

# Coccidioidomycosis In A Cancer Hospital

A Huaringa

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## Abstract

**Study objective:** Coccidioidomycosis is a fungal disease that is known to cause pulmonary complications and significant derangement in immunocompromised hosts. We conducted this study to evaluate the behavior of this disease in our unique patient population. **Design:** A retrospective clinical study. **Patients and setting:** We studied the records of all patients with coccidioidomycosis diagnosed at The University of Texas, M.D. Anderson Cancer Center, a university tertiary hospital from January 1956 to December 1994. **Results:** We obtained 20 record numbers of patients with coccidioidomycosis. Fifteen patients (75%) were asymptomatic with an abnormal chest-X ray. Five patients (25%) had: chest pain (2), dyspnea (1), cough (1), and weight loss (1). Solitary pulmonary nodule was found in 55% of patients, followed by focal infiltrates (25%), multiple nodules (10%), and cavitary lesions (10%). The diagnostic procedures were Open lung biopsy (OPL), Fine needle aspiration (FNA), Bronchoscopy, and Serology. Higher sensitivities were associated with OPL and FNA. Sixteen patients underwent a thoracotomy as a diagnostic and therapeutic procedure. Three patients were medically treated with fluconazole, and one was lost to follow up. None of our patients were in the immunosuppressed category. **Conclusions:** Coccidioidomycosis has a relatively infrequent occurrence in our patient population. Bronchoscopy and serology had low diagnostic yields. Transthoracic fine needle aspiration (FNA) needs to be considered, since coccidioidomycosis does respond to medical treatment, in order to avoid unnecessary ablative surgery.

Abbreviations: FNA = Fine needle aspiration. OPL = Open lung biopsy.

## INTRODUCTION

Coccidioidomycosis is a multisystemic fungal disease caused by the soil fungus *Coccidioides Immitis*, which is endemic to the Southwestern United States, Central and South America<sup>1234</sup>. The estimated incidence of coccidioidomycosis in the United States ranges from 50,000 to 100,000 cases<sup>13</sup>. The annual endemic risk of infection is in the range of 2% to 4%<sup>3</sup>. The organism requires a dry and dusty environment, especially after rainy winters, to become an infective aerosol<sup>3</sup>. The arthrospores are then inhaled and germinated in the alveoli, and they mature into spherules that later release endospores<sup>1234</sup>. The most common clinical presentation (60%) is an abnormal chest X-ray in an asymptomatic patient, whereas 40% may experience a febrile pulmonary illness. The symptomatic thoracic coccidioidomycosis may be classified as primary pulmonary, chronic pulmonary, and disseminated disease<sup>56</sup>. The primary lung infection resolves without any sequel in 95% of the cases. Manifestations of chronic disease (4%) are pulmonary nodules, cavities, and fibrosis. Disseminated

disease (0.5-1%) may demonstrate a military or a reticular pattern on chest x-ray<sup>5</sup>. Risk factors for this complication are pregnancy<sup>7</sup>, racial groups<sup>123</sup> (Filipinos, African-Americans, Mexican-Americans, and Native-Americans), blood group B<sup>13</sup>, human immunodeficiency viral infection<sup>89</sup>, organ and bone marrow recipients<sup>101112</sup>, patients who had immunosuppressive conditions<sup>12313</sup>, elderly patients<sup>14</sup>, and diabetics<sup>15</sup>.

The mainstays of diagnosis are direct smear, culture and serologic testing<sup>2</sup>. Other diagnostic tests include the conversion of skin test reactivity to coccidioidin or spherulin. Immunodiffusion assay (IgM antibodies in acute infection), complement fixation test, which detects IgG (>1:32 suggest dissemination)<sup>16</sup>, bronchoscopy with transbronchial biopsy<sup>17</sup>, fine needle aspiration<sup>1819</sup>, and open lung biopsy. Newer tests such as ELISA, PCR, and DNA probe are yet to be validated<sup>13</sup>. Spherules (4-40microns) containing endospores are necessary to obtain definitive diagnosis. They could be seen in KOH stains of infected material or biopsy specimen. It is noteworthy to mention that cultures are dangerous, because mycelial forms are highly infectious, even for laboratory personnel<sup>123</sup>.

The treatment is medical or surgical. The medical treatment consists in Fluconazole or Itraconazole <sup>20212223</sup> . Amphotericin B may be administered initially in high-risk patients <sup>2425</sup> . New lipid complexing formulations of amphotericin B <sup>26</sup> , and newer classes of antifungal drugs and immunotherapy <sup>27</sup> , are under study. The surgical management has established indications <sup>2</sup> .

MATERIAL AND METHODS

We reviewed the computerized records of the University of Texas M.D. Anderson Cancer Center from January 1956 to December 1994, and obtain the number of 45 patients in whom suspicion for pulmonary coccidioidomycosis was made. Thirty-nine of these 45 cases had medical records available for review, and from this group only 20 had definite diagnosis of coccidioidomycosis. Three of these patients were followed up, since they were referred to our Pulmonary Clinic.

Information collected from the patient’s medical record included epidemiological and clinical data, diagnostic procedures, radiologic patterns, response to treatment, and outcome. All of our patients were transferred to our Institution with the suspicious of cancer and ended up having coccidioidomycosis; consequently none of our patients had previous chemotherapy or an undergoing hematological malignancy that would put them in the immunosupressed category.

RESULTS

Nineteen out of the 39 cases had differential diagnosis other than coccidioidomycosis: Cancer: 3 patients, Granuloma (based on chest-X ray): 12 patients, Granuloma (based on biopsy): 2 patients, Tuberculosis Granuloma (Tuberculoma): 2 patients.

Twenty patients had definite diagnosis of pulmonary coccidioidomycosis. Fifteen were men and 5 women. We obtained data regarding ethnic origin: 14 of these patients were Caucasian, 1 African-American and 5 Hispanic. Four had significant cigarette smoking habit (Table 1).

The most common clinical presentation was the asymptomatic patient with an abnormal chest-X ray and occurred in 15 of the 20 patients (75%). Only 5 patients (25%) complained of the following symptoms: 2 patients experience chest pain, 1 had cough, 1 had dyspnea, and 1 referred weight loss (Table2).

Nodule or mass appearance constituted the most frequent

radiological manifestation in 13 of the 20 patients (65%): 11 had solitary lesions, and 2 revealed multiple (2 or more) lesions. Two patients had cavitary lesions and 5 had focal infiltrates in the chest –X ray (Table 3).

Sixteen patients underwent thoracotomy to have the diagnosis established. Serological tests were performed in 15 patients but only 5 of them had tests compatible with coccidioidomycosis. Bronchoscopy was attempted in seven cases, but only one yielded the diagnosis. FNA was performed in 3 patients, yielding the diagnosis in 2 of them (Table 4).

Table 5 discloses the treatment received by 19 patients, one lost to follow up. Sixteen patients were treated surgically (84%), 14 with wedge resection and 2 with lobectomy. Three patients received medical treatment with fluconazole.

Figure 1  
Table 1. EPIDEMIOLOGIC DATA

SEX	15 male : 5 female	(3 : 1) ratio
RACE	Number of patients	Percentage (%)
White	14	70
Hispanic	5	25
Black	1	5
Smoking	4	20

Figure 2  
Table 2. CLINICAL PRESENTATION

ASYMPTOMATIC	15 patients (75%)	
SYMPTOMATIC	5 patients (25%)	
	Chest pain	2
	Cough	1
	Dyspnea	1
	Weight loss	1

Figure 3

Table 3. RADIOLOGIC APPEARANCE

<b>NODULES</b>	Solitary (55%)	
	Right	5 patients
	Left	6 patients
	Multiple (10%) 2 patients	
<b>CAVITARY LESIONS</b>	(10%)	2 patients
<b>FOCAL INFILTRATES</b>	(25%)	
	Right	4 patients
	Left	1 patient

Figure 4

Table 4. PROCEDURES

TEST	DIAGNOSTIC	PERFORMED	SENSITIVITY
<b>BRONCHOSCOPY</b>	1	7	14 %
<b>FNA</b>	2	3	66 %
<b>SEROLOGY</b>	5	15	33 %
<b>THORACOTOMY</b>	16	16	100 %

Figure 5

Table 5. TREATMENT

SURGICAL	NUMBER OF PATIENTS	PERCENTAGE (%)
Wedge	14	74
Lobectomy	2	11
<b>MEDICAL</b>		
Fluconazole	3	15

## DISCUSSION

Coccidioidomycosis is a fungal disease, which may cause serious and life-threatening infections, especially among the immunosuppressed patients. <sup>123489101112</sup>

Most of our patients came to M.D. Anderson Cancer Center as asymptomatic patients with a lung nodule or mass in which lung cancer was presumed to be the diagnosis until proven otherwise. We did not get to see the reportedly frequent patient with febrile pulmonary illness, or primary infection <sup>12356</sup>. Indeed, it is remarkable to mention that despite the fact that our Institution has a highly prevalent immunosuppressed population, our series did not show any of the disseminated forms reported in this kind of patients

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The solitary pulmonary nodule was the most common radiological presentation, which is frequently seen in chronic infections <sup>1112</sup>. Coccidioidomycosis may also present as cavity or infiltrate, adding more possibilities to the differential diagnosis list <sup>101112</sup>.

The most frequent diagnostic procedure was the open lung biopsy (OLP), due to the fact that the nodules or masses were considered to be neoplastic, and patients underwent "excisional biopsies". Bronchoscopy failed to have an acceptable diagnostic yield and serological test showed low sensitivity. Fine needle aspiration (FNA), clearly underused in our series, seems to be a reasonable alternative to avoid unnecessary ablative surgery <sup>2425</sup>.

The treatment most commonly used in our population was the surgical one; but it is already recognized that coccidioidomycosis does respond to therapy with azoles: fluconazole or itraconazole <sup>282933</sup> <sup>122627</sup>.

## CONCLUSION

Pulmonary coccidioidomycosis has a relatively infrequent occurrence at our Institution. The majority of patients with this disease are asymptomatic at the time of diagnosis. Bronchoscopy has a low diagnostic yield in this condition. The serologic tests for coccidioidomycosis have low sensitivity. The most common diagnostic procedure in our series was an open lung biopsy because of a low index of suspicion for coccidioidomycosis and high probability for lung cancer. Fine needle aspiration should be given higher consideration when approaching a patient with pulmonary nodules in an area for coccidioidomycosis, in order to prevent needless ablative surgery, since *Coccidioides Immitis* is evidently responsive to medical therapy.

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**Author Information**

**Armando J. Huaranga, M.D.**

Department of Medicine, White Memorial Medical Center and Loma Linda University School of Medicine, Los Angeles, California