Original Article

RADIOLOGICAL REVIEW OF 173 CONSECUTIVE CASES OF PARACOCCIDIOIDOMYCOSIS*

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Abstract

OBJECTIVE: To determine the incidence of most significant radiological findings of paracoccidioidomycosis and to verify its possible variants. MATERIALS AND METHODS: One hundred and seventy-three cases of paracoccidioidomycosis presented between 1970 and 1980 were reviewed, including their radiological workup reanalysis by at least two experienced radiologists. RESULTS: Ninety-four cases were pulmonary only and 38 were pulmonary associated with ganglial, visceral and osseous lesions or in association with tuberculosis. There was no pulmonary involvement in 41 cases, with small bowel, viscera, bone lesions, or a combination of these. Most significant radiological findings in cases of pulmonary involvement were bilateral, diffuse reticular and nodular interstitial infiltrate, followed by the diffuse bilateral alveolar form. Visceral and gastrointestinal tract lesions presented predominantly with liver, jejunum and ileum involvement. Lymph nodal involvement was predominantly diffuse, abdominal or peripheral. In bones, osteolytic lesions affected predominantly long bones and clavicle. CONCLUSION: Paracoccidioidomycosis is a granulomatous disease commonly found in Brazil, primarily affecting lungs, caused by inhalation of fungus spores. Other rare or less frequent forms of the disease should be taken into consideration for differential diagnosis.

Keywords: Paracoccidioidomycosis; Granulomatous disease.

INTRODUCTION

Paracoccidioidomycosis is a systemic fungal disease caused by *Paracoccidioides brasiliensis*, a dimorphic fungus that grows like yeast at 37ºC. It is found in Central and South Americas and is a common cause of the disease in Brazil, Venezuela, Colombia, Ecuador, Peru and Paraguay. This fungus has not been isolated in other regions of the planet and, invariably, patients presenting this disease have a history of residence in or visit to endemic areas[1–4].

Paracoccidioidomycosis affects predominantly adult males from rural areas, in the age range between 30 and 50 years[2,3]. It is rare in children, but, when it occurs, affects both sexes equally. The disease may affect urban residents or any individual in contact with the fungus. The *Paracoccidioides brasiliensis* has been isolated from soil for many times, so presently the soil is considered as its most probable natural habitat.

The infection is presumably acquired via inhalation of the fungus in the mycelial phase[1–3], followed by primary infection of the lungs with subsequent lymphahematogenic dissemination. This primary pulmonary lesion may be clinically significant or remain latent, asymptomatic and non-diagnosed.

The disease affects principally the lungs and the reticuloendotelial, tegmental, digestive and osseous systems. Two main forms of the disease are described: the acute or subacute and generalized, with lymphadenopathy and hepatosplenomegaly, affecting youngsters, principally up to the third decade of life[1–5], and another, chronic and progressive, presenting typical oropharyngeal ulcerations and affecting adult patients [1,2,4].

The literature on paracoccidioidomycosis is plentiful, showing a great concern in determining its form of contagion and dissemination[6–17], the oropharyngeal mucosa being considered for years as the portal of entry of the agent[18]. However, we have not found significant reports regarding to the incidence of the several presentations of such as heterogeneous disease, even in great series[9,10].

MATERIALS AND METHODS

Between 1970 and 1980, 173 consecutive confirmed cases treated in the Clinics Hospital of the Faculdade de Medicina de Ribeirão Preto, Universidade de São Paulo, were selected for this study. Cases confirmed by histological analysis of different lesions were included. In cases suspect for tuberculosis, a co-infection study was performed.

Imaging examinations were performed according to the needs of each patient. In all of the cases, a chest X-ray was request. More specific studies, like gastrointestinal series, linear CT, lymphographies, bronchographies and other were performed in patients with specific clinical suspicions. Later reevaluation of films was performed by at least two experimented radiologists.

RESULTS

One hundred and seventy-three patients were studied, of whom 93.7% were male and 6.3% female. Ages ranged between 6 and 75 years, with a mean age of 40.8 years.

Sites of affection in this study were: lungs, ganglia, tegmentum, bowel, viscera and bones. Percentage of affection for each site in relation to the total of cases is demonstrated in Table 1. Different associations were found and divided into 15 groups with their respective incidences demonstrated in Table 2.

Among pulmonary presentations, predominance was as follows: reticular interstitial opacities in 89.3% of cases (Figure 1), nodular opacities in 54.5%, bilateral alveolar opacities in 45.4% (Figure 2) and mixed opacity with "butterfly wing" pattern in 44.7% (Figure 3). Emphysema was found in 34.1%, Kerley's septal lines were seen in 25.7%, retraction was observed in 18.2%, pleural thickening was found in 9.1% and pleural effusion in 7.5%. Nine cases (6.8%) of cavitary lesions were found at chest X-ray (Figure 4). Six percent of cases presented as unilateral alveolar lesion and only 2.2% (three cases) as giant nodules. Increased mediastinal lymphadenopathy was found at chest X-ray in 25 cases (14.4%), 15 of them related only to pulmonary disease. In five cases (2.9% of total, 3.8% of pulmonary cases) there was concomitant infection by *Micobacterium tuberculosis*.

Main sites of generalized ganglial involvement were periphery and abdomen, followed by ganglial mediastinal involvement.

At plain abdominal X-ray, intestinal forms presented as distention in 22% of cases, mass in 10%, calcification in 6% and occlusion in only 2%. In the digestive tract, lesions of jejunum, ileum and colon predominated, presenting as thickening in 74% of cases (Figure 5); as flocculation in 60% (Figure 6), as segmentations in 48% and stricture in 44% (Figure 5). There was no case of intestinal fistula. Three cases of gallbladder lesion were found in this series. No case of gastric lesion was evidenced.

In the visceral form, the liver was involved in 100% of cases (24% of total) and spleen in 54.7%. Two cases of suprarenal involvement and one case with affection of central nervous system were evidenced. In this series no case of pancreatic involvement was found.

Bone lesions presenting lytic aspect and without sclerotic reaction were evidenced in seven cases, involving long bones (Figure 7) and clavicle (Figure 8) (five cases each), flat bones in three cases and the pelvis in two. No case of involvement of spine was found.

DISCUSSION

With up to 3,000 cases diagnosed each year in Brazil, the paracoccidioidomycosis is an endemic disease especially in the states of São Paulo, Rio de Janeiro, Minas Gerais, Rio Grande do Sul e Mato Grosso[2]. Due to its systemic nature, practically all the systems and organs of the human body can be affected. Its predominance in male individuals was evidenced also in this study, with a mean age of 40 years, demonstrating predominance of a chronic and progressive presentation of this disease.

In this study, similarly to others, there was a clear predominance of pulmonary involvement[9,10,19,20]. Among pulmonary patterns and in concordance with the literature[21–27], the interstitial lesion was predominant, followed by bilateral alveolar lesions and the "butterfly-wing" pattern. Emphysema, retraction as well as Kerley's septal lines were significant findings in this study[28], although in lower proportion than that previously described. Some authors have emphasized the presence of pulmonary functions alterations as a result of paracoccidiodomycosis[29–31]. Some studies have been describing this disease alterations at chest high resolution CT[32]. Pleural lesions, effusion and thickening showed a similar proportion to that reported in a previous study by Machado & Miranda[33]. Association with pulmonary tuberculosis was a less frequent finding.

In the present study, the ganglial lesions proportion was lower than that previously described[9]. Preferential sites are the periphery and abdomen, followed by mediastinum Ganglial alterations at lymphography have already been described[34–37] and presently have been practically abandoned due to the availability of other better methods of evaluation. The laryngeal form of this disease was radiologically documented in only seven cases and, in this study, we could not evaluate statistically its incidence. The easy evaluation of this lesion by means of direct examination dispenses with the imaging evaluation. Lauand[38] and Lauand *et al.*[39–41] had significantly contributed to the study of these lesions.

Regarding to intestinal involvement, its incidence was higher than that reported in the previous great series[9,10]. Lesions characteristics had already been described[42–46], although without evaluation of their distribution. The predominance of lesions in jejunum, ileum and colon has been confirmed in this study. As previously described, no case of pancreatic lesion has been identified[47], and the frequency of abdominal ganglial calcifications as a radiological finding was of only 1.7% of

the total of patients. The visceral involvement has predominated in the liver and spleen and lesions of suprarenal and central nervous system have been interpreted as rare complications. Some authors suggest that the central nervous system may occur more frequently[48].

The bone lesions found in 4% of cases in this study were those already previously described as lytic lesions without sclerotic reaction[48–52]. They have predominated in long bones and clavicle. Symmetric lesions on clavicles distal extremities are highly suggestive although being non-pathognomonic findings, therefore other imaging findings and clinical data must be taken into consideration.

CONCLUSION

Paracoccidioidomycosis is a systemic disease and does not spare any system of the human body, presenting radiological findings suffice to a diagnosis definition. When findings are non-specific, the possibility of paracoccidioidomycosis should be taken into consideration for differential diagnosis.

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REVISÃO RADIOLÓGICA DE 173 CASOS

Tabelas e Figuras

Table 1 Percentage by site of affection.

Site of affection	No. of cases	Percentage
Toracic (pulmonary + pleural)	132	76.3%
Ganglial	34	19.6%
Tegmental	7	4.0%
Intestinal	50	28.9%
Visceral	43	24.8%
Bone	7	4.0%

Table 2 Percentage of different associated affections.

Involvement	No. of cases	Percentage
Pulmonary only	99	57.2%
Pulmonary + visceral	9	5.2%
Pulmonary + intestinal	9	5.2%
Pulmonary + ganglial + visceral + intestinal	9	5.2%
Pulmonary + bone	3	1.7%
Pulmonary + tegmental + ganglial	2	1.1%
Pulmonary + central nervous system	1	0.5%
Intestinal	5	2.9%
Intestinal + visceral	6	3.4%
Intestinal + visceral + ganglial	12	6.9%
Intestinal + ganglial + pleural effusion	5	2.9%
Intestinal + visceral + ganglial + bone	4	2.3%
Visceral	2	1.1%
Ganglial	2	1.1%
Laryngeal	5	2.9%

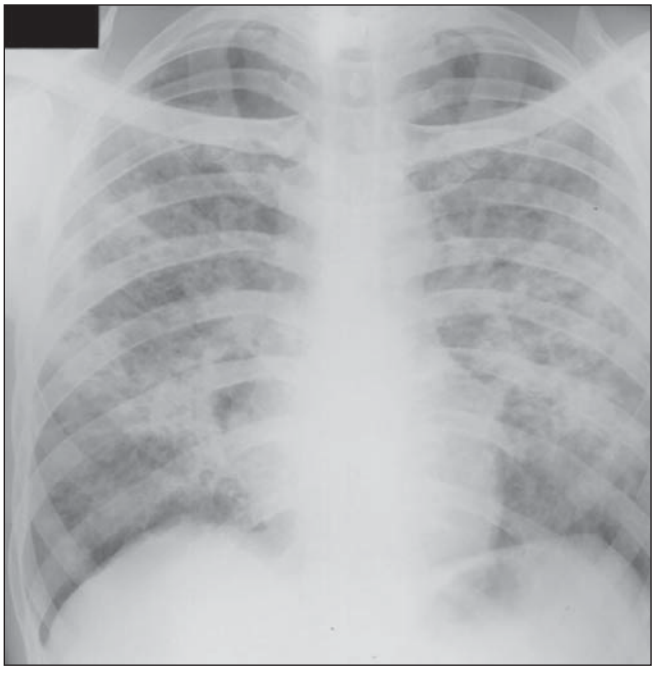

Figure 1. Reticular interstitial and bilateral pattern.

Figure 2. Bilateral alveolar pattern associated with cavitary formations in both lungs.

Figure 3. Mixed lesion in "butterfly-wing" pattern, with predominating confluence.

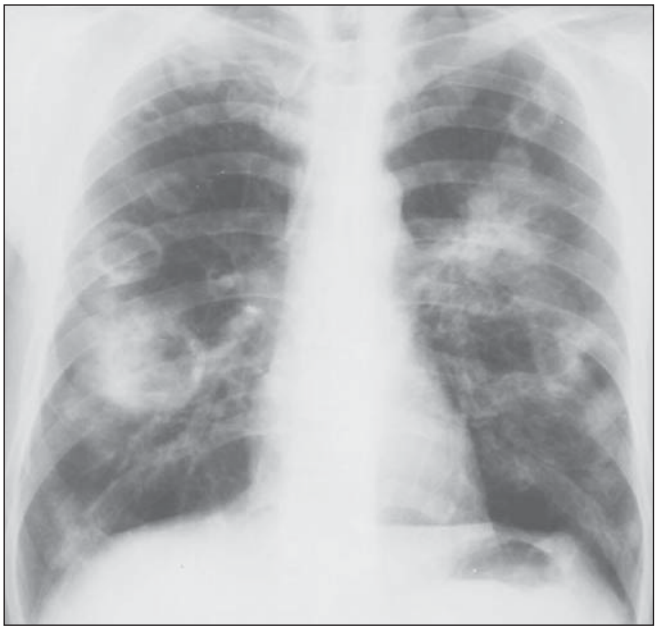

Figure 4. Cavitary lesions in both lungs.

Figure 5. Intestinal involvement with intestinal loops thickening and stricture.

Figure 6. Flocculations in intestinal loops.

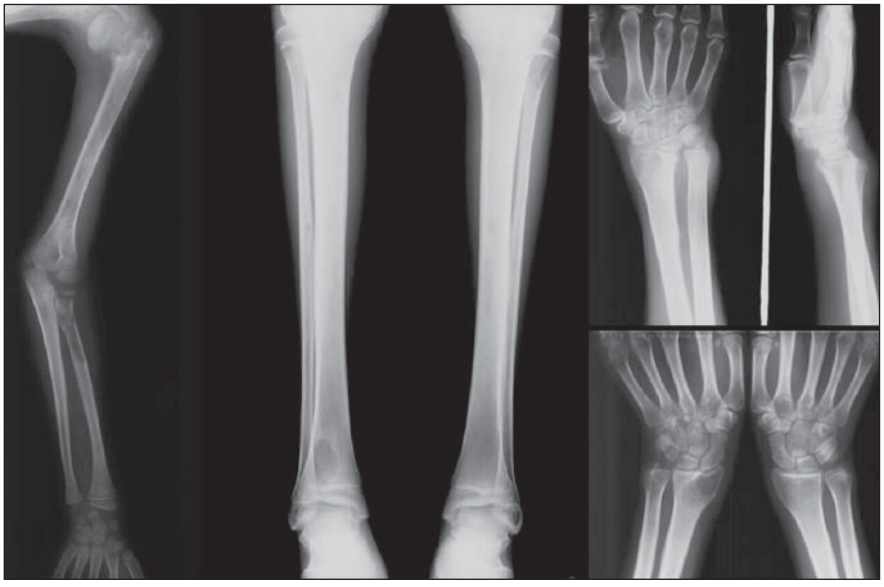

Figure 7. Multiple osteolytic lesions in three patients, without reactional sclerotic bone on tibia, fibula, humerus, radium and ulna, with pathological humerus fracture.

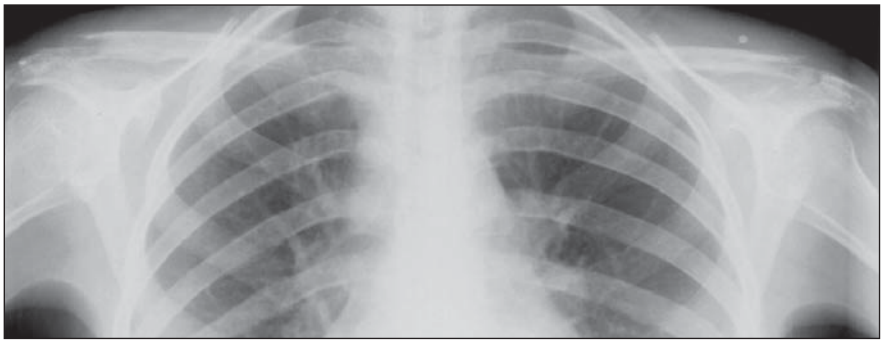

Figure 8. Osteolytic lesions of both clavicles distal extremities.