

[CASE REPORT]

Secondary Syphilis with Pulmonary Involvement

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Abstract:

A 39-year-old Japanese man presented to our hospital complaining of left chest pain and rash on the hands and feet. Plain thoracic computed tomography (CT) revealed multiple nodular shadows in the left lower lobe of the lung. A diagnosis of secondary syphilis was made based on the appearance of the rash and positive serologic tests for syphilis. The patient was started on amoxicillin but was switched to minocycline due to amoxicillin-induced rash on both forearms. Thoracic CT after five months of treatment revealed that the multiple lung nodular shadows had contracted, and secondary syphilis with pulmonary involvement was diagnosed.

Key words: secondary syphilis, *Treponema pallidum*, pulmonary involvement

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Introduction

The global incidence of syphilis was 10.6 million cases in 2008, a slight decrease from the 12 million cases recorded in 1999 (1, 2). Although the incidence is decreasing year by year in Africa, where the disease is most prevalent (3), the yearly incidence in Japan has been rising since 2010; the 4,518 cases reported in 2016 represented a 7.2-fold increase over the figure reported in 2010 (4). In Japan, the incidence of syphilis among women as well as among men who have sex with men (MSM) is rising at a rate similar to that of the United States (4, 5).

Left untreated, syphilis gradually progresses through several stages, including a period of latency: primary, secondary, early latent, late latent, and tertiary. In primary syphilis, *Treponema pallidum* subsp. *Pallidum* invades the mucosa and skin, causing painless chancres and regional lymph node enlargement within 10-90 days of infection (6). In secondary syphilis, 4-10 weeks later, *Treponema pallidum* spreads to multiple organs, causing systemic symptoms including maculopapular rash, enanthema of the mouth and genitals,

general malaise, generalized lymph node enlargement, meningitis, and ocular inflammation (6).

We herein report a rare case of a Japanese man demonstrating secondary syphilis associated with pulmonary involvement.

Case Report

A 39-year-old Japanese man visited our hospital complaining of left chest pain and a rash on his hands and feet. His medical history included allergic rhinitis. He was a regular smoker (5-10 cigarettes/day) and social drinker. He had had sexual intercourse three months previously, in Japan, with a commercial sex worker. He had not traveled overseas. The patient had attended a local clinic because of left chest pain, rash on the hands and feet, and stomatitis three weeks before presenting for an examination at our hospital. He had no fever, coughing, sputum, or weight loss, but plain thoracic computed tomography (CT) revealed multiple nodular shadows in the left lower lobe of lung, and metastatic lung cancer was suspected at the first visit. No lesions were evident on upper or lower gastrointestinal endo-

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Table 1. Laboratory Findings on Admission.

<Urinalysis>	
Protein	(-)
Glucose	(-)
Occult blood	(-)
<Blood cell count>	
White blood cell	10,600 / μ L
Red blood cell	520 10^4 / μ L
Hemoglobin	14.8 g/dL
Hematocrit	43.2 %
Platelet	62.1 10^4 / μ L
<Serum chemistry>	
Total protein	7.6 g/dL
Albumin	3.9 g/dL
Blood urea nitrogen	16 mg/dL
Creatinine	0.63 mg/dL
Total-bilirubin	0.2 mg/dL
Aspartate transaminase	22 U/L
Alanine transaminase	39 U/L
Alkaline phosphatase	351 U/L
γ -Glutamyl transpeptidase	161 U/L
Lactate dehydrogenase	214 U/L
Glucose	86 mg/dL
Sodium	137 mEq/L
Potassium	4.4 mEq/L
Chlorine	102 mEq/L
C-reactive protein	3.13 mg/dL
<Erythrocyte sedimentation>	
1h	62 mm
<Immunology> (Reference range)	
Immunoglobulin G	1,692 mg/dL (900-1,900)
Immunoglobulin A	303 mg/dL (100-440)
Immunoglobulin M	173 mg/dL (33-190)
Rheumatoid factor	(-) U/mL (<15)
MPO-ANCA	(-) U/mL (<3.4)
PR3-ANCA	(-) U/mL (<3.4)
sIL-2R	1,180.0 U/mL (145.0-519.0)
<Infection> (Reference range)	
RPR	(+) 64 Titer (<1)
TPHA	(+) 10,240 Titer (<10)
Hepatitis B surface antigen	(-) 0.01 U/mL (<0.04)
Hepatitis C virus antibody	(-) 0.06 S/CO (<0.99)
Anti-HTLV-1	(-) Titer (<16)
HIV-Ag/Ab	(-) 0.29 S/CO (<0.99)
β -D Gulcan	(-) pg/mL (<11)
<Tumor marker> (Reference range)	
CEA	0.7 ng/mL (<5.0)
SCC	0.8 ng/mL (<1.5)
CYFRA	0.74 ng/mL (<2.08)
Pro-GRP	41 pg/mL (<81)
NSE	10.4 ng/mL (<16.3)

MPO-ANCA: myeloperoxidase anti-neutrophil cytoplasmic antibody, PR3-ANCA: proteinase 3 anti-neutrophil cytoplasmic antibody, sIL-2R: soluble interleukin-2 receptor, RPR: rapid plasma regain card test, TPHA: *Treponema pallidum* hemagglutination test, Anti HTLV-1: human T-cell leukemia virus type-1 antibody, HIV-Ag/Ab: human immunodeficiency virus-antigen/antibody, CEA: carcinoembryonic antigen, SCC: squamous cell carcinoma antigen, CYFRA: soluble cytokeratin fragment, Pro-GRP: pro-gastrin releasing peptide, NSE: neuron specific enolase



Figure 1. Chest X-ray on arrival at the hospital. The costophrenic angle was blunted on the left side (arrow), although no abnormal shadows were visible in the lung field.

scopy. Because the nodular shadows in the lungs were still evident on contrast-enhanced thoracic CT one week after the initial image evaluation, the patient was referred to our hospital for further investigation and treatment.

On arrival at the hospital, he had no impaired consciousness. His physical examination showed height 167.9 cm, weight 70.9 kg, body mass index 25.2 kg/m², body temperature 36.8°C, pulse 85/min (regular), blood pressure 102/60 mmHg, and SpO₂ 99% (indoors). Multiple oral aphthae several millimeters in size were present on the tongue and soft palate. There was no redness of the pharynx or enlargement of the tonsils. Numerous cervical lymph glands on both sides of the neck were enlarged, although these were soft, and no tenderness was observed. There were no abnormal heartbeat or respiratory sounds, and no abdominal abnormalities were observed. Numerous pale red, scaly nodular erythematous patches 3-8 mm in size were scattered on the palms of the hands and the soles of the feet; however, there was no blister formation.

Laboratory test results on initial examination (Table 1)

The white blood cell count was 10,600/ μ L, and the platelet count was elevated, at 62.1 $\times 10^4$ / μ L. Serum biochemistry tests revealed elevated levels of γ -glutamyl transpeptidase at 161 U/L. The serum C-reactive protein levels and sedimentation rate were elevated, at 3.13 mg/dL and 62 mm/h, respectively. The serum soluble interleukin-2 receptor level was elevated, at 1,180 U/mL (normal range 145.0-519.0 U/mL). A rapid plasma regain card test (RPR) and a *Treponema pallidum* hemagglutination test (TPHA) revealed titers of 1:64 and 1:10,240, respectively. Thus, a secondary syphilis infection was diagnosed. Human immunodeficiency virus (HIV) antigen and antibody tests were negative.

Imaging findings

Chest X-ray did not reveal any nodular shadows in the lung field, although the costophrenic angle was blunt on the

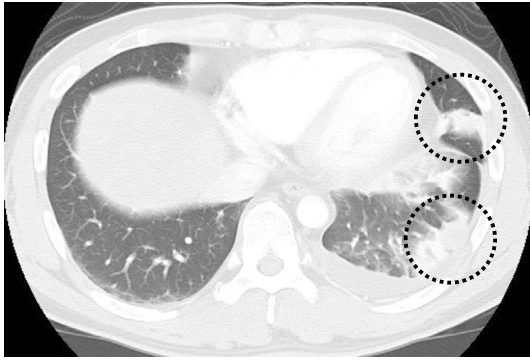


Figure 2. Contrast-enhanced thoracic computed tomography on arrival at the hospital. Bilateral pleural effusion was present, with multiple nodular shadows (dotted lines) in the left lower lobe.

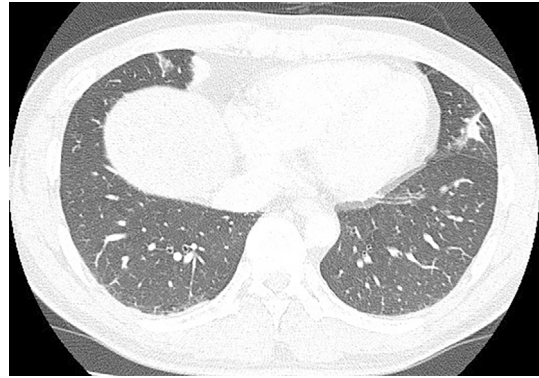


Figure 3. Contrast-enhanced thoracic computed tomography at Week 19 after the start of treatment.

left side (Fig. 1). Contrast-enhanced thoracic CT revealed slight enlargement of the left mediastinal lymph nodes and bilateral axillary lymph nodes, as well as a small volume of pleural effusion on the left side and multiple nodular shadows in the left lower lobe of lung (Fig. 2). Doppler sonography of the neck revealed multiple enlarged lymph nodes, with the lymph node hila preserved. In many lymph nodes, the blood flow entered via the hila; however, because some showed inflow via the margins, the possibility of malignant lymphoma or cancerous lymph node metastases could not be ruled out.

Positron emission tomography-CT (PET-CT) revealed a high uptake in the bilateral cervical, subclavicular, axillary, mediastinal, and pelvic pararectal lymph nodes but no uptake in any other organs. The results from a cervical lymph node biopsy, bacterial culture smear, and acid-fast bacillus culture smear were all negative, as were tests for *Mycobacterium* DNA using polymerase chain reaction. Pathological tests showed lymphoid follicular hyperplasia, enlarged germinal centers, and paracortical dilation, with vascular proliferation and fibrosis of the paracortical area. Immunostaining of the germinal centers was negative for B-cell lymphoma but positive for cluster of differentiation. Taking these results together with those from flow cytometry, genetic tests, and staining, we suspected reactive lymph node enlargement.

Clinical course

Secondary syphilis was diagnosed based on the nodular pale red rash on the palms and soles, the fact that the patient had engaged in sexual intercourse with a commercial sex worker 3 months before the symptoms appeared, and the respective RPR and TPHA titers of 1:64 and 1:10,240. In addition, the observations of oral aphthae and multiple enlarged lymph nodes were consistent with secondary syphilis. The patient was unable to produce sputum, so sputum culture and sputum cytology could not be performed, and bronchoscopy was not done because the patient refused; the bacterial and histological causes of the pulmonary lesions there-

fore remained unclear.

The patient was started on oral amoxicillin at 1,000 mg/day to treat the secondary syphilis. At Week 5 from the start of the amoxicillin administration, a rash appeared on both forearms that was considered to be drug-induced, and the patient was switched to oral minocycline at 200 mg/day. The rash on the palms and soles gradually resolved, and thoracic CT at Week 6 revealed that the nodular shadows had contracted and the pleural effusion had disappeared. By Week 8, his serum RPR had fallen from 1:64 to 1:4, and by Week 11, the rash on the palms and soles had resolved, so antibiotic treatment was discontinued. The total treatment duration was 11 weeks. Thoracic CT at Week 19 (Fig. 3) showed no enlargement of the nodular shadows and no accumulation of pleural effusion; the cervical and axillary lymph nodes had contracted, and serum RPR was undetectable. The ultimate diagnosis was secondary syphilis with pulmonary involvement. The clinical course of this patient is shown in Fig. 4.

Discussion

Syphilis is a sexually transmitted disease that is becoming increasingly common in Japan (4). In our case, the infection was contracted during sexual intercourse with a commercial sex worker. Rash, oral aphthae, and generalized lymph node enlargement are typical symptoms of secondary syphilis (6). It was necessary to differentiate the multiple lung nodules from other conditions, and in light of the patient's clinical course, they were regarded as syphilitic pulmonary lesions. The patient was not infected with HIV.

Pathological tests on cervical lymph node biopsy specimens were useful for ruling out malignant tumor but did not lead to a diagnosis of syphilis. Dark-field microscopy, immunofluorescence microscopy, and silver impregnation staining are valuable for the direct visualization and diagnosis of *Treponema pallidum*; however, in many cases, the bacteria are not seen in lymph node lesions (7, 8). In addition to the follicular hyperplasia seen in our patient, the pathological findings from syphilis in lymph nodes may be varied and atypical, with some cases exhibiting epithelioid cells or non-

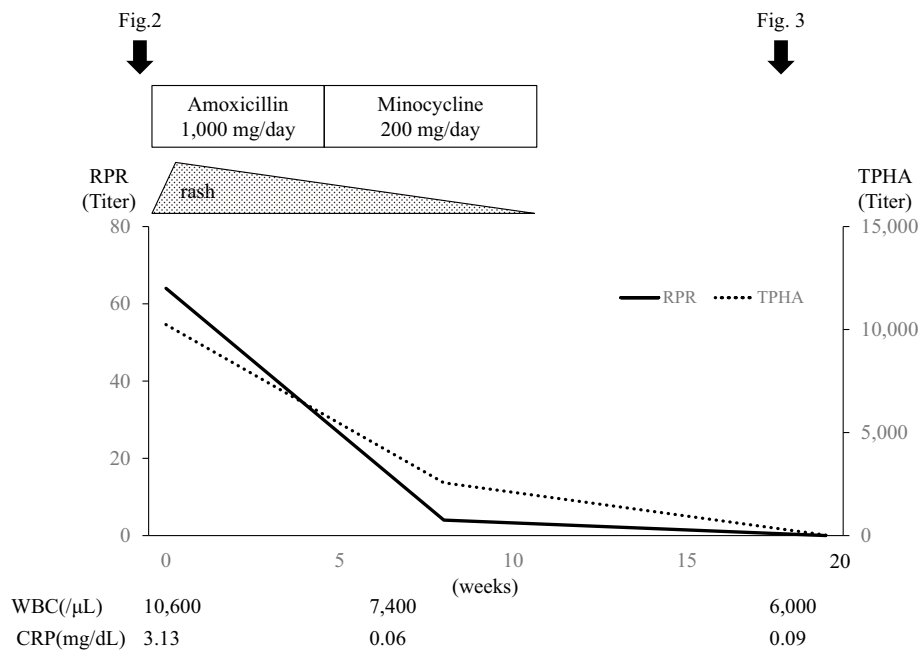


Figure 4. Clinical course. RPR: rapid plasma regain card test, TPHA: *Treponema pallidum* hemagglutination test, WBC: white blood cell count, CRP: C-reactive protein

caseating granuloma and others showing hypertrophy or fibrosis of the capsule (7). In our case, malignant tumor was ruled out by the combination of pathological findings and serological test results.

In 1983, Coleman et al. (9) proposed five criteria for the clinical diagnosis of secondary syphilis with pulmonary involvement: [1] history and physical findings typical of secondary syphilis; [2] serologic test results positive for syphilis; [3] pulmonary abnormalities seen on radiographs with or without associated pulmonary symptoms or signs; [4] exclusion of other forms of pulmonary disease when possible, using serologic tests, sputum smears and cultures, and cytologic examination of sputum; and [5] therapeutic response to anti-syphilitic treatment visible on radiographs. The differential diagnosis for multiple nodular shadows in the lungs includes primary or metastatic lung cancer, malignant lymphoma, mycosis, tuberculosis, septic embolization, rheumatoid nodules, and Wegener's granulomatosis. In the present case, we were unable to perform culture tests, sputum cytology, or a lung biopsy. However, because tests for tumor markers, β -D glucan, rheumatoid factor, and proteinase 3-anti-neutrophil cytoplasmic antibody were all negative and there were no clinical symptoms or signs indicative of another condition that might cause multiple lung nodules, syphilis with pulmonary involvement was diagnosed.

Pulmonary lesions due to syphilis have been reported in cases of late or congenital syphilis, occurring in 1-12.5% of cases (9). The case reports of secondary pulmonary syphilis from 1968 to 2015 in a MEDLINE database are summarized in Table 2 (9-24). We concluded based on these previous case reports that secondary syphilis with pulmonary involvement is relatively rare, with only 16 reported cases since the condition was first described in 1968. A comparison of our

patient with these 16 reported cases revealed that although multiple nodular shadows as seen in our case are the most frequent symptom, single nodular shadows and pleural effusion are also common. Most patients had no pulmonary symptoms, such as coughing or sputum, but did experience chest pain. All of the reported cases responded well to anti-syphilitic treatment, irrespective of HIV status, with the pulmonary lesions resolving within a period of a few weeks to six months.

The total treatment duration for the present case was 11 weeks. The Centers for Disease Control and Prevention guidelines on the treatment of sexually transmitted disease state that the first-choice treatment for syphilis is a single intramuscular injection of benzathine penicillin G (25). In Japan, because intramuscular injection of benzathine penicillin G is not approved, oral amoxicillin and aminobenzyl penicillin for four to eight weeks are recommended as the first-choice treatments for early syphilis. However, a recommended treatment period for secondary syphilis with pulmonary involvement has not been established. Because this was our first experience with this type of case, we determined the treatment duration after confirming improvement on imaging findings.

In our case, thoracic CT five months after the initiation of treatment revealed the persistence of slight shadows in the left lower lobe. However, because RPR was negative and the patient had no risk factors for reinfection, such as MSM or HIV infection (26, 27), the risk of flare-up or reinfection was considered to be low, and no further examination was performed.

In conclusion, we treated a patient with multiple nodular pulmonary shadows and pleural effusion who responded well to anti-syphilitic treatment. Our diagnosis was second-

Table 2. Case Reports of Secondary Pulmonary Syphilis from 1968 to 2015 and the Present Case.

Case No.	Age (Years)	Sex	Respiratory symptom	Symptoms except for chest symptoms	Radiological image of the lung	Drug therapy	Time to radiological improvement	HIV infection	Sexual orientation	Reporting year	Reference
The present case	39	Male	Chest pain	Rash, Stomatitis, Lymphadenopathy	pleural effusion LLL multiple nodules and pleural effusion	Amoxicillin 1.0 g/day for 5 weeks → Minocycline 200 mg/day for 6 weeks	19 weeks	None	Heterosexual	-	-
1	37	Male	Chest pain	Fever, Rash, Lymphadenopathy, Penile ulcer	Multiple bibasilar nodules	Penicillin	8 weeks	Unknown	MSM	2015	10)
2	50	Male	None	Rash, Malaise	RML isolated nodule	Benzathine penicillin G	6 months	Unknown	Unknown	2015	11)
3	51	Male	Chest pain	Fever, Myalgia, Rash, Lymphadenopathy	Multiple nodules	Benzathine penicillin G 2.4 MU im	10 months	None	Heterosexual	2013	12)
4	38	Male	Right thoracic-abdominal pain	Low grade fever	Right pleural effusion	Meropenem	4 weeks	None	Unknown	2012	13)
5	40	Male	Right chest pain	Right lower abdominal pain, Malaise, Exertional dyspnea, Rash	RML multiple nodules	Benzathine penicillin G 2.4 MU/week im for 3 weeks	4 months	None	MSM	2012	14)
6	56	Female	Left chest pain	Rash, Hyperemia, Eyeball pain, Malaise, Weight loss	RML and bibasilar multiple nodules	Benzathine penicillin G 2.4 MU/week im for 3 weeks	3 months	None	Heterosexual	2011	15)
7	34	Male	Right chest pain	Malaise, Loss of appetite, Night sweat, Weight loss	Multiple nodules	Penicillin G 18 MU/day iv for 2 weeks	3 months	Positive	MSM	2006	16)
8	50	Male	Dry cough	Fever, Chill, Night sweat, Weight loss, Rash, Nasal bleeding, Conjunctivitis	Multiple nodules	Penicillin	2 months	None	Heterosexual	2004	17)
9	68	Male	Dyspnea, Chest pain	Malaise, Slight fever, Headache, Disorientation	LLL pneumonia with pleuritis	Benzathine penicillin G 2.4 MU/week im for 3 weeks	2 weeks	Positive	Unknown	1997	18)
10	37	Male	None	Rash, Fever, Penile ulcer, Lymphadenopathy, Abdominal pain, Nausea	Bibasilar reticulonodular infiltrates	Penicillin G iv	1 months	Positive	Unknown	1994	19)
11	33	Male	None	Rash, Loss of appetite, Weight loss, Rectal mass	RUL solitary nodule	Benzathine penicillin G 2.4 MU/week im for 2 weeks	6 weeks	Unknown	Heterosexual	1992	20)
12	48	Male	Dry cough, Chest pain	Fever, Loss of appetite, Sore throat, Rash, Penile ulcer	LLL solitary nodule	Amoxicillin 1.5 g/day for 2 weeks → Benzathine penicillin G 1.2 MU/week im for 4 weeks	2 months	Unknown	Heterosexual	1987	21)
13	37	Male	Backache	Fever, Night sweat, Rash, Lymphadenopathy, Splenomegaly	LLL nodule	Tetracycline for 15 days	1 month	Unknown	MSM	1985	22)
14	39	Male	Dry cough	Malaise, Night sweat, Weight loss, Rash, Lymphadenopathy	RLL solitary nodule	Benzathine penicillin G 2.4 MU/week im	4 months	Unknown	MSM	1983	9)
15	31	Male	Backache	Fever, Weight loss, Rash	LLL solitary opacity, Pleural effusion	Penicillin G 10 thousand U/day iv for 10 days + Benzathine penicillin G 2.4 MU/week im for 3 weeks	Unknown	Unknown	Heterosexual	1981	23)
16	52	Male	None	Fever, Loss of appetite, Sore throat, Rash, Uveitis, Alopecia	Multiple bibasilar nodules	Penicillin G 0.6 MU/day iv for 13 days	4 months	Unknown	Unknown	1968	24)

MSM: men who have sex with men, RML: right middle lobe, LLL: left lower lobe, RUL: right upper lobe, RLL: right lower lobe, im: intramuscularly, iv: intravenously, MU: mega unit

dary syphilis with pulmonary involvement. The differential diagnosis for pulmonary lesions is varied, and syphilis must be included, regardless of the presence of respiratory symptoms.

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

References

- World Health Organization, Global incidence and prevalence of selected curable sexually transmitted infections-2008 [Internet]. [cited 2015 Nov. 20]. Available from: http://apps.who.int/iris/bitstream/10665/75181/1/9789241503839_eng.pdf
- World Health Organization, Global prevalence and incidence of selected curable sexually transmitted infections: overview and estimates. Geneva, 2001 [Internet]. [cited 2015 Nov. 20]. Available from: http://www.who.int/hiv/pub/sti/who_aids_2001.02.pdf
- Kenyon CR, Osbak K, Chico RM. What underpins the decline in syphilis in Southern and Eastern Africa? An exploratory ecological analysis. *Int J Infect Dis* **29**: 54-61, 2014.
- NATIONAL INSTITUTE OF INFECTIOUS DISEASES IDWR Surveillance Data Table [Internet]. [cited 2017 Mar. 24]. Available from: <https://www.niid.go.jp/niid/en/surveillance-data-table-english/6999-idwr-sokuho-data-e-1652.html>
- 2012 Sexually Transmitted Disease Surveillance, Centers for Disease Control and Prevention [Internet]. [cited 2015 Nov. 21]. Available from: <http://www.cdc.gov/std/stats12/syphilis.htm>
- Ho EL, Lukehart SA. Syphilis: using modern approaches to understand an old disease. *J Clin Invest* **121**: 4584-4592, 2011.
- Wang X, Li WQ, Liu HM, et al. Isolated syphilitic cervical lymphadenopathy: report of two cases and review of the literature. *J Int Med Res* **40**: 1988-2000, 2012.
- Yuan Y, Zhang X, Xu N, et al. Clinical and pathologic diagnosis and different diagnosis of syphilis cervical lymphadenitis. *Int J Clin Exp Pathol* **8**: 13635-13638, 2015.
- Coleman DL, McPhee SJ, Ross TF, Naughton JL. Secondary syphilis with pulmonary involvement. *West J Med* **138**: 875-878, 1983.
- Soares Souza A Jr, Soares Souza A, Zanetti G, Marchiori E. A skin rash with multiple pulmonary nodules. *Eur Respir Rev* **24**: 682-683, 2015.
- Fu Z, Zhang J, Li Q, Liu M, Kang L. A case of secondary syphilis involving tonsil, pulmonary, and multiple lymph nodes: ¹⁸F-FDG PET/CT findings. *Clin Nucl Med* **40**: 335-337, 2015.
- Kim SJ, Lee JH, Lee ES, et al. A case of secondary syphilis presenting as multiple pulmonary nodules. *Korean J Intern Med* **28**: 231-235, 2013.
- Elzouki AN, Al-Kawaaz M, Tafesh Z. Secondary syphilis with pleural effusion: case report and literature review. *Case Rep Infect Dis* 2012 Article ID: 409896.
- Alrajab S, Payne K, Arenó J, Holladay R, Smith T, Zhang S. A 40-year-old man with a nodular lung disease and skin rash. *Chest* **141**: 1611-1617, 2012.
- McCready JB, Skrastins R, Downey JF, Powis JE. Necrotic pulmonary nodules in secondary syphilis. *CMAJ* **183**: E163-E166, 2011.
- David G, Perpoint T, Boibieux A, et al. Secondary pulmonary syphilis: report of a likely case and literature review. *Clin Infect Dis* **42**: e11-e15, 2006.
- Olson AL, Gutman JA, Welsh CH. A 50-year-old man with skin lesions multiple pulmonary nodules. *Chest* **125**: 2322-2327, 2004.
- Zaharopoulos P, Wong J. Cytologic diagnosis of syphilitic pleuritic: a case report. *Diagn Cytopathol* **16**: 35-38, 1997.
- Dooley DP, Tomski S. Syphilitic pneumonitis in an HIV-infected patient. *Chest* **105**: 629-631, 1994.
- Cholankeril JV, Greenberg AL, Matari HM, Reisner MR, Obuchowski A. Solitary pulmonary nodule in secondary syphilis. *Clin Imaging* **16**: 125-128, 1992.
- Kurumaji Y, Katoh T, Ohtaki N, Tachibana S, Hashimoto K. A case of secondary syphilis with a solitary pulmonary lesion. *Dermatologica* **174**: 23-27, 1987.
- Geer LL, Warshauer DM, Delany DJ. Pulmonary nodule in secondary syphilis. *Australas Radiol* **29**: 240-242, 1985.
- Schibli H, Harms M. Tumor-like pulmonary lesion in secondary syphilis. A case report. *Br J Vener Dis* **57**: 367-371, 1981.
- Biro L, Hill AC, Kuflik EG. Secondary syphilis with unusual clinical and laboratory findings. *JAMA* **206**: 889-891, 1968.
- 2010 Sexually Transmitted Disease Treatment Guidelines, Centers for Disease Control and Prevention [Internet]. [cited 2015 Jun. 15]. Available from: <http://www.cdc.gov/std/treatment/2010/>
- Kenyon C, Lynen L, Florence E, et al. Syphilis reinfections pose problems for syphilis diagnosis in Antwerp, Belgium - 1992 to 2012. *Euro Surveill* **19**: 20958, 2014.
- Brewer TH, Peterman TA, Newman DR, Schmitt K. Reinfections during the Florida syphilis epidemic, 2000-2008. *Sex Transm Dis* **38**: 12-17, 2011.

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