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ENDOTRACHEAL ASPIRATION IN CRITICALLY ILL PATIENTS: DEVELOPMENT AND VALIDATION OF A *CHECKLIST*

ASPIRAÇÃO ENDOTRAQUEAL EM PACIENTE CRÍTICO: ELABORAÇÃO E VALIDAÇÃO DE UM *CHECKLIST*

ASPIRACIÓN ENDOTRAQUEAL EN PACIENTES CRÍTICOS: DESARROLLO Y VALIDACIÓN DE UNA *LISTA DE VERIFICACIÓN*

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ABSTRACT

Objective: To develop and validate a checklist-type instrument to identify adherence to recommendations in the endotracheal aspiration procedure in critically ill patients under mechanical ventilation, according to the Clinical Practice Guidelines of the American Association for Respiratory Care. **Method:** Methodological, cross-sectional study with a quantitative approach. A checklist was elaborated for endotracheal aspiration procedures in critically ill patients under mechanical ventilation and submitted to the apparent and content validation process. Applied pre-test, with ten procedures and inter-observer reliability analysis, with a sample of 116 procedures from January to October 2021. **Results:** In the apparent and content validation phase, five judges evaluated the instrument. In the pre-test, the need for adequacy of the items was not identified, thus remaining the second version as the final version of the instrument, with 35 items. An inter-observer reliability analysis was carried out by two nurses, most of the items showed excellent agreement, with an index above 81%, demonstrating exact agreement in the readings by the two observers. Kappa coefficient values ranged from fair to perfect (0.338 to 0.982; $p<0.001$), and reliability was considered excellent (ICC= 0.918). **Conclusion:** The checklist is considered valid and reliable.

Descriptors: Suction; Critical Care; Patient safety; Intensive Care Units; Artificial Respiration.

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RESUMO

Objetivo: Elaborar e validar um instrumento, tipo *checklist*, para identificar a adesão às recomendações, no procedimento de aspiração endotraqueal, em pacientes críticos sob ventilação mecânica, segundo as Diretrizes de Práticas Clínicas da *American Association for Respiratory Care*. **Método:** Estudo metodológico, transversal e com abordagem quantitativa. Realizou-se a elaboração de um *checklist* para procedimentos de aspiração endotraqueal, em pacientes críticos sob ventilação mecânica, submetidos ao processo de validação aparente e de conteúdo. Foi aplicado pré-teste, com dez procedimentos e análise de confiabilidade interobservadores, com a amostra de 116 procedimentos, no período de janeiro a outubro de 2021. **Resultados:** Na fase de validação aparente e de conteúdo, cinco juízes avaliaram o instrumento. No pré-teste, não se identificou a necessidade de adequabilidade dos itens, permanecendo, assim, a segunda versão como a versão final do instrumento, com 35 itens. Foi realizada análise de confiabilidade interobservadores, por dois enfermeiros, sendo que a maioria dos itens apresentou força de concordância ótima, com índice acima de 81%, demonstrando exato acordo nas leituras pelos dois observadores. Os valores do coeficiente Kappa variaram de regular a perfeito (0,338 a 0,982; p<0,001), e a confiabilidade foi considerada excelente (ICC= 0,918). **Conclusão:** O *checklist* é considerado válido e confiável.

Descritores: Sucção; Cuidados Críticos; Segurança do Paciente; Unidades de Terapia Intensiva; Respiração Artificial.

RESUMEN

Objetivo: Desarrollar y validar un instrumento tipo lista de verificación para identificar la adherencia a las recomendaciones en el procedimiento de aspiración endotraqueal en pacientes críticos bajo ventilación mecánica, según las Guías de Práctica Clínica de la Asociación Americana de Cuidados Respiratorios. **Método:** Estudio metodológico, transversal con enfoque cuantitativo. Se elaboró una lista de verificación para los procedimientos de aspiración endotraqueal en pacientes críticos bajo ventilación mecánica y se sometió al proceso de validación aparente y de contenido. Pretest aplicado, con diez procedimientos y análisis de confiabilidad interobservador, con una muestra de 116 procedimientos de enero a octubre de 2021. **Resultados:** En la fase de validación aparente y de contenido, cinco jueces evaluaron el instrumento. En el pre-test no se identificó la necesidad de adecuación de los ítems, quedando la segunda versión como la versión final del instrumento, con 35 ítems. Se realizó un análisis de confiabilidad interobservador por dos enfermeros, la mayoría de los ítems presentaron excelente fuerza de concordancia, con índice superior al 81%, demostrando concordancia exacta en las lecturas de los dos observadores. Los valores del coeficiente Kappa variaron de regular a perfecto (0,338 a 0,982; p<0,001), y la confiabilidad fue considerada excelente (ICC= 0,918). **Conclusión:** La lista de verificación se considera válida y confiable.

Descriptores: Succión; Cuidado crítico; Seguridad del paciente; Unidades de Cuidados Intensivos; Respiración Artificial.

INTRODUCTION

Patient safety continues to be a major challenge for health services, as more and more publications appear that reflect on the effectiveness of safe care. The search for strategies, based on offering quality care that is free from harm, is a growing discussion among professionals and managers of health institutions.[1,2]

Critical patients admitted to Intensive Care Units (ICUs) are more exposed to iatrogenic events that compromise their safety, as they require complex care, present clinical instability and constant interventions carried out by health professionals.[3.4]

Among the most complex care provided is assistance to patients maintained under Mechanical Ventilation (MV). The objective of MV is to partially or completely replace the patient's spontaneous ventilation, ensuring gas exchange and reducing respiratory work for those who are unable to maintain their respiratory functions.[5.6]

MV can occur invasively and non-invasively. The invasive form occurs through an endotracheal tube or tracheostomy cannula. The orotracheal tube makes it impossible for the patient to voluntarily mobilize and expel bronchial secretions, therefore, the only way to remove them is through Endotracheal Aspiration (ETA).[7]

This procedure is widely used in the care of patients in critical condition, admitted to the ICU and using an artificial airway with ventilatory support. However, it exposes the patient to serious risks such as: hypoxemia, bradycardia, mucosal trauma, atelectasis, discomfort, pain, drop in arterial oxygen saturation, nosocomial pneumonia, infections, hypertension, increased intracranial pressure and hemodynamic instability.[8]

Recent studies have identified the existence of knowledge gaps among professionals regarding the ETA procedure, demonstrating the need for educational activities to improve the development of the practice and prevent harm to patients.[6,9,10]

Research reveals that, although there is scientific evidence for the safe and efficient performance of ETA, the team does not adopt the recommendations in their clinical practice, which can cause harm and the patient's involvement in their treatment. Furthermore, teams are insecure when carrying out the procedure.[11-13]

Despite knowledge about potential complications, providers fail to adhere to best practice guidelines.[5]

An internationally carried out study states that, even though scientific evidence on ETA is available, it is not being implemented in clinical practice.[14]

The ETA procedure must be carried out carefully and judiciously, based on best practices, so that it does not cause harm to patients. The nurses and physiotherapists who perform the procedure must be trained in order to provide quality care and minimize possible complications from the procedure.

The American Association for Respiratory Care (AARC) Clinical Practice Guidelines is a guideline developed by the American Association for Respiratory Care to guide the performance of the endotracheal

suction procedure in critically ill patients under mechanical ventilation (AARC, 2010). Since there are no instruments in the literature that allow identifying adherence to these guidelines, the idea of a checklist was formulated.

Research like this can contribute to support the development of clinical practice guidelines, protocols and manuals, which aim to improve the execution of the endotracheal aspiration technique, in intubated patients under mechanical ventilation, for the effectiveness of maintaining airway clearance, providing systematized and safe care, reducing risks and complications.

Therefore, the aim of this study was to develop a valid and reliable instrument to identify adherence to the recommendations of the American Association for Respiratory Care Clinical Practice Guidelines for the endotracheal suction procedure in critically ill patients under mechanical ventilation.

METHODS

This is a methodological, cross-sectional study with a quantitative approach. This study was carried out in two stages. The first stage was characterized by the elaboration of the instrument and, subsequently, there was apparent and content validation. In the second stage, the pre-test and inter-observer reliability were carried out,from January to October 2021.

The field of study for applying the pre-test and reliability analysis took place in the Intensive Care Units (ICUs), in a large public teaching hospital, which offers highly complex care. The choice of this institution is due to the fact that it is a hospital that cares for critical patients, who are more susceptible to physiological changes and require highly complex care.

The instrument was developed based on the Clinical Practice Guidelines of the American Association for Respiratory Care[15] and scientific evidence from the literature[5,6,11,16] that deal with recommendations for performing the endotracheal aspiration procedure in critically ill patients under mechanical ventilation.

The first version of the prepared checklist comprised 35 items, divided into two parts, with part I comprising the characterization of participants/vital and ventilatory parameters. Part II of the checklist consists of the aspiration technique (criteria assessed before, during and after performing the ETA procedure). The items were structured with the options: 1- yes, 2- no and 3- not applicable.

For apparent and content validation, nine experts were invited, with doctorate degrees (judges) and experience in the area of the study topic, verified through

consultation in the Lattes database. An invitation to participate in the instrument validation stage was sent by email. After accepting and signing the Free and Informed Consent Form (TCLE), in two copies, they were returned by email. A document containing the description, purpose and objectives of the research was also sent, with the instrument for validation, with 35 items, which was returned, via email, within an estimated period of 15 days. The four judges who did not respond to the invitation to participate in the study and did not return the instrument evaluation in a timely manner were excluded.

The judges verified whether the proposed items adequately represented the object of study, the adequacy of the semantic structure, clarity, ease of reading and understanding of the items. After this evaluation, the instrument was returned to the researchers to analyze the observations and proposed suggestions.

A pilot test was carried out with the observation of ten endotracheal aspiration procedures, with the purpose of estimating the collection time, as well as evaluating the suitability of the instrument. The ten observations mentioned above were not included in the final observations.

In this study, the interobserver consistency assessment method was used, by using the checklist simultaneously and independently, the observers, two nurses, identified whether the AARC recommendations for ETA procedures in critically ill patients under MV were followed by professionals. health professionals (nurses and physiotherapists) who performed the aspiration procedure.

The selection of observers was based on the availability of time for data collection among professional nurses, members of the Study and Research Group on Evidence-Based Practice and Patient Safety in the Care Process, and their availability to carry out prior training regarding the instrument and its applicability.The two selected nurses observed all evaluated procedures.

The checklist was recorded by checking the items: yes, followed the recommendations; did not follow the recommendations; not applicable. And, without interference, non-participatory observation and monitoring were carried out throughout the procedure, maintaining a distance of one meter between the patient and the professional. The observers received prior training regarding the instrument and its applicability, and carried out an applicability test.

To assess the strength of the relationship between observations, the equivalence or agreement index was calculated. The strength of the relationship between observations was determined by the Kappa Coefficient and the Intraclass Correlation Coefficient (ICC), which

verified the power of agreement between the generated scores17. In this study, simple Kappa and ICC were calculated, considering a significance level α = 0.01.

The sample size calculation, for interobserver reliability analysis, considered an expected intraclass correlation coefficient of ICC = 0.90, between the scores, assuming that it is not lower than ICC = 0.80, for a power of 90%, and considering a significance level α = 0.01. With these a priori values, using the PASS 2013 application (Power Analysis and Sample Size), a minimum sample size of n=95 ETA procedures was obtained, however 116 ETA procedures were observed.

Critical patients were observed, aged 18 years or over, conscious or unconscious, of both sexes, admitted to the ICU and who underwent the ETA procedure. Critical patients admitted to the ICU and who were not under mechanical ventilation, and those who did not undergo the ETA procedure, were excluded. The health professionals (nurses and physiotherapists) who performed the endotracheal aspiration procedures knew that they were being observed, however, they were not informed about which procedures were being observed. It should be noted that the information about the observation was given to the person responsible for the unit and strictly followed the recommendations of the Research Ethics Committee.

The data were entered by double typing, stored in an Excel® spreadsheet and transported to the Statistical Package for the Social Sciences® (SPSS) statistical program. For the analysis of categorical variables, tables of absolute and relative frequencies were used and for quantitative variables they were summarized, using measures of central tendency (mean and median) and variability (ranges and standard deviation).For the reliability analysis, in the assessment of inter-observer consistency, the equivalence or agreement index was calculated. The values were determined by the Kappa Coefficient and the ICC. In addition to these two statistical tests, the proportion of agreement between observers was also calculated.To determine the total adherence score between the two observers, scores were generated for each procedure evaluated. This score was obtained by counting responses with a score of 1 (one), a score referring to the answer: “yes, the recommendation was followed” plus the item (not applicable), divided by the total number of items in the instrument, according to the following formula: [number of yes + number of not applicable / (number of valid items) *100], resulting in a score expressed as a percentage.

This study is part of a larger project, entitled “Critical patient safety in the endotracheal aspiration procedure”, approved by the Research Ethics Committee.

RESULTS

The first version of the instrument developed, which was called “Checklist for Endotracheal Aspiration Procedure in Critical Patients under Mechanical Ventilation”, was sent to nine experts (judges). There was feedback from five judges who made suggestions regarding the content and sequence of items considered relevant to patient safety in the ETA procedure in critically ill patients.The descriptions of the items were reformulated, and all the judges' suggestions were incorporated, since the authors considered all the considerations pertinent, the instrument continued with 35 items.

In the pilot test, the checklist application time varied between 10 and 15 minutes, and the need for item suitability was not identified, thus remaining the second version as the final version of the instrument, with 35 items(Annex 1).

In the assessment of interobserver consistency, 116 procedures were observed, with 33 (28.4%) of the patients being female, and 83 (71.6%) being male. The length of stay intubated, from the date of data collection, ranged from one to 12 days.

To analyze agreement between observers, the proportion of agreement as well as Kappa were calculated for each item of the constructed instrument. It was observed that the majority of items presented excellent agreement strength, with a rate above 81%, demonstrating exact agreement in the readings by the two observers. It was evident that the instrument's items were understandable and reliable when applied to the observed context.

Kappa coefficient values ranged from regular to perfect (0.338 to 0.982; $p<0.001$) and, in items where there was 100% agreement, the Kappa coefficient was not calculated, as perfect agreement occurred. The proportion of agreement of the evaluated items is presented descriptively in Table 1.

Table 1 -Analysis of the interobserver reliability of the *checklist* for the endotracheal aspiration procedure in critically ill patients under mechanical ventilation, Uberaba/MG, 2021

Items	Observer 1			Observer 2			Proportion of agreement (%)	Kappa	p-value
	Yes n (%)	No n (%)	NA* n (%)	Yes n (%)	No n (%)	NA* n (%)			
1	116 (100)	0	0	115 (99.1)	1 (0.9)	0	99.13	_	_
2	116 (100)	0	0	116 (100)	0	0	100.00	_	_
3	111 (95.7)	5 (4.3)	0	111 (95.7)	5 (4.3)	0	98.27	0.791	<0.001
4	95 (81.9)	21 (18.1)	0	97 (83.6)	19 (16.4)	0	84.48	0.457	<0.001
5	21 (18.1)	95 (81.9)	0	22 (19)	94 (81)	0	97.41	0.914	<0.001
6	79 (68.1)	12 (10.3)	25 (21.6)	78 (67.2)	13 (11.2)	25 (21.6)	99.13	0.982	<0.001
7	116 (100)	0	0	116 (100)	0	0	100.00	_	_
8	116 (100)	0	0	115 (99.1)	1 (0.9)	0	99.13	_	_
9	7 (6)	1 (0.9)	108 (93.1)	11 (9.5)	1 (0.9)	104 (89.7)	94.82	0.676	<0.001
10	106 (91.4)	10 (8.6)	0	104 (89.7)	12 (10.3)	0	96.55	0.799	<0.001
11	102 (87.9)	14(12.1)	0	102 (87.9)	14 (12.1)	0	100.00	_	_
12	112 (96.6)	4 (3.4)	0	112 (96.6)	4 (3.4)	0	100.00	_	_
13	116 (100)	0	0	115 (99.1)	1 (0.9)	0	99.13	_	_
14	116 (100)	0	0	116 (100)	0	0	100.00	_	_
15	116 (100)	0	0	116 (100)	0	0	100.00	_	_
16	116 (100)	0	0	116 (100	0	0	100.00	_	_
17	116 (100)	0	0	116 (100)	0	0	100.00	_	_
18	116 (100)	0	0	116 (100)	0	0	100.00	_	_
19	71 (71.2)	37 (31.9)	8 (6.9)	71 (61.2)	38 (32.8)	7 (6)	85.34	0.716	<0.001
20	116 (100)	0	0	116 (100)	0	0	100.00	_	_
21	116 (100)	0	0	116 (100)	0	0	100.00	_	_
22	114 (98.3)	2 (1.7)	0	115 (99.1)	1 (0.9)	0	99.13	0.663	<0.001
23	114 (98.3)	2 (1.7)	0	114 (98.3)	2 (1.7)	0	100.00	_	_
24	8 (6.9)	2 (1.7)	106 (91.4)	8 (6.9)	0	108 (93.1)	97.41	0.702	<0.001
25	116 (100)	0	0	116 (100)	0	0	100.00	_	_
26	116 (100)	0	0	116 (100)	0	0	100.00	_	_
27	116 (100)	0	0	116 (100)	0	0	100.00	_	_

28	79 (68.1)	37 (31.9)	0	69 (59.5)	47 (40.5)	0	82.75	0.630	<0.001
29	116 (100)	0	0	114 (98.3)	2 (1.7)	0	100.00	_	_
30	116 (100)	0	0	116 (100)	0	0	100.00	_	_
31	78 (67.2)	10 (8.6)	28 (24.1)	75 (64.7)	10 (8.6)	31 (26.7)	97.41	0.948	<0.001
32	82 (70.7)	34 (29.3)	0	74 (63.8)	42 (36.2)	0	70.68	0.338	<0.001
33	108 (93.1)	8 (6.9)	0	110 (94.8)	6 (5.2)	0	98.27	0.848	<0.001
34	115 (99.1)	1 (0.9)	0	115 (99.1)	1 (0.9)	0	100.00	_	_
35	116 (100)	0	0	116 (100)	0	0	100.00	_	_

NA* - Not applicable.
Source: Authors, 2021.

In Table 2, the average adherence scores for each observer are presented, as well as the interobserver reliability, analyzed by the ICC. It was observed that the reliability of the instrument was excellent (ICC=0.918), with a statistically significant correlation (p<0.001).

Table 2- Measures of central tendency and variability for observer adherence scores and interobserver reliability analyzed by ICC. Uberaba/MG, 2021

Observers	Minimum	Maximum	Average	Median	SD*	ICCα	P
Observer 1	74.29	100.00	92.73	94.28	5.22	0.918	<0.001
Observer 2	80.00	100.00	92.26	91.42	4.82		

SD* - Standard deviation;
ICCα - Intraclass Correlation Coefficient.
Source: Authors, 2021.

DISCUSSION

This study developed a checklist for the ETA procedure in critically ill patients undergoing MV, based on the recommendations of the AARC (2010) and the evidence available in the literature. The main recommendations suggested in the clinical practice of health professionals specialized in ETA are:assessment of the need for aspiration,hand hygiene, in addition to the use of sterile technique,the diameter of the suction catheter that occludes less than half of the internal lumen of the endotracheal tube, the supply of oxygen before the procedure, adequate levels of negative pressure for suction, assessment of oxygenation, during and after the procedure,avoid the instillation of saline solution and also that the aspiration duration is not longer than 15 seconds.[15,16,18]

In the interobserver assessment of the Checklist for Endotracheal Aspiration Procedures in Critically Ill Patients Under Mechanical Ventilation, the item with the lowest agreement between observers was number 32, “Restart the enteral diet infusion”, which is credited to the fact that for some patients, the diet was not interrupted or, when interrupted, it was not restarted, immediately after the completion of the ETA procedure. The literature highlights that, before starting the ETA procedure, it is necessary to interrupt the enteral diet, as there may be a risk of vomiting and, consequently, bronchoaspiration. However, studies indicate that interruption of the diet is not carried out by health professionals, putting patient safety at risk.[11.16]

The ETA procedure in critically ill patients under MV must be carried out with specialized health professionals who know the possible beneficial and negative effects and who can mediate control and prevention measures that bring benefits to the patient. Thus, studies have already shown that the application of this technique, in addition to other care with MV and the artificial airway, must be based on scientific evidence, to

promote the patient's clinical evolution, in an appropriate manner.[11.19]

Considering the risks related to the frequency with which health professionals perform ETA on critically ill patients under MV, critical and periodic investigations are needed for the respective clinical practice. Therefore, specific non-conformities must be identified to improve the assistance provided in this situation, in which the identification of specific instruments is essential to support planning actions and interventions on site.[11]

The instrument developed consists of behaviors that must be incorporated by health professionals, during the ETA of critical patients, with the aim of guaranteeing safe care, preventing adverse events, contributing to patient safety and quality of care. Therefore, it went through the processes of apparent and content validation, pre-test and inter-observer reliability.

The growing number of validation instruments, mainly in the health area, available to evaluate specific phenomena is notable, which provides research assistance. These instruments have been fundamental, as they generate reliable results, in addition to high credibility to be put into practice to improve some treatment, or even adapt a methodology that generates satisfactory results.[20.21]

For the proper validation of an instrument, it is recommended that the respective techniques verify the validity of the instrument, through construct and even criteria and content. In this way, validation allows the chosen instrument to be improved, in addition to becoming reliable, precise, valid and decisive in its actions.[20.21]

The use of instruments, such as questionnaires or checklists, is extremely important when it comes to providing quality care, so that the validation of these instruments allows the healthcare team to obtain knowledge based on scientific evidence, resulting, above all, in the minimization of complications due to aspiration.[22]

The application of well-established standards and facilitated protocols that are duly validated are essential, as they allow the guidance of these specialized professionals, which include the necessary strategies for the correct execution of routine procedures.[23.24]

The existence of standardization favors standardizing procedures, as well as the content of necessary materials and their organization, providing the execution of an adequate procedure. Adopting the checklist aims to ensure everyone's safety, thus improving the work environment, with the presence of properly trained professionals, equipment and materials suitable for carrying out the procedure. Therefore, it is of fundamental importance to use a checklist in the ETA process, since it has a low cost to implement, improves the patient care process, humanizes assistance and trains professionals to recognize errors that can be avoided, during the procedure.[25]

Studies show that using the checklist reduces complications and death in patients, as

it improves the execution of safety processes.[26.27]

However, there are barriers that make it difficult for professionals to use such a tool, one of which may be related to the feeling that it is unnecessary to check some elements, as they present obvious answers. However, the redundancy of the list is an intentional factor, in order to remember to carry out minimal but necessary tasks. Furthermore, it is possible that the completion of the list is influenced by team members' perception of the relevance of security items. From this perspective, it is necessary for professionals to participate in educational programs, so that they are empowered on the appropriate use of the checklist and made aware of the importance of its application in reducing complications, which could improve adherence to this tool in its entirety.[28]

Study Limitations

The healthcare professionals who performed the endotracheal suction procedures knew that they were being observed, which could cause bias in the results. However, there was no interference in the results, as they were not informed about the procedures observed. This information was given only to the person responsible for the unit, following the recommendations of the Research Ethics Committee.

CONCLUSION

The Checklist for Endotracheal Aspiration Procedure in Critically Ill Patients Under Mechanical Ventilation is considered reliable, as it demonstrates optimal psychometric properties for its use in clinical practice. Kappa values ranged from regular to almost perfect, most items showed excellent strength of agreement, and the reliability of the instrument was excellent, with a statistically significant correlation.

The Checklist brings, in the construction of its items, the main aspects that represent the construct of patient safety, in the ETA procedure under MV, which allows researchers and health professionals to evaluate the care provided, in addition to subsidizing interventions that guarantee care safer, quality and free from harm.

Care, based on scientific evidence, as well as the use of reliable instruments is an approach that provides quality in health services, cost control and effectiveness in health care.

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APPENDIX 1

***CHECKLIST* FOR ENDOTRACHEAL ASPIRATION PROCEDURE IN CRITICAL PATIENTS UNDER MECHANICAL VENTILATION**

I - Characterization of participants / Vital and ventilatory parameters		
Data collection date:_____/____/_____	Time:	
Participant number:_____		
Gender:	1- Female ( )	2- Male ( )
Main diagnosis:		
Intubation time:		

Parameters (10 minutes) BEFORE the Endotracheal Aspiration (ETA) procedure

Vital parameters:
FC: _____
FR: _____
$Sat0_2$: _____
Blood pressure:_____

Ventilatory parameters:
$Fi0_2$: _____
PEEP: _____

Parameters DURING the ETA procedure (after insertion of the catheter in the ETT)

Vital parameters:
FC: _____
FR: _____
$Sat0_2$: _____
Blood pressure:_____

Ventilatory parameters:
$Fi0_2$: _____
PEEP: _____

Parameters AFTER the ETA procedure (after reconnecting the VM)

Vital parameters:
FC: _____
FR: _____
$Sat0_2$: _____
Blood pressure:_____

Ventilatory parameters:
$Fi0_2$: _____
PEEP: _____

Note: The parameters will be observed by the researcher who will be positioned close to the ventilator.

II - Aspiration Technique

Criteria evaluated - BEFORE performing the ETA procedure

Verifies the need to aspirate the patient, through auscultation of adventitious sounds or visualization of secretions in the Endotracheal Tube (ETT), changes in hemodynamic and ventilatory parameters:	1- Yes ( )	2- No ( )

Gather and organize all necessary material: Personal Protection Equipment (disposable cap, protective glasses, surgical mask and disposable apron), 01 pair of sterile gloves, sterile compresses or gases, sterile aspiration catheter, distilled water (DW) or saline solution (SS), extending rubber, tested vacuum source and collection bottle:	1- Yes ()	2- No ()	
3. Clean your hands before the procedure:	1- Yes ()	2- No ()	
4. Explain the procedure to the patient:	1- Yes ()	2- No ()	
5. Ensure patient privacy by installing screens on the sides of the bed.	1- Yes ()	2- No ()	
6. Interrupt enteral feeding:	1- Yes ()	2- No ()	3- Not applicable ( )
7. Test and adjust suction pressure (<150mmHg):	1- Yes ()	2- No ()	
8. Position the client in the Fowler position:	1- Yes ()	2- No ()	
9. Perform hyperoxygenation with 100% FIO2 (in cases of hypoxemia):	1- Yes ()	2- No ()	3- Not applicable ( )
Criteria evaluated - DURING the ETA procedure			
10. Use a disposable apron:	1- Yes ()	2- No ()	
11. Use a protective hat:	1- Yes ()	2- No ()	
12. Use protective glasses:	1- Yes ()	2- No ()	
13. Use a protective mask:	1- Yes ()	2- No ()	
14. Use sterile gloves:	1- Yes ()	2- No ()	
15. Use sterile catheter:	1- Yes ()	2- No ()	
16. Use a catheter with half the internal diameter of the TET:	1- Yes ()	2- No ()	
17. Uses suction pressure (< 150mmHg):	1- Yes ()	2- No ()	
18. Use a maximum vacuuming time of 15 seconds:	1- Yes ()	2- No ()	
19. Use distilled water (AD) or saline solution (SF) to fluidize secretions:	1- Yes ()	2- No ()	3- Not applicable ( )
. Perform superficial aspiration, introducing the catheter according to length of artificial airway plus adapter:	1- Yes ()	2- No ()	
21. Follow the tube, nose and mouth sequence:	1- Yes ()	2- No ()	
22. Wash the catheter and extension rubber with AD or SF to promote cleaning, when necessary:	1- Yes ()	2- No ()	
23. Connects the VM in the intervals from aspirations to patient stabilize their vital parameters:	1- Yes ()	2- No ()	
24. Performs hyperoxygenation with 100% FIO2 per hair least 1 minute (in cases of hypoxemia):	1- Yes ()	2- No ()	3- Not applicable ( )
25. Monitors vital and respiratory parameters (FC, FR, $FI0_{2\ and\ Sat02}$):	1- Yes ()	2- No ()	
Criteria evaluated - AFTER carrying out the ETA procedure			
26. Discard the catheter after aspiration:	1- Yes ()	2- No ()	
27. Protects the latex tip:	1- Yes ( )	2- No ( )	
28. Perform lung auscultation:	1- Yes ( )	2- No ( )	
29. Places the patient in a comfortable position:	1- Yes ( )	2- No ( )	

30. Evaluates vital and ventilatory parameters (FC, FR, $FI0_2$ and $Sat0_{2)}$:	1- Yes ( )	2- No ( )	
31. Restart the enteral diet infusion:	1- Yes ( )	2- No ( )	3- Not applicable ( )
32. Informs the patient about the end of the procedure:	1- Yes ( )	2- No ( )	
33. Properly remove PPE (disposable cap, glasses protective mask, surgical mask and disposable apron):	1- Yes ( )	2- No ( )	
34. Perform hand hygiene:	1- Yes ( )	2- No ( )	
35. Record the procedure in the medical record:	1- Yes ( )	2- No ( )	