Esc Anna Nery 2018;22(2):e20170200

Indicators for best practices in glycemic control in the intensive care unit

Indicativos para melhores práticas no controle glicêmico em unidade de terapia intensiva

Indicativos para mejores prácticas en el control glicémico en una unidad de terapia intensiva

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Abstract

Objective: To understand the perception of the nursing team' regarding the management of the intensive glycemic control protocol in order to obtain better practices in glycemic control in the Intensive Care Unit of a University Hospital. **Method:** A qualitative, convergent care study carried out in an Intensive Care Unit of a university hospital. The data were collected through interviews and workshops and analyzed through thematic analysis. Thirty nursing professionals participated in the study. **Results:** The importance of the glycemic control protocol which standardizes and guides care was reported by the participants, however they indicated that the used protocol is confusing, difficult to understand and does not include some important guidelines. Restructuring was recommended by adding aspects such as: the desired glycemic value, spaces between glycaemia recording, diet and others; as well as training for its application. **Conclusion:** The participants recognized the weaknesses of the protocol, and reaffirmed the potentialities of this instrument and defended permanent education as a fundamental factor for the best practices in intensive care.

Keywords: Nursing Care; Hyperglycemia; Intensive Care Units; Insulin Infusion Systems.

Resumo

Objetivo: Conhecer a percepção da equipe de enfermagem quanto ao manejo do protocolo de controle glicêmico intensivo, com vistas a obter melhores práticas no controle glicêmico na Unidade de Terapia Intensiva de um Hospital Universitário. **Método:** Estudo qualitativo, convergente assistencial, realizado em Unidade de Terapia Intensiva de um hospital universitário. Os dados foram coletados através de entrevistas e oficinas e analisados por meio da análise temática. Participaram do estudo 30 profissionais de enfermagem. **Resultados:** Relatam a importância do protocolo de controle glicêmico, que padroniza e guia a assistência, entretanto referem que o protocolo utilizado é confuso, difícil de entender não contemplando algumas orientações importantes. Recomendam sua reestruturação acrescentando aspectos como: valor de glicemia pretendido, espaçamento entre glicemias, dieta e outros; bem como capacitação para sua execução. **Conclusão:** Reconhecem as fragilidades do protocolo utilizado, reafirmam as potencialidades desse instrumento e defendem a educação permanente como fator fundamental para as melhores práticas em terapia intensiva.

Palavras-chave: Cuidados de Enfermagem; Hiperglicemia; Unidades de Terapia Intensiva; Sistemas de Infusão de Insulina.

Resumen

Objetivo: Conocer la percepción del equipo de enfermería sobre el manejo del protocolo de control glicémico intensivo, con el objetivo de obtener mejores prácticas en el control glicémico en la Unidad de Terapia Intensiva de un Hospital Universitario. **Método:** Estudio cualitativo y convergente asistencial realizado en una Unidad de Terapia Intensiva de un hospital universitario. Los datos fueron obtenidos através de entrevistas y talleres y analizados através del análisis temático. Participaron del estudio 30 profesionales de enfermería. **Resultados:** Relatan la importancia del protocolo de control glicémico que estandariza y guía la asistencia. Sin embargo, refieren que el protocolo utilizado es confuso, difícil de entender y no contempla algunas orientaciones importantes. Recomiendan su reestructuración agregando aspectos como: valor de glicemía pretendido, espaciamiento entre glicemías, dieta y otros, y la capacitación para su ejecución. **Conclusión:** Reconocen las fragilidades del protocolo utilizado, reafirman las potencialidades de este instrumento y defienden la educación permanente como factor fundamental para mejores prácticas en terapia intensiva.

Palabras clave: Cuidados de Enfermería; Hiperglicemia; Unidades de Terapia Intensiva; Sistemas de Infusión de Insulina.

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Submitted on 07/19/2017.
Accepted on 02/08/2018.

DOI: 10.1590/2177-9465-EAN-2017-0200

INTRODUCTION

Hyperglycemia frequently occurs in critically ill patients. It is characterized by insulin resistance and the release of stress hormones and is related to increased morbidity and mortality, increased time of use of mechanical ventilation (MV) and hospitalization in an Intensive Care Unit (ICU) as well as higher infection rates.[1]

Intensive blood glucose control in the ICU has been a matter of debate and controversy over the last decade, especially after the study published by Van den Berghe in 2001, in which it was verified that the control of glucose through the use of intravenous regular insulin protocol decreased the mortality and morbidity of surgical patients hospitalized in the ICU. The study population included 1,548 patients from a single center. The intensive control group had a blood glucose target of 80-110mg/dl, whereas the conventional group had a target of 180-200mg/dl, and the insulin infusion was started with a glycaemia greater than 215mg/dl for both groups. With this intensive control, a mortality reduction of 3.4% and a reduced number of organ failure and sepsis was obtained.[2]

Recommendations for intensive glycemic control were recognized and incorporated by 16 professional societies, including the American Diabetes Association (ADA), American Association of Clinical Endocrinologists (AACE), and Surviving Sepsis Campaign (SSC) and in 2006 the benefits of glycemic control in a study carried out with 2,000 non-surgical patients of an ICU were confirmed.[3]

Later studies have shown that intensive glycemic control, with blood glucose targeting between 140 and 180mg/dl, through the use of a clinical protocol, results in greater safety, with less risk of hypoglycemia. Thus, about 46% of British ICUs changed their intensive glycemic control policy by adopting this target limit.[4]

Current indications about the glycemic control range in critically ill patients do not preclude further multicenter studies, including a larger number of patients to define the ideal target range of blood glucose for intensive glycemic control at the best risk-benefit ratio. However, accurate glucose measurements and insulin administration protocols should be standardized to avoid heterogeneity in the outcomes.[5]

In the ICU of the hospital under study, an insulin protocol for intensive glycemic control prepared by the medical area based on the Van den Bergerg study was used.[2] This intravenous regular insulin protocol provides information about glycemic control, target glycaemia values, and guidelines regarding the gauge intervals to be used. However, it is evident in daily practice that the nursing team questions the conduct and the guidelines of the protocol itself, demonstrating difficulties and nonautonomy in its application.

The existence of different interpretations among the members of the team regarding the application of the protocol causes dependence on medical consultation and prolongs the time of reaching the target glycaemia.

The limits reported by study participants are also observed in other studies, whereby the authors describe difficulties in using protocols, stating that most are complex, confusing, and prone to errors.[6,7]

They highlight the fact that the team did not participate in the construction of the protocol, and the lack of training. They report that a highly involved and motivated team is essential for the successful implementation of a protocol.[8,9]

Although there are limitations, the protocol is a tool for the safe practice regarding glycemic control. To achieve the ideal of applying an intensive glycemic control protocol, it is fundamental that the nursing team fully understands this instrument, be confident in its handling and procedures, in order to offer safe and quality care to patients.

Considering this, the objective of the study was: To understand the perception of the nursing team regarding the management of the intensive glycemic control protocol, with a view to obtaining better practices in glycemic control in the Intensive Care Unit of a University Hospital.

METHOD

A qualitative study, carried out in an ICU of a general University Hospital in a state capital of Southern Brazil. The principles of the Convergent Care Research (PCA) were used, which consists of maintaining a close relationship with the practice of care, proposing solutions or minimizing existing problems by interceding in the reality and utilizing suggestions for changes and innovations.[10]

Thus, when identifying the difficulties in nursing care regarding following the protocol for the intensive glycemic control of critically ill patients in the ICU, we propose the present study, which was carried out between September and December 2014. Data collection was done through semi-structured interviews and reflective workshops.

The study involved the participation of 30 (42.8%) nursing workers in the studied ICU; 28 professionals participated in the interview stage, 13 of whom also participated in reflective workshops. Two workers participated only in the workshops, totaling 15 participants in the workshops.

The subject choice was intentional, and the inclusion criteria consisted of nursing professionals who had been working in the unit for more than a year, during the various work shifts. Seven nurses, 17 nursing technicians and four nursing assistants were interviewed in the morning, afternoon and three night shift teams. Exclusion criteria was any nursing professional who was on vacations or medical leave.

The interview phase was completed when the findings began to repeat and the participants no longer presented new situations that contributed to the study result.

The interviews were conducted individually at the participants' workplace and addressed issues related to the used protocol. The interviews lasted for an average of 20 minutes. The

responses were recorded on a digital voice recorder, with prior consent being granted by the participants. The data collected in this stage of the research were transcribed and organized, and went through a first analysis for presentation at the workshops stage in order to stimulate reflection and the collective formulation of proposals for protocol adjustment.

The second stage of data collection was performed through the use of workshops, with the purpose of presenting and discussing the interview findings, as well as allowing participants to reflect on the theme. The expectation at this stage of the study was to provide opportunities to exchange experiences and to discuss the use of the protocol, in order to contribute to better practices in the unit for the educational potential that involves this modality of research. In order to do so, we invited all the nursing workers from the ICU. Two workshops were held, one in the morning and another in the afternoon, each workshop lasted at most 2 hours in duration. 15 professionals participated in this stage, from these 15, six participated in the morning and nine in the afternoon. The workshops were conducted by one of the researchers and took place in the workplace.

Each meeting was organized by welcoming the participants, and started with recapping the research objectives, presentation and discussion of the synthesis of the interview results, and a review of the suggestions for updating the nursing guidelines in the protocol. In this way, the workshops were also considered as an opportunity for data collection, since in the discussion some new situations appeared that were included in the result. An evaluation of the workshop was done at the end of each workshop.

The workshops were recorded on a digital voice recorder with the authorization from study participants, as well as annotations by a member outside the group.

After completing the two steps, the data from the interviews and workshops went through a final stage of analysis with data interpretation. Thematic analysis was used in which the data of the interviews and the workshops previously transcribed were interpreted through exhaustive reading, separately and then together. The information was grouped by affinity, through frequent phrases, keywords or paragraphs, from which two categories of analysis emerged. The related information was grouped and presented in percentages demonstrating its importance to the study.

The analysis categories highlighted suggestions for the reformulation of the nursing guidelines in the application of the intensive glycemic control protocol.

The final interpretation of the data was performed, including the literature review. The study project was submitted to the institution for approval and was approved by the Ethics Committee (CEPSES-SC) and the Certificate of Presentation for Ethical Consideration (CAAE), approved by the Ethics Committee of the State Secretariat of Health of Santa Catarina (CEPSES-SC) No. 35876314.0.0000.

It complied with the requirements established by Resolution 466/12 of the National Health Council (CNS) and other complementary resolutions that provide guidelines and norms that regulate research involving human beings. All the participants signed the Informed Consent Form (TCLE) and their names were replaced by the first letter of the profession, followed by numbers in ascending order, thus, nurses were assigned the letter E followed by number (E1, E2 ...), nursing technicians (T1, T2 ...) and nursing assistants (A1, A2 ...).

RESULTS AND DISCUSSION

By identifying the nursing actions for the care of the patients using intravenous regular insulin, it was possible to capture the perception of the nursing team that works with and experiences the particularities of these actions on a daily basis. The analysis of the interviews and the workshops allowed the elaboration of two categories: **Team perception** regarding the management of the glycemic control protocol and the indicators for the improvement of the protocol.

Perception of the nursing team regarding the management of the glycemic control protocol

According to the study participants, the existing protocol is an important care guideline because it contributes to faster glycemic control and serves as a guide in care practice, however, this instrument presents weaknesses that may compromise the safety of the patient. Thus, they advocate the use of the protocol for the care of patients using intravenous regular insulin in the ICU.

> *It is very important, it facilitates care and glycaemia control. (T2)*
>
> *It guides our care very well, making it easier and safer for both the patient and the team that is working. (E1)*
>
> *My experience is good [...] I think it standardizes the care. (T15)*

According to the participants, 46.42% (14) referred to the protocol as a facilitator for care and 38.13% (11) believe that it enhances their autonomy and contributes to patient safety. These aspects, which are considered as facilitating factors of use, are characterized mainly by the standardization of medical conducts.

> *Having a protocol that gives autonomy to correct hyperglycemia is important for sure. [...] this autonomy of control and correction efficiency is important and also has legal backing. (E4)*
>
> *We have a guide that will not have a change in conduct between one doctor and another, or between one team and another. (E1)*

However, all the participants of the study had difficulties in the application of the existing protocol, considering it difficult to understand, with confusing guidelines which need to be adapted in order to provide better care, with a focus on patient safety.

> *[...] the guidelines are a bit confusing; I think it should be rewritten in a clearer way. (T16)*

To understand the participants' positions, it is necessary to briefly describe how the guidelines of the current institutional protocol are described. The objective of the protocol is to maintain glycaemia between 110 - 180mg/dl, a very wide range, which hinders a consensus among medical professionals regarding achieved level. The protocol is described using four columns, with ten rows in each column including the insulin levels that are to be infused according to the blood glucose result, as well as the interval time between one check and the other. It also provides guidance in relation to the infusion rate and how to proceed in case of hypoglycemia (Table 1).

With these characteristics, the lack of practicality of the protocol is highlighted as a difficulty, which present tendencies that confuse the professional who uses it, as well lacking some necessary information.

Both in the interviews and in the workshops, the difficulties that the nursing team finds in the application of the intensive glycemic control protocol were observed, these difficulties are related to the uncertainty in interpreting the protocol; aspects not covered by the protocol; IV therapy involving IR administration; difficulties related to lack of material and lack of training to apply the protocol.

They highlight that the greatest difficulty in relation to the protocol is the interpretation of nursing guidelines, of which 46.42% (14) report is confusing, providing several interpretations.

> *In reality, people do not know the purpose of the protocol, when it changes column and also when to turn it off, is it to check in the next hour and then, never again? (T11).*
>
> *I see that there is a lot of divergence between one professional and another, they don't really know what range of glycemic normality is desired and, sometimes, they decide what ideal glycemic they want to use at that moment. (T5).*

Other aspects are related to the orientation to change the interval of blood glucose checks, which is confusing for 67.85% of the participants, and 50% (15) were in doubt regarding which column of the protocol should be followed in the dose change of IR to be infused. For 10.71% of the interviewees the protocol is not clear regarding how and when to restart the IR infusion, if it is turned off.

> *The difficulty is in the matter of the column change, because this always diverges from one professional to another, from nurse to nurse, so sometimes, "you" stay in that, change the column, do not change, go back and forth, the standard is never followed, each one does it their way. (T14)*
>
> *I never know when to check every two hours or every four hours. "I'm always asking the nurse. I don't understand it yet. (T13)*

Continuing on the subject of difficulties related to aspects that are not addressed in the protocol, 10.71% (3) report that the protocol does not predict what to do when the parenteral nutrition is turned off.

Table 1. Guide for intensive blood glucose control

COLUMN 1		COLUMN 2		COLUMN 3		COLUMN 4	
glycemia	**UIh**	**glycaemia**	**UI/h**	**glycaemia**	**UI/h**	**glycaemia**	**UI/h**
≤110	**Turned off**	**≤110**	**Turned off**	**≤110**	**Turned off**	**≤110**	**Turned off**
111-140	2.0	**111-140**	4.0	**111-140**	5.0	**111-140**	6.0
141-180	3.0	**141-180**	5.0	**141-180**	6.0	**141-180**	8.0
181-210	4.0	**181-210**	6.0	**181-210**	8.0	**181-210**	10.0
211-240	5.0	**211-240**	8.0	**211-240**	10.0	**211-240**	12.0
241-270	6.0	**241-270**	10.0	**241-270**	12.0	**241-270**	16.0
271-300	7.0	**271-300**	12.0	**271-300**	14.0	**271-300**	20.0
301-330	8.0	**301-330**	14.0	**301-330**	16.0	**301-330**	24.0
331-360	9.0	**331-360**	16.0	**331-360**	18.0	**331-360**	28.0
>360	10.0	**≥360**	18.0	**≥360**	20.0	**≥360**	30.0

Source: Archives of the Intensive Care Unit of the study, 2015.

There are no dietary guidelines, if they are NPO, if you can start insulin EV, because it could cause hypoglycemia. (T2)

Also for 10.71% (3) of the professionals, the current protocol does not explain what to do in cases of hypoglycemia, there is no guidance on hygiene at the site of capillary blood collection, nor on how to do blood collection when the perfusion is decreased, and for 3.75% (1), the protocol does not predict what to do when the patient is on hemodialysis.

[...] It does not explain what to do in cases of hypoglycemia. I administer two vials of glucose and then I do not know what to do, the protocol does not make it clear. (T8)

[...] another thing that is important is the hygiene of the site, if I can use alcohol or chlorhexidine, if I can't, if I use nothing, if I do not sanitize. I think this should be clearer. [...] and what are the observations to make capillary blood collection when the perfusion is reduced, what is the standard that I should follow, should I continue using this capillary blood or should I take as a conduit use the venous, or arterial. (E4)

[...] the question of hemodialysis, we take a break, but how long in advance should this break be, and the same for restarting (E4)

Another aspect addressed concerns the difficulties related to intravenous therapy involving IR.

There are doubts regarding the use of intravenous regular insulin, especially regarding the validity of insulin after dilution, drug interactions and, finally, the route of administration.

I have several doubts: first: drug interaction with intravenous regular insulin, if it requires the need to run in alone or not? (E4)

There is no orientation regarding the validity of the insulin in the serum. (T6)

As for the lack of material and/or organization of the medical records as a complicating factor for the implementation of the protocol, 7.14% (2) of the participants reported the lack of glucometers and the absence of a form in the patient's charts for the application of the protocol.

Another important aspect highlighted by the study participants is the lack of continuous training of the workers, which may compromise nursing care and pose risks to patient safety. The following statements clarify this condition:

[...] it (the protocol) did not have an explanation, training, it was put as if it were self-explanatory and in fact it is not. (E2)

It's a little complicated to understand, I think people are not trained adequately to use it (the protocol). (T5).

This study confirms the importance of the use of care protocols in the care of critically ill patients with hyperglycemia, and the need for continuous intravenous regular insulin. This result is in concordance with previous studies that address the protocol as an important and useful tool for glycemic control in critically ill patients. The use of this instrument promotes better cooperation among the interdisciplinary teams and provides greater confidence and optimization in the care of the insulin administration due to the standardization of conducts through an institutional protocol.[9,11]

The defense in relation to the use of protocols in the care of critically patients in the use of intravenous regular insulin for the benefit to the patient, for the efficacy and safety in reaching the goal of normoglycemia, without increasing the risks of hypoglycemia and for the understanding that it increases the autonomy in nurses and supports nursing is cited in several studies and was also cited by the workers in the study, especially nurses who consider that the use of the protocol facilitates care and also standardizes conducts.[5,9]

A study conducted at the Presley Trauma Center at the *Regional Medical Center in Memphis*, highlights that each institution should have its own institutional protocols for the care of the critically ill hyperglycemic patient. Thus, when assessing nursing adherence nursing to the elaborated protocol, approximately 90% nursing adhesion was obtained. In the evaluation performed, the nursing participants classified the protocol as easy to interpret, simple to perform and understood that it improves the safety of the team and the treatment effectiveness. The positive factors, reported by the authors, are closely related to the team's capacity to use them.[6]

In the prevention of hypoglycemia, it is recommended that the protocols provide for the nutrition plan of the patients.[7] Special care should also be taken for the decrease of insulin during periods when nutrition is interrupted.[9]

The World Health Organization (WHO) determines that hygiene at the collection site should be performed with 70% alcohol, and left to air dry. The skin should then be punctured by wiping the first drop with dry gauze in order to avoid contamination with tissue fluid or skin splitting using the next drop for the test. Regarding the site and collection, it is recommended to the fingers first and in the latter case to use the earlobe.[12] Other authors highlight that patients with decreased peripheral perfusion present the proportion of glucose in the lower periphery, consequently the

glucose levels in this area are significantly lower, and arterial or venous blood collection should be chosen.[13,14] The order of choice for cases of decreased peripheral perfusion should be: arterial blood as the first choice, followed by venous blood, and finally capillary blood.

Concern with the infusion time of the regular insulin cited by the participants also appears as a concern of authors who evaluated the validity of the action of the insulin solution using two intravenous infusion protocols. In the former, solution was established every 6 hours; in the second it was performed every 24 hours. The authors observed that there were no alterations or damages to the patients and that they did not present hypoglycemia and the desirable glycemic level was reached in both situations, thus justifying the exchange of solution every 24 hours due to saving the nurses time and decreasing material costs.[15]

In relation to the concerns raised by the participants regarding drug interactions and IR EV is corroborated with authors presenting the drugs incompatible with insulin, which, therefore, should not be administered in the same way as the infusion catheter. These drugs include amikacin, atracurium, phenytoin, levofloxacin, piperacillin/sulbactam, sulfamethoxazole/trimetropine, chlorpromazine, diazepam, haloperidol, ondansetron, ampicillin, cefoxitin, gentamicin, midazolam, polymyxin B, hydralazine and ranitidine.[16]

The unavailability of sufficient/adequate material and the lack of a permanent education plan for professionals and the non-participation of the nursing team in the formulation of the protocol negatively influences the work of the team and the use of the protocol.[17,18]

Reflections and indicators for the improvement of the protocol

The inadequacies of the protocol perceived by the participants of the study made them reflect and present some indicators with the aim to promote changes in the existing protocol, making it more dynamic and practical, promoting safer and better quality care. Among the aspects to be modified in the current IR protocol, 23 out of the 30 participants in the study emphasized that rewriting the guidelines more clearly would solve this problem. Such guidelines related to specifying the desired glycemic level, improving the guidelines regarding the intervals between blood glucose checks and changing the volume of IR infusion.

Among the participants, 32.14% (10) considered it necessary to add the guidelines regarding diet intake and hemodialysis. However, for its effectiveness, 67.86% (20) highlighted the importance of training workers in order to practice safer care which is less susceptible to adverse events. Therefore, the meetings also served for this purpose as the existing doubts were already being resolved.

> *[...] guidance on drug interactions should be added because, I know they exist. But what are they? Also, make it clear how stable the insulin solution is after dilution? (E4)*
>
> *[...] I also think I should put the diet and hemodialysis because there is nothing about those. (E3)*
>
> *[...] specify the guidelines, so as not to have several interpretations, because it is confusing, especially the intervals between the blood glucose check times, also, to make the purpose of the protocol clearer*
>
> *There should be training, especially for the new employee who has some difficulties. (T14)*

According to the reflections, 10.71% (3) feel the need to place a copy of the protocol in a visible place in the ICU and in patients' charts, reinforcing the most important guidelines in bold font.

> *There should be a form on every clipboard and somewhere that would be accessible to everyone, on the wall, perhaps, something plasticized. (T4).*
>
> *I think the protocol should be rewritten by adding the information it does not have today and by rewriting the information that is confusing more clearly and also highlighting the most important information in bold font or in another color. (T1)*

The professionals' concern regarding the care in situations of hemodialysis or NPO are in line with research that highlights the need for increased attention to patients who are on continuous intravenous regular insulin and who are NPO or undergoing hemodialysis, because in these situations there is a high risk of hypoglycemia. It is necessary to observe if the patient is receiving an enteral diet, parenteral nutrition or serum glucose in order to proceed with the adjustment of insulin according to the medical orientation.[19]

Regarding drug interactions, we also observed indications for improved practices in the implementation of intravenous insulin therapy. The use of multi-lumen venous access lines leads to the reduction of hypoglycemic events, but may cause hypoglycemia when the access route is used simultaneously for the infusion of ''bolus'' medications. Other precautions include infusing the insulin with an infusion pump, use a central access, preferably an exclusive route, or, if the route is used for the administration of several medications, not to use this route for ''bolus'' medications and to be aware for drug interactions.[20]

These recommendations for improvements may also be observed in studies reporting that guidelines for the

implementation of the protocol should be easy to understand, easy to perform, and should cover all guidelines for each specific situation, such as hypoglycemia during hemodialysis sessions or while the patient is not receiving caloric intake. In these studies, it is also possible to observe the need to train the team so that they are always up to date and free from doubts when using the protocol.[7,9,19]

Even with all the difficulties presented by the participants, it is perceived that they believe that the protocol is the best way to promote glycemic control, and that with some adjustments and training it is possible to provide a comprehensive, effective and safe practice. Therefore, during the reflections the doubts were answered and the main suggestion for best practices was to rewrite the guidelines more clearly and including the aspects which were not previously addressed.

FINAL CONSIDERATIONS

The principle of maintaining the relationship between research and practice, with a view to finding solutions to real problems experienced in care and the production and introduction of innovations in care practice, respond to the need to produce nursing knowledge in the realities in which care takes place.

In this sense, convergent care research shows a direct relationship between the concerns of nursing professionals in the care of the critically ill patient receiving intravenous regular insulin in the ICU environment, and the scientific evidence present in the literature that deals with this theme. The positive opinion of the professionals regarding the use of a care protocol that guides this process was confirmed, as well as evidencing the need for improvements in the current protocol used in the service as the professionals involved in the study are aware of the deficiencies of the same.

The meetings allowed reflection on the practice and a new reorganization of the glycemic control protocol that can contribute in the reduction of difficulties that the professionals experience in their reality when using the existing protocol in the care of the patient in need of intensive glycemic control. The diverse contributions can serve as a stimulus for changes, which can translate into benefits for the team as well as for the patient, either by the role of the workers in defining the issues involved in implementing the protocol or in the motivation of these professionals, stimulating the initiative and the transformation of attitudes into daily practice.

Thus, while acknowledging the deficiencies of the protocol in daily practice, they reaffirm the potential of this instrument as an effective tool in the glycemic control of the critically ill patient. Based on this perspective, they highlight the necessary adjustments and defend permanent education as fundamental factors for best practices in the glycemic control of critically ill patients admitted to the ICU.

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