastric volume (RGV) every 6 hours for patients receiving diet.	VII	Chosen by 2 DGs

*Contraindicated
** Problem not solved

For the selection of interventions, we took into account the best scientific evidence found, the possibility of execution, considering the reality of the ICU, and the interventions chosen through consensus among the three DGs. Therefore, through this selection, four nursing interventions emerged to compose the bundle, as shown in Chart 3.

Chart 3 - Nursing interventions composing the nursing intervention bundle for ENT in the ICU, according to the level of evidence - Florianópolis, SC, 2014

Nursing interventions	Level of evidence
Bedside pH monitoring of gastric aspirate for confirmation of tube position	Ib
Stabilization of the tube	VII
Enteric position of the tube	Ia
Head of the bed elevated between 30° and 45°	IIb

DISCUSSION

In order to support the discussion of the four interventions that composed the bundle, we used the pertinent literature published between 2008 and 2013, classified as having a good level of evidence, according to the aforementioned hierarchical scheme proposed.

Bedside pH monitoring of gastric aspirate for confirmation of the tube position

Incorrect placement of gastrointestinal tubes is a complication characterized by inadvertent positioning of the device in the brain, respiratory tract, esophagus and gastroesophageal junction, representing a generally preventable occurrence of nursing care. In order to prevent it, nurses have several bedside techniques to verify tube positioning in addition to the radiological confirmation. However, it has been shown in the literature that some of those methods are not safe[12].

Gastric auscultation, ostensibly used in clinical practice, is a tool currently contraindicated for bedside assessment of tube positioning when performed to substitute radiological confirmation. Some studies identified audible air intake under the epigastrium even when the devices were inadvertently placed in the esophagus, thereby causing great risk of regurgitation and aspiration of gastric contents and diet to the respiratory system[13]. Another inefficient characteristic of this test is related to distinguishing between gastric positioning versus enteric positioning, because such an assessment is not possible solely through auscultation[14].

Thus, it is necessary to use other methods that allow the preliminary determination of the position of the gastroenteral device, when the procedure is performed at the bedside.

In this sense, the use of pH monitoring has been gaining strength because guidelines conceptualized in ENT state that the appearance and pH of the content aspirated through the tube can provide clues to the location of the gastrointestinal access, especially when attempting to distinguish between gastric and tracheopulmonary positions. Moreover, it has been shown to be more efficient in distinguishing between gastric and enteric positions than the auscultation method [14].

However, it should be noted that some authors claim that the method is not yet effective for detecting esophageal position, due to the possibility of aspiration of gastric reflux content. The use of H2 receptor antagonist drugs (Ranitidin® and Cimetidin®, for example), that raise gastric pH, also make it difficult to determine the exact location of the tube position. Another problem commonly encountered when using pH monitoring is not obtaining gastric aspirate via the tube, which makes it impossible to measure the pH and, consequently, the position of the tube[13].

Although there is neither a strong recommendation nor the global widespread use of pH monitoring, this technique has been considered a test suitable for use in clinical practice, standing out as the most secure and adaptable for different contexts of care among a range of bedside techniques[12,15].

Considering this, the team chose to adhere to pH monitoring as a bedside confirmatory test. However, it should be emphasized that radiography remains the sole method considered to be the gold standard for confirmation of the position of the gastrointestinal tube, where one can view the full trajectory of the device. However, this test entails frequent exposure to radiation, is not very accessible, and significantly interferes with the feeding system, since patients are maintained in a fasting state for an extended period of time, waiting for the migration of the tube through the gastrointestinal tract[15].

Stabilization of the tube

After obtaining access, it is essential to ensure that the tube remains in the correct place, preventing inadvertent

displacement. A radiographic test to confirm tube position obviously cannot be routinely obtained, so it is necessary to adopt strategies to ensure tube stabilization at its exit point, either via the oral or the nasal orifice. Therefore, it is necessary to mark the exit site of the enteral/gastric device upon initial radiography to assess the change in length of the external device, suggestive of displacement[14,16].

With regard to the data obtained during the DGs, the need to secure the nasoenteric/nasogastric tube to the nasal wing was a consensus among participants, changing the stabilization every 24 hours, and the ongoing assessment of the demarcation of proper positioning at the exit site of the device.

In cases of possible displacement (change in the external length of the tube), the participants cited the need for bedside testing in order to confirm tube positioning, with this intervention being scientifically recommended[14].

It is noted that the scientific evidence found was not strong regarding care of tube stabilization, and this was due to the lack of well-designed studies on the topic. However, this intervention still represents essential nursing care for clinical practice, and is recommended by several guidelines developed within ENT[14,16]. Therefore, despite its low scientific classification according to the assessment tool used, the team chose to keep this intervention in the bundle.

Enteric position of the tube

Although enteral nutrition is essential to the recovery of critically ill patients, when not contraindicated, the use of this route is associated with an increased risk of aspiration, and therefore pneumonia. Some studies have been conducted in order to define the safest way to feed patients who require a gastrointestinal device, and which strategies can be adopted to decrease the risk of aspiration, with an emphasis on the comparative studies between gastric positioning versus enteric positioning.

Gastric positioning is considered the most physiological environment for food, however, it is statistically more associated with gastrointestinal intolerance due to delayed gastric emptying and bacterial colonization of the stomach, by the accumulation of gastric volume. Thereby, enteral feeding has great potential in reducing the episodes of gastroesophageal reflux in the episodes of aspiration of gastric content and in the incidence of pneumonia, especially in patients with a decreased level of consciousness or sedation[17].

A systematic review and meta-analysis of 15 studies showed that the incidence of pneumonia was significantly lower in patients fed enterally (duodenum or jejunum) than in patients fed gastrically. However, with regard to the incidence of vomiting and aspiration, there was no difference between gastric or enteral positioning[17].

Another positive result found was a non-randomized clinical trial that tested the efficacy of a protocol for prevention of pneumonia in mechanically ventilated patients receiving their diet through enteral tube, which showed a lower incidence of pneumonia in patients receiving three specific interventions: elevation of the head to at least 30°, enteral tube positioning, and adherence to an algorithm for measurement and management of Gastric Residual Volume (GRV)[18].

In another observational study, the aim was to relate the incidence of pneumonia with the site of the enteral tube location. It showed that the rates of pneumonia were significantly lower in patients receiving diet from the second portion of the duodenum on[19].

Thereby, we can state that there is currently strong scientific evidence supporting the enteric position of the tube in the absence of contraindications, because it implies lower risk and incidence of gastric and pulmonary complications.

In the ICU where this study was performed, tubes used for gastric positioning, mainly for the purpose of draining, are made of PVC and are non-radiopaque. Occasionally these tubes are used for dietary infusion, even in intubated patients, which makes radiographic confirmation of correct placement of the device impossible. In order to enable the radiographic confirmation of the tube, and also aiming to reduce the risk of regurgitation and aspiration, the team chose to include this intervention in the bundle, in addition to suggesting that the PVC tubes are changed to enteral tubes (radiopaque) when dietary treatment begins.

Head of the bed elevated between 30° and 45°

There is evidence to support the statement that the maintenance of the patient with enteral/gastric tube feeding in supine position increases the incidence of gastroesophageal reflux and the risk for aspiration, therefore the risk for pneumonia[14]. Pneumonia, in turn, is considered the most recurrent healthcare-related infection in the ICUs, increasing the length of hospitalization, the healthcare costs, and impacting complications with potential health damage to the individual[20].

It is worth noting that it is not only the occasional aspiration of large volumes that contribute to the incidence of pneumonia, but the microaspirations that occur uninterrupted and quietly[21].

Therefore, maintaining the head of the bed elevated between 30° and 45° is essential for the prevention of aspiration, especially in mechanically ventilated patients receiving enteral feeding[13]. In addition, some authors also mention that positioning the patient in semi-fowlers position, 30º-45°, implies not only the reduction of the incidence of aspiration and pneumonia, but also has an effect on mortality, length of ICU stay, and duration of mechanical ventilation[22].

Here we highlight a study in five North American ICUs of different specialties, where a protocol of interventions was implemented on three fronts: maintaining the head of the bed at least 30°, enteric position of feeding tubes, and measurement and management of high rates of GRV. It was noticed that, after application of this set of interventions, there was a significant reduction in the frequency of aspiration (39.3% in the intervention group versus 88.4% in the control group) and in the incidence rates of pneumonia (19.3% in the intervention group versus 48.2% in the control group). Furthermore, patients in the intervention group received mechanical ventilation 1.5 fewer days, and stayed 1.9 fewer days in the ICU and 2.2 days fewer in the hospital, compared to the control group [18].

By understanding the effectiveness of this treatment, the participants of the DGs highlighted the importance of including the intervention in the bundle, also demonstrating knowledge about the scientific justification for this care.

Another point mentioned by the team was the need to pause the diet during the performance of procedures in which the patient remained in the supine position for a long period of time, thereby reducing the risks for possible aspiration, this intervention also being recommended by the guidelines in the field[14,16].

CONCLUSION

The method used in the construction of the bundle contributed to the engagement of the team in the research process and recognition of the importance of this instrument for clinical practice. Through CCS and DGs, it was possible to elucidate that professionals took a reflective and questioning role regarding their own practices.

It was observed that professionals held knowledge about the indication of nursing interventions frequently cited in the literature, such as tube stabilization and elevation of the head between 30° and 45°. However, they were unaware of interventions that were currently in the scientific community which also had strong scientific evidence, such as enteric tube positioning.

Finally, it is emphasized that the interventions chosen neither required additional professional workload nor extra charges to the institution, which are emphasized as potentiating the adoption of the bundle by nursing professionals in the ICU.

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