Toxocara canis and Toxocara catis are worldwide cosmopolitan roundworms that infect dogs, especially puppies, and cats. T. canis infection in humans occurs by ingestion of the embryonic eggs, which are shed in the feces of infected dogs. Toxocariasis is manifested in three different syndromes: visceral larva migrans (VLM), ocular larva migrans (OLM), and covert toxocariasis (1, 2).

VLM is usually a disease of children 1 to 6 year old, and it may cause hepatosplenomegaly, lymphadenopathy, fever and pulmonary symptoms (3). Unlike children, VLM is less common in adults where it is, usually a benign and self-limited condition; the pulmonary and hepatic involvement of VLM has rarely been described. We report here on a case of VLM due to T. canis in an immunocompetent male patient who presented with cough, pleuritic chest pain, eosinophilia associated with an elevated serum Ig E level, and CT findings including multiple focal air space consolidations in the lungs, bilateral pleural effusion and low attenuated hepatic nodules.

**Index words:** Liver, diseases

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**Case Report**

A previously healthy 48-year-old man was admitted to our hospital presenting with a nonproductive cough and pleuritic chest pain for 2 weeks. He had lost 2 kg of his body weight in 1 month. On his past history, he has eaten raw foods such as liver, muscle and stomach of cattle 2 months ago. The physical examination revealed sign of pleural effusion that manifested as decreased breathing sounds on the right lower chest, but a chest radiograph showed bilateral pleural effusion that was larger on right side and there was a small amount of iatrogenic pneumothorax in the left hemi-thorax due to thoracentesis.

The blood cell count at the time of his admission showed 14,230 leukocytes/mm³ with the cellular component of 45.1% eosinophils. The blood chemistry findings disclosed mildly elevated LDH and alkaline phosphatase levels. The pleural fluid was serous and contained 108 RBC/mm³ and 3744 leukocytes/mm³ with 58% polymorphonuclear cells and 42% lymphocytes.

Contrast-enhanced CT scan revealed multiple focal air space consolidations in both lungs, predominantly in...
Fig. 1. 48-year-old male with toxocariasis involving the lungs, both pleura, and the liver.

A. Chest radiograph shows multifocal ill defined opacities in the right upper lung zone and left mid-lung zone (arrowheads). Note the bilateral pleural effusion and the small amount of pneumothorax in apical portion of left hemi-thorax due to a previous thoracentesis (small arrows).

B. CT scan obtained at the level of the carina of the lung shows focal wedge-shaped consolidation in subpleural portion of the left upper lobe with surrounding ground glass attenuation, and there is patchy ground glass attenuation in the superior segment of the right lower lobe.

C. CT scan obtained at the level of left upper lobar bronchus shows focal consolidation in the posterior segment of the left upper lobe, and a small amount of right pleural effusion.

D. Enhanced CT scan obtained at the level of hepatic dome shows small, round, low attenuated lesion in the right hepatic lobe with poor enhancement (arrow). Patchy infiltration in the left lower lobe and the subpleural area, and bilateral pleural effusions are also seen.

E. Enhanced CT scan obtained at the level of celiac axis shows an ill-defined linear low attenuated lesion in segment 6 of the liver, in the subcapsular area (arrow). The lesion disappeared on follow-up liver US after treatment (Liver US not shown).
testing shows an excellent sensitivity of 91%, and a
specificity of 98%.

In children with VLM (1, 3), bilateral pulmonary infil-
trations are observed in 40 to 50% of patients’ pul-
monary symptoms; however, multiple non-cavitating
pulmonary nodules or focal consolidations are unusual,
and the hepatomegaly with multiple nodules are seen in
72.7% of patients. Unlike children (2, 5, 6), only several
cases have been described in adults with VLM manifes-
tations of diffuse pulmonary infiltration, multiple pul-
monary nodules without cavitation, large amount of
pleural effusion, tamponade and mediastinal lymph-
adenopathy, and hepatic involvement seen as multi-
ple low-density nodules (7). However, to the best of our
knowledge, pulmonary and hepatic involvement of
VLM due to *T. canis* on the CT findings in immunocom-
potent adults has not been previously reported.

In our case, pulmonary involvement was shown as
multiple ill-defined focal air space consolidations with a
GGA halo in both lungs, and this was predominantly
displayed in the subpleural areas on CT. Bilateral pleur-
al effusion was associated with these findings. In addi-
tion, poorly enhanced low attenuated nodules in the liv-
er were also revealed. These CT findings were occasion-
ally described in hypereosinophilic syndrome with mul-
tiple organ involvement (8); however, unlike toxocari-
sis, an elevated serum Ig E level and ECP level are not
generally observed for hypereosinophilic syndrome,
and bilateral pleural effusion rarely occurs.

Humans are infected with *T. canis* by swallowing em-
byronic eggs. The eggs then release larvae into the up-
per small bowel where most of the larva penetrate the
wall of the gut and gain access to the portal venous cir-
culation and hepatic tissue. Lungs, skin, eyeballs and
nervous systems are rarely involved through systemic
circulation (7). It is well known that the larvae release
excretory-secretory *T. canis* antigen (TES-Ag) during
their prolonged tissue migration. Considering that previ-
ous reports of larvae found in biopsy specimens from
the involved organs, and especially liver, were rare (3,
7), it seems that the released TES-Ag causes an Ig E me-
diated immune reaction in the involved organs. And so,
we may presume that pulmonary and hepatic infiltra-
tion observed on CT may be a result of a hypersensitive
reaction due to TES-Ag rather than to a tissue reaction to
just the larvae.

We suggest that if a patient has eosinophilia in periph-
eral blood, multiple focal air space consolidations or
nodules with GGA halo, and multiple hepatic lesions in
adults, the differential diagnosis should include toxocari-
asis, as well as hypereosinophilic syndrome.

References