

## OCCURRENCE OF *TRICHOMONAS TENAX* IN PLEURAL EFFUSION: A CASE REPORT AND A BRIEF REVIEW OF LITERATURES

TOSHIHIKO OHKURA, NORIJI SUZUKI AND YOSHIHISA HASHIGUCHI

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**Abstract:** *Trichomonas tenax* was observed in the pleural effusion of Japanese male patient (70-year-old) with purulent pleuritis. The trichomonad protozoan was found to be concomitant infection with *Escherichia coli* in the purulent effusion. The protozoan measured an average size of  $12.44\mu$  in length and  $8.52\mu$  in width ( $n=30$ ). Based on the morphological features, such as size of trichomonad, number of flagella and short undulating membrane, the organism was identified as *T. tenax*. The aetiological aspects in this case, however, still remained uncertain, though the patient might be partially affected by a great number of *T. tenax* in the pleural cavity. As to the two organisms found in the pleural effusion, the route of invasion was not known. The homosexual behaviour of the patient, however, might have some connection with the route of invasion.

In 1867, Leyden and Jaffe described the first case of trichomonad infection from the human respiratory tracts in Germany (Walton and Bacharach, 1963; Memik, 1968). Thereafter, few cases have been reported in the world; only one case in Japan so far as is known. Due to the paucity information, invasion of the respiratory tracts by trichomonads is little understood among parasitologists or physicians. To have more information on the human infection with this protozoan, such a case report seems to be important, though there still remain certain doubts regarding the exact pathogenesis.

Recently, we have had an opportunity to observe trichomonad protozoans from the pleural effusion of a patient with acute pleural disease from Kochi, Japan.

### CASE REPORT

A 70-year-old male from a nearby village presented himself to the Kochi National Hospital, Kochi City. The patient was hospitalized from 28 April 1981 to 4 June 1981, because of hemoptysis associated with shortness of breath, wheezing, cough, tachypnea and fever with severe chest-pain. In the past history, the patient had had fractures of the right 6th and 7th ribs, having been treated in 1976. Moreover, he had fallen down on the street and injured his right chest in the middle of April, 1981. The patient had no history of gastrointestinal disease and diabetes or tuberculosis, but he was suffering from alcoholism and had a homosexual behaviour.

Physical examination revealed a well-developed and wellnourished man. Vital signs on the day (28 April, 1981) of admission were: temperature, 38°C; pulse, 98; respiration, 36; and blood pressure, 100/60. The liver and spleen were not palpable. The extremities had no cyanosis or edema. Chest X-ray showed a cured picture of fractures of the 6th and 7th ribs (1976) and a high retention of the right pleural effusion. The X-ray, after removal of the effusion, revealed an adhesion of the pleura, caused by purulent pleuritis. By a test thoracocentesis on the day of admission, purulent materials were obtained and they were positive for Gram positive and negative bacteria in smear specimens. The fresh materials were also positive for *Trichomonas tenax*. Moreover, in culture of the materials, *T. tenax* and *Escherichia coli* were found, but not *Mycobacterium tuberculosis*. Sensitivity test of *E. coli* for the following drugs were: PcA, -; PcB, -; PcS, -; TC, +; AMK, +; CER, +; CET, +; PIP, +; CM, +; CFS, +; CEP, +; and CEX, +.

Laboratory examinations showed the following value at the time of admission: hemoglobin, 11.9 g/100 ml; white blood cell count, 22,400/mm<sup>3</sup>, with 92 per cent neutrophil and 8 per cent lymphocyte; red blood cell count, 367 × 10<sup>4</sup>/mm<sup>3</sup>; hematocrit, 38 per cent; blood platelet, 32.4 × 10<sup>4</sup>/cm<sup>3</sup>; total bilirubin, 0.8 mg/100 ml; total protein, 5.4 mg/100 ml; A/G ratio, 0.74; GOT, 10 u; GPT, 65 u; alkaline phosphatase, 11.0 King-Armstrong units; and LDH, 220 u. The patient revealed a decrease of total protein and a slight liver failure.

According to the results of laboratory examinations, the following treatments were performed on and after the day of admission: as a wide spectrum chemotherapy against bacteria, Cephalothin (Shionogi Co.) was daily given 6 g/day for the first 15 days and thereafter Cefotiam (Takeda Co.), 3 g × 16 days; Cefsulodin (Takeda Co.), 2 g × 10 days; and against trichomonads, Metronidazole (Shionogi Co.), 0.5 g × 10 days. At 24 hours after admission, the 2nd thoracocentesis was performed and yielded 1,900 ml of purulent fluid. In order to remove the pleural effusion, a chest tube was inserted on the right side and this alleviated the symptoms, such as cough, chest pain and tachypnea, of the patient gradually. A total of 400 ml to 600 ml per day of the pleural fluid was removed during the first 3 days after insertion of the tube. From the 4th day onward, amount of the fluid ranged between 100 ml and 300 ml per day, showing a gradual decrease, and the body temperature of the patient fluctuated between 36.5°C and 37.5°C. The tube was removed on the 21st day of admission when no pleural fluid flowed from his chest. *E. coli* disappeared on the 11th day of admission and *T. tenax*, on the 4th day by the treatment mentioned above. The patient recovered and was discharged in good condition on the 38th day of admission.

#### OBSERVATION OF TRICHOMONADS

Both the fresh and Hematoxylin-Eosin stained materials revealed a great number of trichomonad protozoans. The organism was readily identified as *Trichomonas* by its typical features, such as pear-shaped form with flagella, undulating membrane and protruding axostyle, and also by its characteristic wobbly, rolling movement. The trichomonad has four free flagellae of equal length and a fifth one on the margin of the undulating membrane. It measured 12.44 ± 1.60 (9.09–16.16) μ in length and 8.52 ± 2.41 (4.04–12.12) μ in width (n = 3). These features observed suggested the organism to be *T. tenax*.

## COMMENTS

In the present study, *T. tenax* and *E. coli* were recovered from the purulent pleural effusion of a male patient with acute pulmonary disease. The patient suffered from the pleuritis probably caused after spontaneous pneumothorax at the time of thoracic bruise in the middle of April, 1981. In this case, therefore, the pleural effusion might be produced mainly by the pleuritis. Moreover, the concomitant infection of the two organisms would have an influence against a bad turn of the present illness. The patient recovered from the disease by 38th day of hospitalization, having treatment with Cephalothin, Cefotiam, Cefsulodin and Metronidazole.

In general, it is considered that both *T. tenax* and *E. coli* are nonpathogenic for man in their normal sites of parasitism, such as the mouth and the large intestine respectively. In case of the present abnormal parasitism, however, it would be quite probable that the two organisms, *T. tenax* and *E. coli*, could partly affect the patient, in particular the latter being a causative agent of such a great amount of the pleural effusion. As to *T. tenax* and *E. coli* found in the pleural effusion, the route of invasion was not known. The homosexual behaviour of the patient, however, might have some connections with the route of invasion.

In the genus *Trichomonas*, three species, *T. vaginalis*, *T. hominis* and *T. tenax*, are found in man. Of these, *T. vaginalis* is the most popular trichomonad in ordinary practice of physicians. Thus, most of the literatures are concerned with the case found in the vaginal, urinary and intestinal tracts. On the other hand, invasion of the respiratory tract by trichomonad protozoans is a relatively rare case (42 in total in the world) in human infections (Table 1). Walton and Bacharach (1963) made a chronological summary of 16 literature references to pulmonary trichomonads reported during the period from 1867 to 1942; they summarized 30 cases from Germany, France, U.S.A., Holland, Switzerland, Argentina and Japan, adding 3 own cases from U.S.A. In these earlier literatures, as the variety of names was applied to flagellates from the respiratory tract, no reliable identification was available (Walton and Bacharach, 1963). In 1961, Kott and Adler demonstrated serotype differentiation among *T. vaginalis*, *T. hominis* and *T. tenax*. However, a clinically reliable serologic test is not yet available (Walzer *et al.*, 1978). The above 3 cases of Walton and Bacharach (1963) were considered to be *T. tenax* based on the morphological characteristics of the trichomonads which measured  $13\mu$  in an average length, while *T. vaginalis* showed the length of  $18\mu$  in similarly fixed and stained materials. Memik (1968) reported a case of *T. tenax* recovered from the pleural effusion of a patient with chronic pulmonary disease, and insisted the importance of examination of the pleural fluid of patients by direct microscopic means, in order to diagnose trichomonad infections. Recently, Osborne *et al.* (1984) reported a case of trichomonads in the respiratory tract, along with a review of reported 10 cases of respiratory trichomoniasis during the years from 1956 to 1984 in the world.

In the present case, a great number of active *T. tenax* was found in the fresh materials of the pleural effusion. Such an abundance in numbers of the flagellate might be due to the concomitant infection with *E. coli*, in spite of the abnormal site of parasitism; *T. tenax* was normally cultured only in the presence of bacteria (Carneri and Giannone, 1964). The aetiological aspects of *T. tenax* in this case still remained uncertain, but pulmonary forms of trichomonads should not be considered completely benign yet (Memik, 1968).

Table 1 Summary of references of pulmonary trichomonads from different countries\*

Author and year	No. of cases	Materials found	Name applied	Associated disease	Country
Leyden and Jaffe, 1867	2	Sputum	Infusorien	Putrid bronchitis	Germany
Kannenber, 1879	5	Sputum,	Monas lens,	Lung gangrene	Germany
1880	6	lung abscess (1)	cercomonas		
Stockvis, 1884	1	Sputum	Paramecium	Hemoptysis-purulent sputum	Holland
Litten, 1886	1	Pleural exudate	Cercomonas	Tuberculous hydropneumothorax	Germany
Streng, 1892	3	Sputum, histologic section (1)	Monaden	Exudative pleuritis & abscess, lobar pneumonia	Germany
Roos, 1893	1	Sputum, pleural exudate	Cercomonas	Purulent pleuritis, lung abscess	Germany
Grimm, 1894	1	Sputum, liver abscess	Flagellaten	Lung and liver abscess	Japan
Schmidt, 1895	3	Sputum, Dittrich's plugs, bronchus (1)	<i>Trichomonas pulmonalis</i> **	Carcinoma of larynx, bronchiectasis, chronic pleuritis	Germany
Artault, 1898	1	Sputum	<i>T. pulmonalis</i> **	Lung gangrene	France
Dollet, 1910	1	Sputum	<i>T. intestinalis</i>	Pneumonia, lung gangrene	U. S. A.
Honigman, 1921	1	Sputum	<i>T. hominis</i>	Chronic bronchitis	Germany
Parisot and Simonin, 1921	1	Sputum	<i>T. intestinalis</i>	Lung gangrene	France
Marx, 1927	1	Sputum	<i>T. pulmonalis</i> **	Putrid bronchitis, bronchiectasis, chronic pneumonia	Switzerland
Navarro and De Alzaga, 1933	1	Sputum, pus from thoracic abscess	<i>T. hominis</i>	Hepatic and thoracic abscess	Argentina
Glabach and Guller, 1942	1	Sputum	<i>T. buccalis</i> **	Pneumonia	U. S. A.
Tumka, 1956	1	Pleural fluid	<i>Trichomonas</i>	Tuberculosis	U. S. S. R.
Walton and Bacharach, 1963	3	Sputum, bronchial washings	<i>Trichomonas</i> ( <i>T. tenax</i> ?)	Pulmonary fibrosis (1) pulmonary carcinoma (2)	U. S. A.
Rebhun, 1964	1	Sputum	<i>Trichomonas</i>	Chronic bronchitis	U. S. A.
Abed <i>et al.</i> , 1966	1	Pleural fluid	<i>Trichomonas</i>	Bronchopleural fistula	France
Memik, 1968	1	Pleural fluid	<i>T. tenax</i>	Pleural pleuritis	U. S. A.
Fardy and March, 1969	2	Pulmonary tissue	<i>Trichomonas</i>	Tuberculosis	Canada
Walzer <i>et al.</i> , 1978	1	Pleural fluid	<i>Trichomonas</i>	Aspiration pneumonia	U. S. A.
Osborne <i>et al.</i> , 1984	1	Pleural fluid	<i>Trichomonas</i>	Purulent pleuritis	U. S. A.
Ohkura <i>et al.</i> , 1985	1	Pleural fluid	<i>T. tenax</i>	Purulent pleuritis	Japan

\* Modified based on Walton and Bacharach (1963), and Osborne *et al.* (1984).

\*\* Considered to be *T. tenax*.

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胸水中の *Trichomonas tenax* の 1 症例および既報症例

大倉 俊彦・鈴木 了司・橋口 義久

膿胸を伴う胸膜炎患者 (70歳, 男性) の胸水中に活発な運動性を有する多数のトリコモナスを見いだし, 虫体の計測値や鞭毛の形態等から口腔トリコモナス *Trichomonas tenax* と同定した。また同時に多数の大腸菌 *Escherichia coli* も検出された。これらの原虫や細菌の本症例における詳細な関わりについては不明である。日本における *T. tenax* の症例は1894年以来第2例目に当たる。口腔トリコモナスに対して Metronidazole を, 大腸菌には Cephalothin, Cefotiam および Cefsulodin を用いて治療を試みたら, 前者は入院4日後に, 後者は11日後に, それぞれ胸水中から消失し, その後の再発はなく, 患者は入院38日後に退院した。口腔トリコモナスと大腸菌の胸腔内への侵入経路は明らかでないが, 自然気胸や患者の同性愛癖が何らかの形で関与していることも考えられる。