Diagnosis of radiological imaging as a certification protocol in the prevention of adverse events after naso/enteral oro probing

Diagnóstico de imagem radiológica como protocolo de certificação na prevenção de eventos adversos após sondagem naso/oro enteral

Diagnóstico de la imagen radiológica como protocolo de certificación en la prevención de eventos adversos tras el sondeo naso/enteral oro

Elias Rocha de Azevedo Filho[1], Vera Lúcia Teodoro Santos[2], Wanderlan Cabral Neves[3], Cláudia Márcia Ventura Teixeira Santos[4], Dhaiane de Sena Mendes Silva[5], Maria do Socorro de Lima Silva[6], , Marcus Vinícius Ribeiro Ferreira[7]

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1. Catholic University of Brasilia. Brasília, Distrito Federal, Brazil. https://orcid.org/0000-0002-1991-2558

2. Centro Mineiro de Ensino Superior Promotes. Belo Horizonte, Minas Gerais, Brazil. https://orcid.org/0000-0002-5741-0268

3. Catholic University of Brasilia: Brasília, Distrito Federal, Brazil. https://orcid.org/6698-4300-7920-7832

4. Catholic University of Brasilia: Brasília, Distrito Federal, Brazil. https://orcid.org/0000-0002-8451-0627

5. University of Brasilia. Brasília, Distrito Federal, Brazil. https://orcid.org/0000-0003-4467-4560

6. University of Brasilia. Brasília, Distrito Federal, Brazil. https://orcid.org/0000-0003-0340-0846

7. University of Brasilia. Brasília, Distrito Federal, Brazil. https://orcid.org/0000-0003-1417-0871

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RESUMO

Objetivo. Apontar para a forma como a sonda nasoenteral serve a várias finalidades, entre as quais estão a própria alimentação enteral, a administração de drogas, como meio de contraste ou carvão ativado, para fins de aspiração do conteúdo do estômago para descomprimir o estômago de fluido, ar ou sangue, para reduzir o risco de vômito ou aspiração e para outros fins. **Método:** Revisão de literatura, descritiva exploratória, escolhidas, pois descreve, discute e analisa de forma ampla a literatura publicada sobre o tema, sob o ponto de vista teórico ou contextual a respeito da relevância do diagnóstico por imagem radiológica nestes casos. **Resultados:** Deve-se garantir a segurança do paciente, para isso é essencial confirmar que a sonda foi introduzida de maneira correta e está no devido local (estômago ou parte do intestino), uma vez que a sonda pode inadvertidamente ter sido inserida nos pulmões, o que pode passar desapercebido em pacientes de alto risco. **Conclusão:** Deve-se usar a sonda naso/oro para terapia nutricional, além de se prevenir eventos adversos para que o processo seja efetivo.

Descritores: Sonda oro/nasoenteral; Raios-x; Prevenção de Eventos adversos; Capacitação

ABSTRACT

Objective. Point out how the nasoenteral tube serves various purposes, among which are enteral feeding itself, administration of drugs such as contrast medium or activated charcoal, for the purpose of aspiration of stomach contents to decompress the stomach of fluid, air or blood, to reduce the risk of vomiting or aspiration, and for other purposes. **Method:** Literature review, descriptive and exploratory, chosen because it describes, discusses and analyzes widely the published literature on the subject, from a theoretical or contextual point of view regarding the relevance of radiological imaging diagnosis in these cases. **Results:** Patient safety must be ensured, for this it is essential to confirm that the tube has been inserted correctly and is in the right place (stomach or part of the intestine), since the tube may have been inadvertently inserted into the lungs, which may go unnoticed in high-risk patients. **Conclusion**: The naso/oro tube should be used for nutritional therapy, in addition to preventing adverse events for the process to be effective.

Descriptors: Nasoenteral tube; X ray; Prevention of adverse events; Training.

RESUMEN

Objetivo. Señalar cómo la sonda nasoenteral sirve para varios fines, entre los que se encuentran la alimentación enteral en sí, la administración de fármacos como medio de contraste o carbón activado, con el fin de aspirar el contenido del estómago para descomprimir el estómago de líquido, aire o sangre, para reducir la riesgo de vómito o aspiración, y para otros fines. **Método:** Revisión bibliográfica, descriptiva y exploratoria, elegida porque describe, discute y analiza ampliamente la literatura publicada sobre el tema, desde un punto de vista teórico o contextual respecto a la relevancia del diagnóstico por imágenes radiológicas en estos casos. **Resultados:** Se debe garantizar la seguridad del paciente, para ello es fundamental confirmar que la sonda se ha insertado correctamente y está en el lugar correcto (estómago o parte del intestino), ya que la sonda puede haber sido introducida inadvertidamente en los pulmones, que puede pasar desapercibido en pacientes de alto riesgo. **Conclusión**: La sonda naso/oro debe ser utilizada para la terapia nutricional, además de prevenir eventos adversos para que el proceso sea efectivo.

Descriptores: Sonda nasoenteral; Rayos x; Prevención de eventos adversos; Capacitación.

REVIEW

Introduction

In order to minimize the risk of complications resulting from the naso and enteric probe insertion procedure SNE/SOE, especially those related to the poor positioning of the distal tip of the probe, clinical tests (auscultation, pH measurement of the aspirated content and verification of the aspect of gastric residue)[1-3] are usually performed.[4-5] However, studies[1,3,6] have shown that these tests are insufficient to adequately predict the location of the distal tip of the probe.

There are numerous reports of deaths associated with these tubes.[7] The FDA (Food and Drug Administration) estimates that from January 2012 to July 2017, there have been 51 reports of pneumothorax related to the placement of nasogastric and enteric nasogastric treatment (NGT/NET), most of which required urgent intervention, including needle decompression or thoracic drain insertion. Several of these events were associated with cardiorespiratory arrest and death.[8]

Serious and fatal adverse events related to NGT/NET were reported in Brazil, mainly caused by disconnection, which resulted in the infusion of enteral nutrition into the vein.[9] Research conducted in the USA showed that up to 3.2% of NGT/NET were inserted in the airway, resulting in pneumothorax and death.[10-11]

An X-ray examination is performed to verify the proper positioning of numerous types of medical, control or support, vascular and extravascular devices[12], among which are the endotrachimal tubes, digestive tubes, pleural drains[13-14] venous and arterial catheters and cardiac pacemakers and cardiac pacemakers and cardiac pacemakers.[15-16] In addition to verifying the appropriate positioning of the medical device, the X-ray assists in the finding of complications related to the passage or its installation and late complications related to its presence.[14]

For critically ill patients who require cardiovascular support or mechanical ventilation, it is recommended to perform chest X-ray daily according to instruction from the American College of Radiology[12], in addition to immediate care to patients who have undergone the introduction of endotracheal tubes, feeding tubes, vascular catheters and chest drains. This is made necessary by the possibility of mispositioning these devices, leading to serious complications, which are often not clinically palpable.

In order to reduce complications caused by inadequate positioning of the tube, after insertion and before diet administration, clinical tests are adopted at the bedside to estimate whether the distal tip of the probe is actually in the stomach or intestine, and the auscultation test is the most used by nurses in clinical practice. In addition to this test, the pH (hydrogen potential) measurement of the residue aspirated through the Nasoenteral Probe is also used.[17-18] The isolated result of one of these tests, or the combination of them, supports the nurse to issue his impression on the anatomical location of the distal tip of the probe. However, there are no studies documenting the validation and diagnostic accuracy of these tests in adequately predicting the anatomical location of the distal tip of the probe. Therefore, X-ray is still the diagnostic reference method for this purpose.[17c]

A probe should be used to provide nutrients necessary for the maintenance of its life, in cases of impossibility of food intake. In data provided about other countries, about one million food probes are placed annually on adults and children in the United States of America19, and about 170,000 enteral probes are provided annually by the National Health Service (NHS) in England.[20]

In 2005, the National Patient Safety Agency (NPSA) advised that the feeding probe should be introduced, but that there should be a confirmation of its lease more safely, because, as of the date of the research, 21 deaths and 79 cases of damage resulting from poor positioning of the probes in England and Wales have been reported. A misinterpretation of radiological examination image was mentioned, causing 45 serious incidents, including 12 deaths.[20] The objective of such tests is to ensure that nurses have greater safety and efficiency when caring for their patients.[21]

To facilitate its passage and assist its visualization by the RX, the nasoenteral probe has a metal guide wire, which should be removed after confirmation of its location, leaving the patient safe to receive the TNE (nasoenteral treatment).[22] It is ensured that the use of the guide wire is used to guide and give rigidity to the probe, facilitating its introduction.[23]

In view of the above, the objective of this study is to describe the relevance of imaging for radiological diagnosis after naso/enteral oro probing. It is understood that the lack of studies on radiological examination after insertion of SNG/SNE represents a challenge, but at the same time highlights the importance of this study as an essential first step to improve patient safety. A good approach can follow a better path to deal with the difficulties faced. Therefore, discussing the subject contributes to the teachings in the area of health.

Method

This is a literature review, descriptive exploratory, since it is appropriate to describe, discuss and analyze broadly the published literature on the subject, from the theoretical or contextual point of view regarding the relevance of radiological imaging diagnosis in the prevention of adverse events after naso/enteral oro probing, and it is necessary to perform, seek and gather the contribution of different authors, their professional experiences and differentiated approaches on the subject. The present study was divided into four steps described below:

First stage: Selection and review of articles found in databases, such as Virtual Health Library (VHL), Latin American Literature in Health Sciences (LILACS), Bireme and the Scientific Electronic Library Online (SciELO), U.S. National Library of Medicine (PUBMED - NLM), in related books, between 1988 and 2020. Articles were searched in order to elaborate a literature review of descriptive and exploratory character.

Second stage: The inclusion and exclusion criteria of articles were used, and those whose publications portrayed the theme: Relevance of radiological imaging of the distal tip in the prevention of adverse events after naso/enteral oro probing: A bibliographic review were chosen. The following were used as descriptors: Radiology diagnosis, standard, certification, nasoenteral probe and pre-selection of articles with full text in Portuguese. After the pre-selection of 40

articles, 32 articles were used, which comprised the search text and a systematic review that addressed these descriptors.

Third stage: All ethical criteria were followed according to the norms, with articles that met the pre-established inclusion criteria. Subsequently, in possession of the potential bibliography, qualitative analysis and analytical reading were performed. In addition, a careful analysis of the articles was carried out, as it is a review of the literature. The importance of preserving the author's idea was also considered.

Fourth stage: After reading and analyzing the articles, a literature review was elaborated and a discussion was conducted on the performance of the technologist's procedure in radiology after introduction of the nasoenteral probe. The database was analyzed, selecting the theoretical framework to further the front of methodology and linguistic analysis.

Results and Discussion

Nasogastric or nasoenteric probes are intended to aspirate content, administer medications and nutrition, and are chosen for the function. In its use, its extremity should point to the inside of the stomach, in positioning beyond the cardia.[24] The enteric probe must be in the second part of the duodenum, in addition to the pyloric region, to the right of the midline. They are sodas that have radiopaque tips, to facilitate their identification in the X-ray (Figure 1).

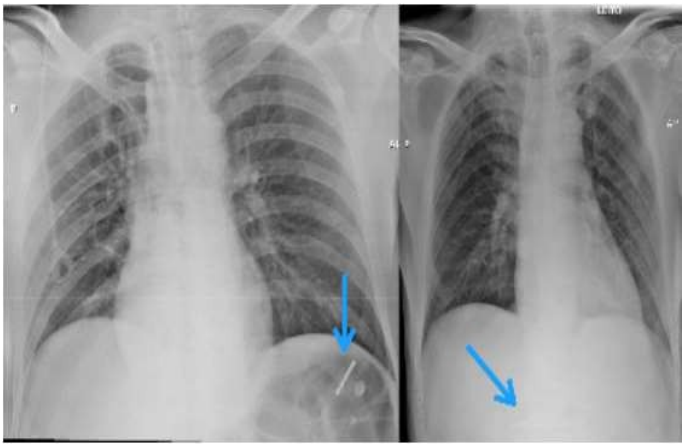

Figure 1- On the left, nasogastric tube well positioned. There is also a central venous access catheter and tracheostomy cannula, both of which are properly positioned. On the right, nasoenteric probe with correctly positioned end to the right of the midline.

The major problems related to these probes are the lack of precision in their placement, and sometimes they are inserted incompletely or allowing it to curl in the esophagus.[13,25] Another possibility is that of its insertion in the tracheobronchial tree, and there may even be perforation and the extremity being identified in the lung, pleural and mediastinal cavity.[26] On radiography, poor positioning can be identified by the anomalous position of the path or end of the probe (Figure 2). Spellings in two incidences can help. After nutrition and medication have been administered, X-ray may show rapid development of pleural effusion, mediastinal enlargement, pneumothorax, or pneumomediastinum, increasing suspicion for poor positioning of the probe.[13,15]

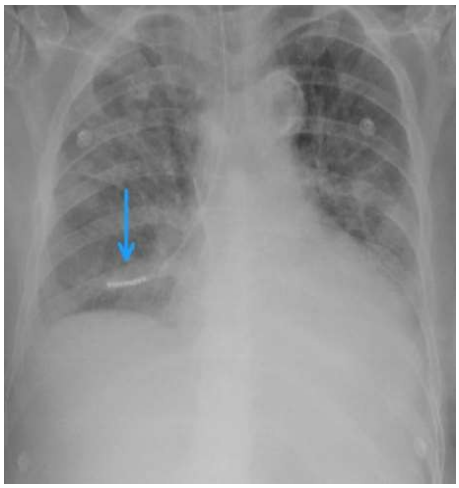

Figure 2- Poorly positioned digestive tube, with end in projection of right lower lobar bronchus branch. There is also a central venous catheter with distal extremity in the transition between superior vena cava and right atrium, and images of cardiac monitoring plugs.

The X-ray examination is used to reduce the risk of complications resulting from the nasoenteral tube insertion procedure, especially those related to the location of the distal tip of the probe.[27] Its efficiency for this purpose is so evident that Technical Opinion No. 09/2011 of the Regional Nursing Council of the Federal District (Coren-DF) presented the same conclusion, that the only way to certify the location of the probe is through X-ray", which is also confirmed by another study.[28]

According to the opinion of Technical Chamber No. 004/2021 – it is the competence of the nurse professional in requesting the radiological examination in order to confirm the location of the naso/oro enteric tube after the procedures of insertion of the probe and refer the patient to radiological examination, in order to confirm the positioning of the probe. However, the responsibility for performing the X-ray examination is the professional technologist or radiology technician.

Although the radiological examination is considered standard for certification of the position of the feeding tube, there should be attention by the radiology professional about which procedures to adopt in its performance, because there are situations in which the assessment of the location of the probe is prevented or limited.[29]

In addition, there is another important point regarding the insertion of the probe in situations in which the patient is conscious and when the patient presents changes in the level of consciousness. What can be observed is the active collaboration of the conscious patient, clearly demonstrating signs and symptoms of misplacement of the probe, and when the patient is unconscious or with altered level of consciousness, it may not be identified.

It is important to ensure patient safety, for this it is essential to confirm that the probe has been introduced correctly and is in due place (stomach or part of the intestine), since the probe may inadvertently have been inserted into the lungs, which may go unnoticed in high-risk patients (e.g., those with decreased levels of consciousness, confused mental states, vomiting reflexes and deficient or absent cough, or agitation during insertion). In addition to this situation, the fact that the patient is in use of everything endotracqueal, or has its recent removal, increases the risk of accidental application of the probe in the lung.

The efficacy of radiological examination is related to the clinical picture of the patient and to possible professional failures in the performance of the examination, such as the positioning of the patient during the emission of X-ray beams and the inadequate positioning of the chassis with film.[29] However, the evaluation of the examination is made by the attending physician or on-call of the unit, and enteral diet is released regardless of whether the probe is positioned in the stomach or intestine.

Conclusion

The recording of radiological imaging is the attribution of the technologist or technician in medical radiology, the insertion of the probes to request the examination are nurse procedures, although it is the doctor's function to prescribe the X-ray request and diagnose. Naso/Enteral Oro requires a set of techniques to ensure its effectiveness, of which imaging is one of the most important. It also requires the preparation and knowledge of the Technologist or radiology technician, who assist in the performance of the other professionals involved in this process. It is concluded that the insertion of the naso/oro probe is considered necessary for nutritional therapy, and the prevention of adverse events is the commitment of the entire health team, and for the effectiveness of this process it is relevant that the multidisciplinary team recognizes the importance of this therapy and is trained, to adopt devices and actions that ensure the quality and safety of the patient.

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Corespondent Author
Elias Rocha de Azevedo Filho
SIGA Special Area for Industry Lot 2/3, Sce St. East Industrial. ZIP Code: 72445-020- Gama. Brasília, Distrito Federal, Brazil.
eliaspresley@gmail.com