

number of patients lost-to-follow-up (11.7%) was acceptable and not due to problems with the app. Satisfaction improved 1 point at completion of follow-up.

We found that less adherent patients scored higher on the anxiety (Hospital Anxiety and Depression Scale) and hyperventilation (Nijmegen) questionnaires, a finding that might aid the identification of individuals who need additional support to improve their use.

Only 13% of alerts generated during the entire follow-up period required medical intervention. This means that the app can be used in daily clinical practice and public health systems without overburdening resources. In addition, it would restrict face-to-face visits to those patients who really need them, while the remaining patients could be monitored in a daily virtual follow-up, essential in situations such as those experienced in the Covid-19 pandemic.

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## Sneeze-induced chylothorax<sup>☆</sup>



### Quilotórax inducido por estornudo

To the Editor,

Chylothorax, a pleural effusion with a high content of chylomicrons and triglycerides, is usually caused by surgical complications (esophagectomies, pulmonary resections), lymphomas, liver cirrhosis, or other causes.<sup>1</sup> It rarely occurs spontaneously in association with injuries that are considered “trivial”. The only case of chylothorax attributable to sneezing published to date resolved rapidly within a few days.<sup>2</sup> We report, however, another similar case with a course that was not so favorable and required various interventional therapeutic techniques.

A 71-year-old man consulted for progressive dyspnea of two weeks' duration, with no general symptoms, orthopnea, fever, or previous trauma. His history was significant for arterial hyperten-

sion, permanent non-valvular atrial fibrillation, and aortic valve replacement with a mechanical prosthesis performed 8 years earlier. He was receiving treatment with acenocoumarol. Chest X-ray revealed left pleural effusion occupying half of the hemithorax. Thoracentesis showed a milky fluid with the following characteristics: leukocytes 1,875/μL (95% lymphocytes), proteins 3.8 g/dL (serum 6.91 g/dL), lactate dehydrogenase 373 U/L (serum 685 U/L), triglycerides 1,203 mg/dL (serum 93 mg/dL), cholesterol 62 mg/dL (serum 197 mg/dL), normal flow cytometry, and cytological studies negative for malignancy. A chest-abdominal CT only showed left pleural effusion with no pleural thickening or enlarged lymph nodes. Intranodal lymphangiography showed extravasation of contrast material (lipiodol) into the left pleural cavity (Fig. 1). The patient was interviewed again and reported several fits of intense sneezing during the days before the appearance of the present symptoms, an event confirmed by his wife. He required two therapeutic thoracenteses of 1 L and 1.25 L over the course of two weeks, so a tunneled pleural catheter (TPC) was inserted for controlled drainage at home. After two weeks of intensive (daily) drainage via the TPC and radiological confirmation of lung re-expansion, 4 g of talc in solution (slurry) were instilled through the TPC. A low-fat diet was also recommended and octeotride (50 mcg/12 h sc) was prescribed, which continued for six weeks. After 10 weeks of talc instillation through the TPC and when three successive drainage

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**Fig. 1.** Coronal CT slice showing lipiodol injected during intranodal lymphangiography in the inguinal lymph ducts, thoracic duct, and left pleural cavity.

procedures yielded less than 50 mL, the TPC was withdrawn. No radiological recurrence of effusion has been observed after 1 year of follow-up.

This would be the second case of sneezing-induced chylothorax described in the medical literature, according to a search in the PubMed database from its inception until November 16, 2020, using the terms «chylothorax or thoracic duct leak» and «sneeze or sneezing». The previously reported case was a 60-year-old woman who developed bilateral chylothorax after a violent sneeze.<sup>2</sup> Along with the dietary restriction of fats, the patient required the placement of endopleural tubes, one in each hemithorax, which could be removed after two and five days, respectively. Absence of effusion was confirmed on a follow-up X-ray at 3 months. Given the rapid resolution of the process in less than a week with the described treatment, chylothorax due to sneezing was believed to have a good prognosis.<sup>2</sup> However, in our case, the patient required three and a half months of successive and simultaneous procedures (therapeutic thoracentesis, low-fat diet and octeotride, insertion of a TPC,

pleurodesis with talc) to definitively resolve the chylothorax. Lymphangiography, which by itself can reduce the leakage of chyle in some patients, was ineffective in our patient. Therefore, we cannot confirm that strictly conservative treatment can resolve all cases of this rare entity. The left location of the chylothorax indicates that the thoracic duct must have been damaged above the fifth or sixth thoracic vertebrae. Hypothetically, the pathogenesis of chylothorax would be the acute and intense increase in intrathoracic pressure during the sneeze, which would lead to a micro-rupture of the thoracic duct and the corresponding leakage of chyle into the pleural space. In the medical literature, cases of spontaneous “idiopathic” chylothorax have been described, some of which, in view of their temporal relationship and exclusion of other causes, were finally attributed to physical activity,<sup>3</sup> energetic cough,<sup>4</sup> or childbirth,<sup>5</sup> all with the common link of an increase in intrathoracic pressure. Our case underlines the importance of obtaining a directed history to suggest the etiology of chylothorax of apparently uncertain origin. However, due to the exceptional nature of the association between sneezing and chylothorax, it is not possible to infer a uniform course in these cases.

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