RIASE
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PATIENTS RECEIVING TO HIGH FLOW NASAL OXYGEN THERAPY IN A POLYVALENT INTENSIVE CARE UNIT – A REALITY

PESSOA SUBMETIDA A OXIGENOTERAPIA NASAL DE ALTO FLUXO NUMA UNIDADE DE CUIDADOS INTENSIVOS – UMA REALIDADE

PERSONA QUE SE SOMETE A OXIGENOTERAPIA NASAL DE ALTO FLUJO EN UNA UNIDAD DE CUIDADOS INTENSIVOS POLIVALENTE – UNA REALIDADE

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ABSTRACT

Introduction: High-flow nasal oxygen therapy (HFNOT) is a respiratory support technique that supplies a mixture of heated, humidified air and oxygen. It is used to treat respiratory insufficiency, achieving high levels of comfort and, as a result, good treatment outcomes for the patient. Nursing care quality is a key factor in the success of this treatment.

Objectives: To identify the characteristics of patients receiving HFNOT in the intensive care unit and the complications occurring, and to identify the most appropriate nursing interventions in the care of these patients.

Methods: A quantitative, observational, descriptive, retrospective study was conducted with a sample of 32 patients identified in a review of clinical records.

Results: The sample included 32 patients receiving HFNOT during hospitalisation. The data analysis identified complications in 15.63% of patients, with the most relevant being discomfort, intolerance to temperature or noise, and pressure ulcers, justifying the early implementation of effective nursing interventions.

Conclusions: HFNOT is an effective technique in the care of patients with respiratory compromise. Its success depends on the implementation of high-quality nursing interventions during administration. Analysis of the data collected enables a proactive approach, seeking to optimise the technique and to prevent potential complications. This will contribute to improving care provision.

Keywords: Critical Care; High Flow Nasal Oxygen Therapy; Medical-surgical Nursing.

RESUMO

Enquadramento: A Oxigenoterapia Nasal de Alto Fluxo é uma terapia de suporte respiratório que entrega uma mistura de ar e oxigénio quente e húmido. Têm como objetivo o tratamento da insuficiência respiratória, proporciona elevados níveis de conforto e consequentemente bons resultados terapêuticos para a pessoa. A qualidade dos cuidados de enfermagem são fator preponderante para o sucesso da técnica.

Objetivo: Identificar as características e complicações apresentadas pela pessoa submetida a ONAF numa Unidade de Cuidados Intensivos, e identificar as intervenções de enfermagem mais adequadas à prestação de cuidados à pessoa submetida a ONAF.

Metodologia: Estudo Observacional Descritivo Retrospetivo, de âmbito quantitativo. A amostra é constituída por 32 casos obtidos através da consulta dos processos clínicos.

Resultados: A amostra é composta por 32 pessoas que realizaram ONAF durante o inter-

namento. A análise dos dados permitiu identificar que as complicações surgiram em 15,63% da amostra, sendo os principais focos de enfermagem o desconforto, a intolerância à temperatura ou ao ruído e a úlcera de pressão, visando a implementação de intervenções atempadas e eficientes.

Conclusão: A ONAF é uma técnica efetiva no cuidado à pessoa com compromisso da função respiratória, cujo sucesso depende da implementação de intervenções de enfermagem de qualidade durante a técnica. A analise dos dados recolhidos permite uma abordagem pró-ativa, visando uma melhor otimização da técnica e a prevenção de possíveis complicações associadas, contribuindo para a melhoria dos cuidados prestados.

Palavras-chave: Enfermagem Médico-cirúrgica; Oxigenoterapia Nasal de Alto Fluxo; Pessoa em Situação Crítica.

RESUMEN

Introducción: La oxígenoterapia nasal de alto flujo es una terápia de apoyo para la respiración que fornece una mezcla de aire y oxígeno caliente y húmedo. Tiene como objetivo el tratamiento de la insuficiencia respiratória, proporciona altos niveles de comodidad y consecuentemente buenos resultados terapéuticos para la persona. La calidad de los cuidados de enfermería son un factor indispensable para el éxito de la técnica.

Objetivo: Identificar las características y complicaciones que presenta la persona sometida a ONAF en una Unidad de Cuidados Intensivos y identificar las intervenciones de enfermería más adecuadas a la prestación de cuidados a la persona sometida a la ONAF.

Metodología: Estudio Observacional Descriptivo Retrospectivo, de alcance cuantitativo. La muestra consta de 32 casos obtenidos mediante consulta de expedientes clínicos.

Resultados: La muestra está compuesta por 32 personas que realizaron ONAF durante la hospitalización. El análisis de los datos permitió identificar que surgieron complicaciones en el 15,63% de la muestra, siendo los principales focos de enfermería el malestar, intolerancia a la temperatura o al ruido y úlceras por presión, con vistas a implementación de intervenciones oportunas y eficientes.

Conclusión: La ONAF es una técnica eficaz en los cuidados de enfermería a personas con compromiso de función respiratoria, cuyo éxito depende de intervenciones de Enfermería de calidad durante la técnica. El análisis de los datos recojidos permite un enfoque proactivo, con el objetivo de una mejor optimización de la técnica y la prevención de posibles complicaciones asociadas, contribuyendo a la mejora de la atención previsto.

Descriptores: Enfermeria Medico-quirurgica; Oxígenoterapia Nasal de Alto Flujo; Persona en Estado Crítico.

INTRODUCTION

The provision of quality care to the person in a critical situation requires a vast mobilization of knowledge and skills, allowing to respond to the needs of the person experiencing complex processes of critical illness and/or organ failure[1].

Respiratory function is often compromised in the person in a critical situation, resulting from various disease processes, being a frequent challenge for nursing teams. The threat to the person's survival that respiratory compromise entails requires early and continuous assessment, in order to diagnose alterations in a timely manner and implement efficient measures, aimed at preventing complications or failure situations.

The provision of nursing care to the person with respiratory failure includes the provision of oxygen. Currently, many devices are available for this purpose, we can talk about oxygen therapy by nasal cannula, mask and mechanical ventilation, which can be invasive or non-invasive[2].

Advances in conventional oxygen therapy and non-invasive ventilation allow the treatment of people with moderate to severe respiratory failure, avoiding invasive mechanical ventilation (IMV). However, both techniques have limitations and associated complications. Conventional oxygen therapy only allows oxygen flows up to 15 L/min and its concentration is conditioned by dilution with ambient air. Non-Invasive Ventilation (NIV) implies the abolition of physiological defense mechanisms, so that the intended results can be achieved, the most frequent complications being skin lesions, eye irritation and the feeling of claustrophobia. Thus, there is a need to develop a technique that lies between conventional oxygen therapy and non-invasive ventilation: high-flow nasal oxygen therapy (HFNOT)[3].

The present study takes place in the midst of a SARS-COV pandemic in which the ONAF is of particular importance, its use being a recommendation of the Portuguese Society of Intensive Care, as we can read in the description by recommendation 1 in which it is suggested to use under the trial form in COVID-19 patients with failure of conventional oxygen therapy (SpO_2 < 90% with FiO_2 ≥ 40%) to high-flow oxygen therapy via nasal cannulas or non-invasive ventilation[4:7].

Taking into account the high number of people undergoing HFNOT, with this value increasing as the pandemic situation evolves, it is important to extract and analyze the available data, namely the indications for starting the HFNOT, implemented temperature values, the identified complications and the respective nursing interventions, as well as

the justification for the termination of therapy. With the analysis of the data collected, we think we can actively contribute to the improvement of care provided to people, with a direct implication in the success of the technique, in increasing their comfort and consequent stabilization of respiratory support measures.

In view of the above, the objectives of the present study are to identify the characteristics and complications presented by the person undergoing HFNOT in a Portuguese Multipurpose Intensive Care Unit (ICU) during the year 2020. Mapping the appropriate nursing interventions, aiming at continuous improvement of nursing care provided to people in a critical situation submitted to HFNOT.

Framework

HFNOT is a non-invasive respiratory support therapy that provides an air volume between 30-60 L/minute of a warm, humid mixture of air and oxygen, through nasal cannulas[5].

The HFNOT circuit is based on four components: a high-flow oxygen source, which allows controlling the air flow and the inspiratory fraction of oxygen supplied, a humidifier, an inspiratory circuit heated to 37th and nasal cannulas. The fraction of inspired oxygen in HFNOT varies between 21% and 100%[3].

The indications for HFNOT as the first line are: pneumonia – in the presence of type I respiratory failure; ARDS (Acute respiratory distress syndrome) – in the presence of type I respiratory failure; immunocompromised patients, patients with a decision not to OTI, ventilator weaning process and support for invasive techniques such as laryngoscopy/bronchobibroscopy[3].

The advantages of using the HFNOT are that it is an easy-to-implement and maintain technique, with a low workload for nursing, compared to the NIV technique, causing a minimal risk of skin lesions, not causing a feeling of claustrophobia and having as main justification for its high tolerance to the possibility of the person being able to eat, ingest liquids and communicate during the technique[6].

The disadvantages in the use of HFNOT are the emergence of complications such as irritation of the nasal mucosa, rhinorrhea, discomfort, temperature intolerance, noise intolerance, the appearance of olfactory alterations and the risk of delaying orotracheal intubation (OTI)[6]. The work by Baker, Greaves, and Fraser (2019)[7] presents skin injury as a possible complication, with a reduced incidence.

Based on the study by Renda *et al*[6] the practical recommendations for the HFNOT technique are: nasal cannulas should not occlude the entirety of the nostrils; the air flow should start at 30-40 L/min, and increase progressively, until reaching satisfactory peripheral oxygen saturations and a reduction in respiratory rate; the initial temperature of administration should be 37th; the FiO_2 must increase until reaching satisfactory peripheral oxygen saturations; the water tank must be positioned as high as possible, above the humidifier; monitoring of the person must be continuous and include the following parameters: heart rate, respiratory rate and peripheral oxygen saturations; positive response to HFNOT implies that the adjustment of FiO_2 and flow is achieved within 1 h, depending on the person's clinical response; FAO weaning should start with a 5-10% reduction in FiO_2 and reassess after 1-2 h and flow reduction by 5 L/min and reassess in 1-2 h, suspension of the technique is indicated when flows ≤ 25 L/min are reached and 40% FiO_2 < and finally the signs of a negative response to HFNOT when there is no improvement in the clinical condition after 60-120 minutes from the start of HFNOT, treatment escalation should be considered.

Throughout this process, the support and presence of the Health Team, namely the Nurse, are essential for the provision of quality care. We researched several studies and documents and found that the most appropriate nursing interventions for people undergoing this technique are essentially based on teaching the technique and on continuous monitoring of the person with HFNOT, which should be systemic and systematic, in order to identify the response of the patient to treatment and guide the strategies to be implemented[7,9].

The monitoring of the person with HFNOT in the first 48 hours must include the following parameters: respiratory rate, peripheral oxygen saturations, work of breathing, in this parameter, in addition to identifying the use of accessory muscles in breathing or thoracoabdominal asynchrony, the use of a respiratory work assessment scale reducing the subjectivity of this parameter, heart rate and blood pressure. In the first two hours, the assessment of the person should be every 10 minutes. Regarding the parameters: Flow, FiO_2 and Temperature, it is important to record the initial values as well as their oscillations and the effects on the person's condition[3,6].

Still with regard to nursing interventions for these patients, it is important to emphasize the importance of attention to the surrounding environment, as it is drastically altered. HFNOT therapy causes high noise levels, due to the large flow of gas involved, as well as the alarms inherent to continuous monitoring. Explaining the origin and meaning of noise greatly reduces the person's anxiety, however these noises should be minimized whenever possible, paying special attention to promoting the person's sleep and rest[2].

Question of investigation

What are the characteristics and complications presented by the person undergoing High Flow Nasal Oxygen Therapy at the PICU?

What are the most appropriate nursing interventions to provide care to people with HFNOT?

METHODOLOGY

Based on the first research question presented, we carried out a Retrospective Descriptive Observational Study, with a quantitative scope, in which data from people undergoing HFNOT in the Multipurpose Intensive Care Unit during the year 2020 were analyzed. The sample is composed of 32 people, from the total of 218 people admitted to the PICU, who met the following inclusion criteria: performance of HFNOT during hospitalization at the ICU, in the year 2020.

Data collection was performed by consulting the clinical files through the B-ICU application. Regarding the characterization of the sample, the variables to be analyzed are: age, gender, entry diagnosis, initial parameters implemented: Temperature, complications identified during the High Flow Nasal Oxygen Therapy and justification for the end of the therapy.

The collected data were entered and analyzed using the computer program EXCEL, from Microsoft Office 365 Pro Plus, by the coding number. Data analysis used descriptive statistics in order to describe and characterize the sample, with the calculation of absolute and relative frequencies (%).

The study obtained a positive opinion from the Ethics Committee on 05/19/2021, as described in the document with entry I/10331/21/CA.

The use of confidential data contained in the process is based on a Declaration of Commitment by the principal investigator regarding the maintenance of anonymity and confidentiality of individuals.

RESULTS

After the data analysis in the B-ICU application, we can see that of the total of 218 people hospitalized in the ICU during the year 2020, 32 people performed HFNOT during hospitalization, which represents 14.67% of the people hospitalized. It can also be seen that throughout 2020, there was a progressive increase in the number of people subject to HFNOT, with the last quarter concentrating 43.75% of the total number of people subject to HFNOT in 2020. As previously mentioned, this reality is due to the increasing number of hospitalizations for Pneumonia and SARS-COV.

From the sample, which is composed of 32 people, we can observe that 31.25% are female and 68.75% are male (Table 1↗). Regarding the distribution by age group, it is possible to identify that 75% of people are in the age group below 75. The age group of over 85 years--old represents only 9.38% of the total analyzed sample.

In the study sample, the medical diagnoses were analyzed relating them to the indications for performing HFNOT, previously described, in order to better understand the reality of the analyzed sample (data presented in Table 2↗). It was found that the main indication for the use of HFNOT is Pneumonia, in which 18 people (56.25% of the sample) have this indication. Weaning from ventilation is the second most frequent indication, representing 28.13% of the sample (9 people).

Regarding the results obtained on the initial temperature, presented in Table 3↗, the results were quite comprehensive, ranging between 31st and 37th. The most used initial temperature was 34º, representing 37.50% of the sample (12 people), then the most implemented initial temperature was 31º, in which 8 people (25% of the sample) started HFNOT with this temperature.

The fact that during the COVID-19 pandemic there was a need to open an intensive care unit dedicated to people with SARS-COV2 infection, where the nursing team does not use the B-ICU application. The initial temperature implemented in 5 people.

The complications identified represent 5 people (15.63%) of the total of 32 people in the sample, data shown in Table 4↗. The most mentioned complication was discomfort, in which 6.25% (2 people) reported this complication. Then, Temperature intolerance, noise intolerance and pressure ulcer had the same number of records, 1 person (3.13%), respectively. The pressure ulcer referred to as a complication appeared in the auricular pavilion, related to the positioning of the headgear that supports the nasal cannula.

Finally, in the data obtained in relation to the end of the HFNOT, presented in Table 5↗, it is possible to verify in 22 people, that is, 68.75% of the sample after the HFNOT started conventional oxygen therapy. 4 people (12.5%) of the sample after the end of HFNOT needed to escalate measures of respiratory support for NIV and 1 person, 3.13% of the sample, needed orotracheal intubation due to failure of HFNOT. In 6.25% of the sample (2 people) there was death, and the HFNOT represented respiratory support at the end of life. It was not possible to identify the justification for the termination of the HFNOT in 3 people (9.38%), because they were transferred to another service/hospital during the performance of the HFNOT.

DISCUSSION

As limitations in the present study, it is noted that it is not possible to obtain data on the initial temperature implemented in the HFNOT in 5 people, due to the creation of another intensive care service where the nursing team did not use the B-ICU system and still the impossibility of collecting data related to the end of the HFNOT, due to transfer to another service/hospital while the technique was being performed.

We will then try to confront the collected data with the evidence found in the most recent bibliography on the subject, also making the connection with the second objective of this study, the mapping of nursing interventions for people undergoing HFNOT.

In the study by Pires, Marques, and Masip (2018)[3], HFNOT emerges as an emerging first--line treatment for Pneumonia, ARDS, in immunocompromised patients or patients with therapeutic limitation, a reality identified by data analysis in the present study. These data are also corroborated by the studies by Mauri *et al* (2019)[5], Baker, Greaves, and Fraser (2019)[7] and Renda *et al* (2017)[6].

Regarding the temperature variable, the work by Renda *et al* (2017)[6] suggests starting the HFNOT with a temperature of 37th, a fact that only happened in the implementation of the HFNOT for 1 person. The most frequent temperature at the beginning of the HFNOT, in the analyzed sample, was 31° and 34°, representing 25% and 37.5% of the sample, respectively. The fact that the temperature initially implemented was lower than 37° is corroborated by the study by Mauri *et al* (2018)[8] who state that for equal flows, lower temperatures may be more comfortable. The same study also mentions the importance of individual titration of the temperature value, looking for the parameters of greater comfort for the person. In this way, the variability of temperature values identified corres-

ponds to the titration of the ideal temperature for the person, based on their comfort/tolerance. The importance of this intervention is also mentioned in the study by Ischaki, Pantazopoulos, and Zakynthinos (2017)[9].

Concerning the complications associated with HNOT, these are described as infrequent, according to Renda *et al* (2017)[6], in our study these represent 15.63% (5 people). Discomfort represents 40% of all complications (6.25% of the total sample), being the most frequent complication, the study by Pires, Marques, and Masip (2018)[3] confirms this reality. The proximity of the nursing team makes it possible to identify signs and symptoms of discomfort, allowing the implementation of efficient measures to minimize them.

The provision of care to the person in a critical situation implies continuous observation, nurses collect information in order to keep a constant update on the person's situation. Thus, monitoring must be systemic and systematic, and advanced means of invasive monitoring may be necessary, in order to ensure constant and reliable vital parameters[1].

Renda *et al* (2017)[6] reports that the risk of skin injury is minimal, in the analyzed sample, skin injury from pressure ulcers represents 20% of the total number of identified complications (3.13% of the total sample). The risk of skin injury from the HFNOT cannula/harness is also mentioned in the study by Baker, Greaves, and Fraser (2019)[7] as a possibility. In the analyzed sample, the pressure ulcer identified in the ear is due to the headgear. The simple interface guarantees greater comfort to the person, however the time spent in contact with the skin is high, so it is important to ensure adequate hygiene and hydration of the face, regularly monitoring the development of pressure areas on the face, through the nasal cannula, in the nostrils through the nasal pillows and on the head where the headgear is placed. Careful and frequent oral hygiene, in addition to promoting the person's comfort, prevents respiratory infections due to the migration of bacteria[6].

Other complications described such as noise intolerance and temperature intolerance represent an equal weighting of 3.13% of the total sample (20% of the total number of complications). They are described as possible disadvantages in the use of HFNOT and that in extreme situations can condition the failure of the technique due to the implications for the person's comfort, as mentioned in the study by Renda *et al* (2017)[6]. Nursing interventions in the management and optimization of the physical environment directly contribute to the comfort of the person. The air flow used in the HFNOT implies high levels of noise and temperature, essential to achieve the desired physiological effects, which requires special attention on the part of the team, aiming to minimize the negative impact on the person, namely in ensuring that sleep and rest of the person are efficient, due to their implication in comfort and, consequently, in adherence to the technique.

In successful situations, the end of HFNOT is verified when the therapeutic measures of respiratory support progress to conventional oxygen therapy, when flows ≤ 25 L/min and FiO_2 < 40%[6] are reached, which was verified in 68.75 % of people who performed HFNOT at the PICU.

According to Mauri *et al* (2019)[5] HFNOT has been associated with the risk of delaying the escalation of respiratory support measures, such as NIV or OTI. The key to minimizing the risk of delaying NIV or OTI is the existence of a systemic and systematic monitoring by the nursing team, allowing the identification of early signs of failure of the technique, and consequently, timely decision-making. This reality is corroborated by studies by Dres and Demoule (2017)[10], Helviz and Einav (2018)[11] and Ricard *et al* (2020)[12]. In the analyzed sample, the escalation of therapeutic measures occurred in 5 people (15.63%), with 12.5% increasing the therapeutic measures for NIV and 3.13% for OTI, these situations represent the total of situations where the failure of the HFNOT.

Data collection, constant observation and monitoring of the person are essential, in order to identify the signs of success and failure of the HFNOT in order to outline strategies and implement interventions aimed at improving the person's situation[2,3].

In 6.25% of the sample (2 people) the end of the technique was due to the death of the person, and the HFNOT was the respiratory support at the end of life. In the study by Renda *et al* (2017)[6] the HFNOT emerges as an option in the care of people in a terminal situation where dyspnea and respiratory effort require intervention, aiming at the person's comfort. This indication is supported by the study by Baker, Greaves, and Fraser (2019)[7] and by the study by Ricard *et al* (2020)[12].

CONCLUSION

Providing nursing care to the critically ill person lacks a vast set of knowledge and skills. The incorporation of the latest scientific evidence is a condition for the provision of quality care.

HFNOT is currently an effective therapy in the treatment of people with respiratory failure, and this fact is corroborated by the studies consulted. The delivery of a mixture of warm and oxygen-enriched air makes it possible to achieve the desired physiological effects, guaranteeing high levels of comfort for the person. The present study aimed to identify the characteristics and complications presented by the person submitted to High Flow Nasal Oxygen Therapy in the PICU, as well as to map the most appropriate nursing interventions to provide care to the person with HFNOT.

The analyzed sample consisted of 32 people and the variables analyzed were: age, gender, entry diagnosis, initial parameters implemented: Temperature, complications identified during the High Flow Nasal Oxygen Therapy therapy and justification for the end of the therapy. Through the analysis of the data obtained and the integration of the latest scientific evidence on the subject, it was possible to identify the characteristics and complications presented by people undergoing HFNOT, as well as to identify the nursing interventions involved in the provision of care, aiming at the quality of care provided.

Knowledge of care provided in practice, and its analysis, are a strong driver of continuous improvement. Comfort, combined with all the other physiological effects of HFNOT, is an asset in the treatment of people with respiratory failure. The temperature management implemented has important implications for comfort, as lower temperatures are better tolerated by people, and titration of the ideal temperature value for each person are some of the interventions to be implemented in the care of the person undergoing HFNOT.

The knowledge of possible complications allows a proactive approach by the nursing team, in the prevention of their appearance as well as in the implementation of measures to minimize their impact. Complications such as discomfort, intolerance to temperature or noise and the risk of skin injury should be the focus of nursing intervention, as their appearance can jeopardize the success of the technique.

The proximity to the nursing team is an important advantage, it allows the person in a critical situation to be monitored and monitored continuously, with systematic and systematic records. In this way, it is possible to identify early signs of success or failure of the technique, and timely implementation of efficient measures aiming at better care.

The success of the technique and the high standards of comfort depend on the intervention of the nursing team, in the optimization of the technique and in the prevention of complications, contributing directly to the person's health gains.

It is extremely important to disseminate the results obtained and to develop studies that allow the systematization of nursing interventions for the person submitted to HFNOT, aiming at the provision of quality care, which corresponds to direct gains for people's health.

Authors' contributions

CT: Study coordination, study design, data collection, storage and analysis, review and discussion of results.
AR: Study design, data analysis, review and discussion of results.
TS: Study design, data analysis, review and discussion of results.
All authors read and agreed with the published version of the manuscript.

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Table 1 – Presentation of the distribution of absolute and relative frequency values for the variables "Gender" and "Age group".

Age group	Female	Male	% by age
< 75	7	17	75.00%
76-85	1	4	15.63%
> 85	2	1	9.38%
Total	10	22	100.00%
% by gender	31.25%	68.75%	100.00%

Table 2 – Presentation of the distribution of absolute and relative frequency values for the variable "Diagnosis/Indication".

Diagnosis/Indication	no. people	%
Pneumonia	18	56.25%
ARDS	4	12.50%
Decision non-OTI	1	3.13%
Ventilatory weaning	9	28.13%
Total	32	100.00%

*ARDS: acute respiratory distress syndrome; Non-OTI: no indication for orotracheal intubation.

Table 3 – Presentation of the distribution of absolute and relative frequency values for the variable "Initial temperature".

Temperature	no. people	%
31°	8	25.00%
32°	1	3.13%
34°	12	37.50%
35°	4	12.50%
36°	1	3.13%
37°	1	3.13%
No data	5	15.63%
Total	32	100.00%

Table 4 – Presentation of the distribution of absolute and relative frequency values for the variable "Complications".

Complications	no. people	%	% Total
Discomfort	2	40.00%	6.25%
Intolerance Temperature	1	20.00%	3.13%
Noise intolerance	1	20.00%	3.13%
Pressure ulcer	1	20.00%	3.13%
Total	5	100.00%	15.63%

Table 5 – Presentation of the distribution of absolute and relative frequency values for the variable "justification for ending the HFNOT".↖

Ends	no. people	%
Conventional oxygen	22	68.75%
NIV	4	12.50%
OTI	1	3.13%
Transferred	3	9.38%
Death	2	6.25%
Total	32	100.00%

†NIV: non-invasive ventilation; OTI: orotracheal intubation.