Pulmonary Sparganosis: Tunnel Sign and Migrating Sign on Computed Tomography

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Abstract:
A 77-year-old woman presented at our hospital to undergo a close examination of an abnormal shadow which was observed on a chest radiograph. Contrast-enhanced computed tomography (CT) images in the lung window revealed a tortuous tunnel structure (tunnel sign), which was suspected to be the migration path of a parasite. Furthermore, CT images in the mediastinal window showed a linear filling defect from the right inferior pulmonary vein to the venous ostium in the left atrium (migrating sign), which was suspected to be a migrating parasite in the pulmonary vein. Tunnel and migrating signs on chest CT images were helpful in diagnosing pulmonary sparganosis.

Key words: pulmonary sparganosis, tunnel sign, migrating sign, computed tomography

Introduction
Sparganosis is an infection by the plerocercoid larvae of various tapeworms belonging to the Spirometra genus (1). The larvae enter the human body and may migrate to the subcutaneous tissue, muscles, eyes, or the central nervous system. The involvement of the lungs and pleura is very rare (2). Computed tomography (CT) findings of pulmonary sparganosis previously reported scattered patches or nodules in the lungs (3). To our knowledge, CT images of tunnel and migrating signs reflecting a parasite’s migration path in a pulmonary parenchyma and vessel have not been previously reported. We herein report the presence of tunnel and migrating signs on chest CT images which were helpful in diagnosing pulmonary sparganosis.

Case Report
A 77-year-old woman presented at the division of respiratory medicine at our hospital to undergo a close examination after her chest radiograph revealed an abnormal shadow. No signs of respiratory disease were found, and her superficial lymph nodes were not palpable. On physical examination, the patient’s body temperature was 36.3°C, her respiratory sounds were unremarkable, and no skin lesions were detected. She had a past medical history of hypertension and a family history of endometrial cancer. A hematological analysis revealed a white blood cell count of 5.71×10³/μL with 8.4% being eosinophils, and an erythrocyte sedimentation rate of 40 mm/h. Her chest radiograph showed right hilar lymphadenopathy and thickened linear opacification in the right mid-lung zone (Fig. 1). Contrast-enhanced CT images in the lung window revealed a tortuous tunnel structure (tunnel sign), which was suspected to be the migration path of a parasite, in the lateral basal segment of the right lower lobe (Fig. 2A-E). To our knowledge, CT images of tunnel and migrating signs reflecting a parasite’s migration path in a pulmonary parenchyma and vessel have not been previously reported. We herein report the presence of tunnel and migrating signs on chest CT images which were helpful in diagnosing pulmonary sparganosis.

Under a suspicion of parasite migration, a multi-dot...
Sparganosis is parasitic infection that rarely occurs in humans and it is caused by the larvae of a tapeworm of the genus *Spirometra* (1). While adult spargana live in the intestines of dogs and cats, the eggs are released into fresh water and hatch into coracidia, which in turn are ingested by co-

enzyme-linked immunosorbent assay (ELISA) IgG was performed to detect any specific anti-parasite antibodies in the serum (Division of Parasitology, Faculty of Medicine, University of Miyazaki). The results showed that ELISA IgG was strongly positive for *Sparganum* parasites and negative for *Paragonimus westermani*, *Paragonimus miyazakii*, *Ascaris lumbricoides*, *Dilofilaria parasites* and others. Thus, pulmonary sparganosis was diagnosed.

The patient’s history was taken again, and it was noted that she lives with her husband, who often cuts chickens, which he raises in their backyard, on the same cutting board and knife. Thus, she ingested the larva orally after consuming the raw food. Her husband had no history of any parasitic disease.

To treat the parasitic infection, the patient was given praziquantel, an anti-parasitic drug. Her serum eosinophil counts normalized, and a follow-up chest radiograph indicated a reduction in the linear opacification (Fig. 4) one month after the initial presentation. Contrast-enhanced CT performed five months later revealed that the tortuous tunnel structure and linear filling defect in the pulmonary vein had disappeared. There was no evidence of any recurrence three years after treatment.

**Discussion**

Sparganosis is parasitic infection that rarely occurs in humans and it is caused by the larvae of a tapeworm of the genus *Spirometra* (1). While adult spargana live in the intestines of dogs and cats, the eggs are released into fresh water and hatch into coracidia, which in turn are ingested by co-

pulmonary sparganosis. The tunnel signs were reported to be characteristic MR findings of cerebral sparganosis on post-contrast MRI (7, 8). In the pulmonary parasitic infections, tunnel signs or track signs were reported to be characteristic CT findings of pulmonary paragonimiasis (9, 10). Furthermore, previous studies have not reported a migrating parasite in the vessels, which was identified as a migrating sign on contrast-enhanced CT.
Figure 2. A-E: Axial 5-mm contrast-enhanced computed tomography in the lung window shows a tortuous tunnel structure (arrows). Continually, subpleural nodules with surrounding ground-glass opacity were observed (D, E: thick arrows). The tunnel structure is suspected to be the parasite migration path (tunnel sign). F-J: (Fig. 2F at the same level as Fig. 2A) Axial 5-mm contrast-enhanced computed tomography in the mediastinal window shows a linear defect in right inferior pulmonary vein and venous ostium in the left atrium. Enlarged right hilar lymph nodes (arrowheads) are also observed. The linear defect is suspected to be a migrating parasite in the vessel (migrating sign).

Conclusions

Previously, CT findings of pulmonary sparganosis was reported as scattered patches or nodules in the lung. To our knowledge, tunnel signs reflecting a migration path and a migrating sign reflecting a migrating parasite in the vessel have not been previously reported in pulmonary sparganosis. In the present case, these signs were helpful in the diagnosis
Figure 3. A, B: Using a workstation (ZIO station 2, ZIO soft, Tokyo, Japan), the width of the linear filling defect was measured (A), and the length in six slices was measured and summed (B). The filling defect measured 5.5 cm in length and 2.1 mm in width, which is considered to reflect the size of migrating parasite.

Figure 4. A chest radiograph one month later shows a reduction of the linear opacification (arrow) in the right mid-lung zone.

of pulmonary sparganosis. Additional studies that focus on these diagnostic techniques are needed to support the results presented in this report.

The authors state that they have no Conflict of Interest (COI).

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