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Caso clínico

A malfunctioning nasogastric feeding tube

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Abstract

A critical point of nasogastric feeding tube placement, potentially resulting in an unsafe and/or non-effective operation of the device, is the monitoring of its proper placement into the stomach. A properly obtained and interpreted radiograph is currently recommended to confirm placement. We reported the case of a 68-year-old demented woman referred for complicated dysphagia. A nasogastric tube was blindly inserted and its placement was confirmed by the radiologist. Enteral nutrition was initiated but the patient began to vomit immediately. After reviewing the radiograph it was understood that a gastric loop in the tube and its tip pointing upwards did not allow a safe infusion of the feeding formula. It is not enough having the radiologist reporting that a nasogastric feeding tube is placed in the stomach; the inclusion in the report of specific warnings on any potential cause of malfunctioning of the device should be considered. The presence of a gastric loop should be taken into account as a cause of potential malfunctioning.

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Key words: *Enteral nutrition. Nasogastric feeding tube. Tube placement.*

UNA SONDA DE ALIMENTACIÓN NASOGÁSTRICA QUE FUNCIONA MAL

Resumen

Un punto crítico de la colocación del tubo de alimentación nasogástrica, potencialmente resultando en un funcionamiento peligroso y / o no eficaz del dispositivo, es la supervisión de su correcta ubicación en el estómago. Una radiografía obtenido e interpretado correctamente la actualidad se recomienda para confirmar la colocación. Se presenta el caso de una mujer demente de 68 años remitido para la disfagia complicado. Una sonda nasogástrica se inserta a ciegas y su ubicación fue confirmada por el radiólogo. La nutrición enteral se inició, pero el paciente empezó a vomitar inmediatamente. Después de revisar la radiografía se entendía que un bucle gástrico en el tubo y su punta hacia arriba apuntando no permitió una infusión segura de la fórmula de alimentación. No es suficiente tener el aviso del radiólogo que un tubo nasogástrico de alimentación se coloca en el estómago, la inclusión en el informe de advertencias específicas en cualquier causa potencial de mal funcionamiento del dispositivo debe ser considerado. La presencia de un bucle gástrico debe ser tenido en cuenta como una causa de mal funcionamiento potencial.

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Palabras clave: *Nutrición enteral. Sonda de alimentación nasogástrica. Sustitución de sonda.*

Introduction

A critical point of nasogastric feeding tube placement, potentially resulting in an unsafe and/or non-effective operation of the device, is the monitoring of its proper placement into the stomach. A properly obtained and interpreted radiograph is currently recommended to confirm correct placement of any blindly-placed tube before its use for feeding.

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We report an unexpected cause of malfunctioning nasogastric feeding tube due to non apparent misplacement.

Case presentation

A 68-year-old woman, suffering from Alzheimer's disease, was referred to our attention for complicated dysphagia (malnutrition and aspiration pneumonia). After having excluded the presence of any contraindication to enteral access, a nasogastric tube was blindly inserted for nutritional purposes an abdomen X-ray was requested in order to check the correct placement. The report of the radiologist confirmed that the tip of the tube projected below the diaphragmatic profile,

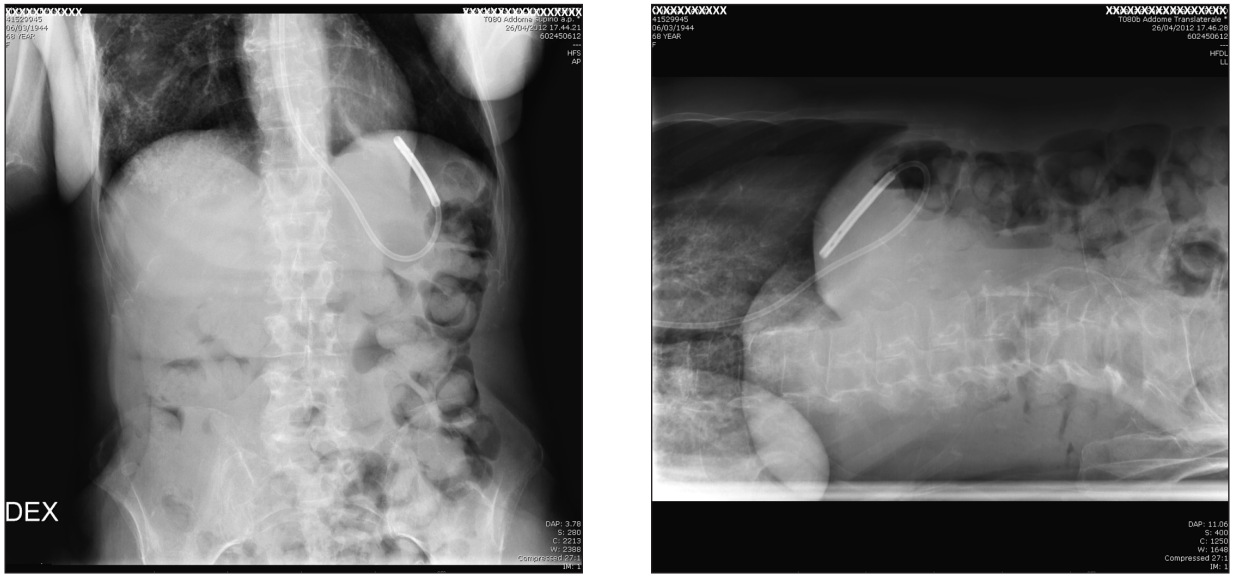

Fig. 1.—Decubitus views of the abdomen demonstrating the presence of a loop in the tube and a tip pointing upwards in the direction of the gastric fundus (Plot A, *supine decubitus;* Plot B, *lateral decubitus).*

but without giving any particular warning (fig. 1). After the initiation of enteral nutrition, the patient began to vomit immediately and the physician responsible for the patient was not able to provide an explanation. Only after he had personally reviewed the radiograph he understood that a loop in the tube and its tip pointing upwards did not allow a safe infusion of the feeding formula. Therefore, the feeding tube was repositioned endoscopically, paying attention to the positioning of the tip in the gastric antrum, and the administration of the formula was carried out without further problems. After the resolution of pneumonia, swallowing disturbances were investigated by means of videofluoroscopy and the results of the test indicated the placement of a gastrostomy. The patient is currently on long-term home enteral nutrition.

Discussion

In addition to feeding, gastrointestinal access can be used for decompression in cases of enteral obstruction. Nowadays, nasogastric tube placement is a widespread procedure which is practiced every day, hundreds of times in every hospital and in most cases blindly. A critical point of this procedure, potentially resulting in an unsafe and/or non-effective operation of the device, is the monitoring of its proper placement into the stomach. In respect with this, different corporate guidelines are now available[1,2] but some room for improvement seems to exist.

A properly obtained and interpreted radiograph is currently recommended to confirm correct placement of any blindly-placed tube before using it for feeding or medication administration[1,2]. However, most of these guidelines may appear quite generic when dealing with the checking of tube location because they report only that a radiograph is mandatory, or even the gold standard procedure, to confirm that the nasogastric tube is properly positioned. But what is meant by the term «properly»? Moreover, no advice on the confirmation of decompressive tube drainage placement seems to exist.

In regard with feeding tubes, it seems that more attention is focused on how to avoid complications due to initial misplacement of the device (and how this could be excluded)[3], rather than on how to evaluate if the placement will allow not only an effective but also a safe infusion of the nutritional formula in the gastrointestinal tract.

However, the recent guideline edited by the American Association of Critical-care Nurses (ACCN) appears to go a little further because it not only recommends the use of radiography to confirm correct placement before its initial use, but it also reports that «it is best to have a radiologist read the film to approve use of the tube for feeding», emphasizing as a level-A evidence that the radiograph «should visualise the entire course of the feeding tube in the gastrointestinal tract»[4]. The same guideline has also suggested the checking of tube location at regular intervals after feedings are started also by reviewing chest/abdominal x-ray reports to look for notations about tube location.

Accordingly, at least one question seems to be due: to which extent the radiologist report should be specific in describing the course of the tube?

A partial answer to this question appears to have been recently provided by the National Patient Safety Agency[5]. Although according to this report the use of radiography is left only to those cases in which initial checking of nasogastric aspirate's pH cannot be performed or is not confirmatory of a correct placement (pH between 1 and 5.5), in its summary it has been

provided an example of how a radiologist should confirm the placement (the tube should cross the diaphragm and deviate to left and the tip is seen in the stomach) and approve the use of the tube[5]. However, it has been also stated that it is not safe to feed if the position is not clear.

Finally, there appears that a further significant improvement of practices could be achieved after a critical reappraisal of the study by Law et al. Recently published in *Clinical Radiology*[6]. In this audit-based implementation of nasogastric intubation practices (documentation, intubation, interpretation training, and radiology) it has been recommended that images must be reviewed by a competent, trained radiographer or radiologist before the patient is returned to the ward. Moreover, it has been suggested that the responsibility for developing safe practice in respect of tube check image interpretation was considered to ultimately lie with the department of radiology.

If we refer to our case it is clear that vomiting was due to an «improper» placement, although we cannot say that every nasogastric tube positioned in such a way can not be used or operates improperly. The tube crossed the diaphragm and deviated to left, a condition that mat be suggestive for a safe use[5]. It could not be recommended that the tip of the feeding tube should be placed in the gastric antrum, although it could be reasonably sustained that it would best operate when the tip is pointing down. The same may apply to decompressive tube drainages. On the other hand, in the present clinical case the report of the radiologist did not arise any suspicion about a malpositioning or even a potential malfunctioning. With this background of consideration, because the responsibility on beginning the feeding seems to be left to the judgment of the radiologist, we believe it could be proposed that:

1. the radiologist should be properly informed of the purpose of the tube in the request of X-ray;
2. the radiologist must be explicit in reporting if the tube has been correctly positioned for what it was aimed; accordingly, the inclusion of specific warnings on any potential malfunctioning of the device should be considered.

Therefore, adherence to available recommended practices on the checking of tube location[1,2,4,5] should be enforced among health professionals involved in tube management.

Finally, we believe that a position statement edited by international societies of radiology and focusing on how to report an X-ray specifically requested to check the tube placement would probably improve the practices. In regard with this, the presence of a gastric loop should be a warning of potential malfunctioning to be taken into account. Nonetheless, every doctor is left with the responsibility to personally examine the radiograph regardless of the report of the radiologist.

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Conflict of interest statement

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Authors contributions

All Authors have participated sufficiently in the work (conception and design of the study; generation, collection, assembly, analysis and/or interpretation of data; and drafting or revision of the manuscript; approval of the final version of the manuscript) to take public responsibility for the content of the paper and must approve of the final version of the manuscript.

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