Small Chyle Leak Localized on Lymphoscintigraphy with Single-Photon Emission Computed Tomography–Computed Tomography

Abstract

Chylothorax refers to the accumulation of triglyceride-rich fluid (chyle) within the pleural space. We described a case of spontaneous chylothorax in an infant. Lymphoscintigraphy was performed with 99 m-Tc sulfur colloid which showed tracer accumulation into thoracic cavity, and single-photon emission computed tomography/CT (SPECT/CT) revealed leak in the thoracic duct at D8 vertebral level as the cause. We, thus, emphasize the role of lymphoscintigraphy with SPECT/CT in identification of cause and guiding the management of chylothorax, especially when surgical treatment is planned.

Keywords: *Chylothorax, lymphoscintigraphy, single-photon emission computed tomography-computed tomography*

Parneet Singh, Girish Kumar Parida, Ralph Emerson, Pramit Kumar, Kanhaiyalal Agrawal

Department of Nuclear Medicine, All India Institute of Medical Sciences, Bhubaneswar, Odisha, India

A 2-month-old female infant presented with the complaints of rapid, labored breathing and failure to thrive. On examination, she was found to have reduced air entry in bilateral lung bases. Chest X-ray (CXR) was performed, which revealed bilateral moderate pleural effusion. Therapeutic pleurocentesis with Information and Communications Technology (ICT) placement was performed, and biochemical evaluation of pleural fluid revealed high triglyceride and chylomicron levels, thus making the diagnosis of chylothorax. The patient was referred for lymphoscintigraphy to identify the cause of chylothorax. Lymphoscintigraphy was performed by subcutaneous injection of 99 m-Tc labeled sulfur colloid into bilateral feet. Dynamic imaging was started immediately, followed by single-photon emission computed tomography-CT (SPECT-CT). The SPECT/CT images identified the cause of chylothorax as leak of chyle from thoracic duct into pleural cavity at D8 vertebral level [Figure 1]. The infant was managed conservatively with low-fat formula feeding and octreotide infusion starting from the dose of 1 μg/kg/hour and titrated up to 4 μg/kg/hour with blood sugar monitoring. The pleural effusion resolved completely with conservative management, and ICT was removed at day 10 of admission. The patient was doing well without any recurrent episode of pleural effusion at 2-month follow-up.

Chylothorax is the abnormal accumulation of chylous fluid into the pleural cavity. It occurs rarely in children, but constitutes the most common form of pleural effusion in neonatal age.[1] Chyle is a milky, opalescent, noninflammatory, alkaline, and bacteriostatic fluid composed mainly of fat, cholesterol, electrolytes, proteins, glucose, and abundant lymphocytes, mainly T lymphocytes with high triglycerides and cholesterol concentration.[2] The clinical features of chylothorax include heavy feeling in the chest, fatigue, and nutritional and immunological consequences with mortality sometimes reaching as high as 50%, especially if not diagnosed and treated timely.[3]

The diagnosis of chylothorax usually involves the findings of pleural effusion on CXR and pleural fluid analysis, which characteristically reveals milky white fluid rich in triglycerides (>110 mg/dL [>1.24 mmol/L]) with cholesterol levels generally <200 mg/dL. There may be variation in about 15% of cases, but demonstration of chylomicrons confirms the diagnosis of chylothorax.[2,4] The most commonly used investigations to outline the lymphatic vessels, identify the site of chyle leakage, and determine the cause include computerized tomography scans,

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Address for correspondence:
Dr. Girish Kumar Parida, Department of Nuclear Medicine, All India Institute of Medical Sciences, Bhubaneswar - 751 019, Odisha, India.
E-mail: grissh135@gmail.com

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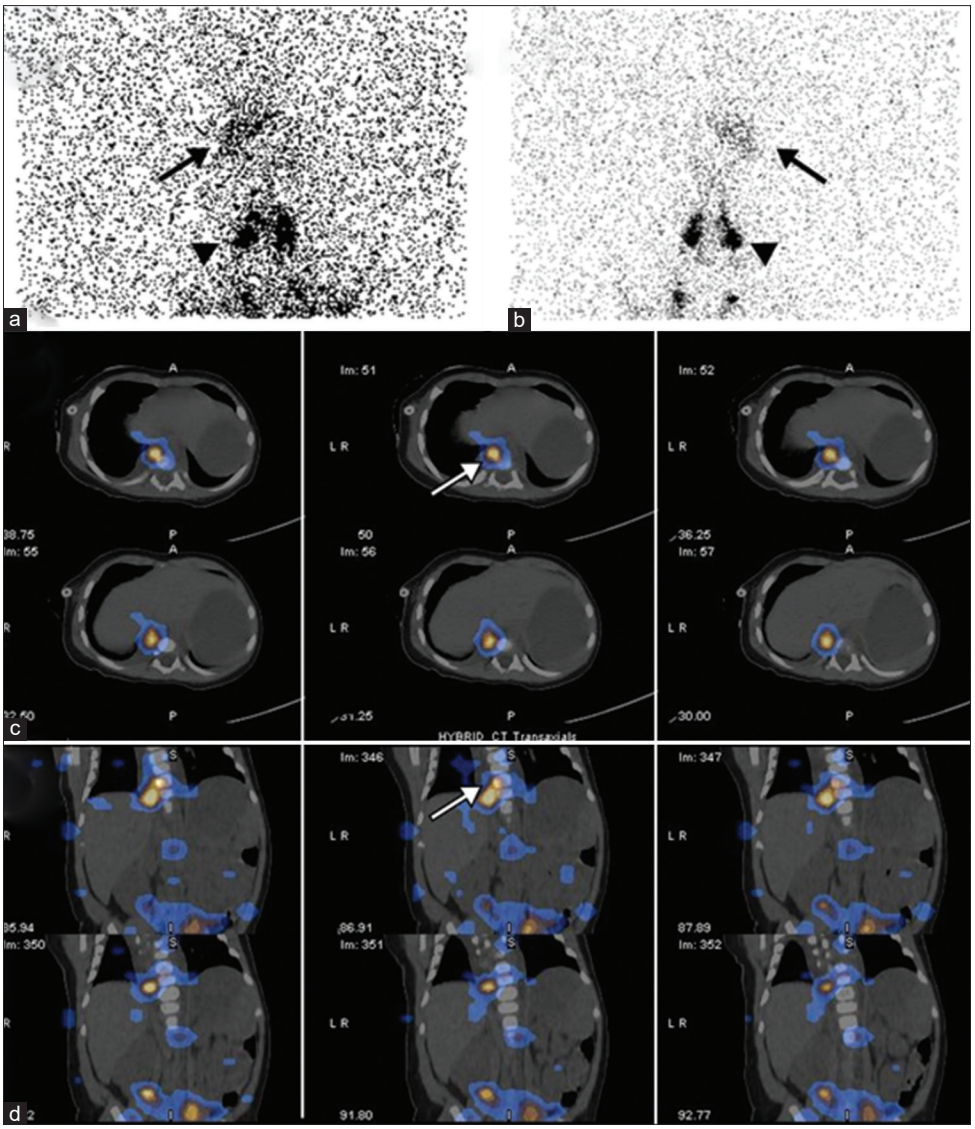

Figure 1: 99 mTc-S colloid LSG images. (a) Anterior and (b) posterior whole-body planar images acquired immediately after tracer injection reveal physiological tracer accumulation in the inguinal lymph nodes (black arrowhead) and liver (black arrow) did not reveal any foci of abnormal tracer localization within the thoracic cavity or elsewhere. (c) Axial and (d) coronal sections of SPECT/CT identified the site of leak in the thoracic duct that corresponds to D8 vertebral level (white arrow). SPECT/CT: Single-photon emission computed tomography/computed tomography

lymphangiography, and lymphoscintigraphy.[5] CT scan has limited utility in localizing the site of leakage. Although lymphangiography enables direct visualization of lymphatic system, it is rarely performed as it is technically demanding and invasive.[5] Lymphoscintigraphy involves intradermal/subcutaneous injection of radionuclide and then tracing its path as it traverses the lymphatic pathway. The entry of radiopharmaceutical into the thoracic cavity gives indirect evidence to chylothorax being the cause of pleural effusion and can also help determine the rate of leak. The 99 mTc-human serum albumin and 99 mTc-sulfur colloid are the two commonly used radiopharmaceuticals for lymphoscintigraphy. Lymphoscintigraphy when added with SPECT-CT, combining both anatomical (CT) and functional (lymphoscintigraphy) images, aids in precise localization of the site of leak as seen in this case. Therefore, lymphoscintigraphy can help precisely define the patient management, especially when surgical management is planned.[1,5,6] The initial management strategy for infantile chylothorax involves conservative management with fluid and electrolyte replenishment, starting TPN, withholding oral feeds, and starting octreotide. More than 80% of spontaneous chylothorax in neonates and infants resolves spontaneously as seen in this case. Surgical treatment is reserved for cases where conservative management fails.[4,7] Thus, due to the cost and radiation exposure associated with lymphoscintigraphy, it should be offered to the patients planned for surgical treatment.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and

other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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