Rev. Inst. Med. trop. São Paulo
29(1):59-62, *janeiro-fevereiro,* 1987

EPIDEMIOLOGIC STUDY OF BRONCHOPULMONARY MYCOSIS IN THE PROVINCE OF CORDOBA, ARGENTINA

Diana T. MASIH, Blanca E. MARTICORENA, Noemi BORLETTO, Camilo FARÍAS & Ricardo NEGRONI

SUMMARY

An epidemiological study for histoplasmosis coccidioidomycosis and cryptococcosis made in five areas of the province of Córdoba is presented. The data obtained showed a global positivity of 41.1% for histoplasmin 26.7% for coccidioidin and 14.1% for cryptococcin.

In some areas, the Rio III basin and Traslasierra, the histoplasmosis infection indexes were much higher, 53,3% and 73.1% respectively. The index of positive skin tests with **Cryptococcus** antigen in Traslasierra was also very high: 31.9%.

KEY WORDS: Bronchopulmonary mycosis — lung; Epidemiology

INTRODUCTION

Deep mycosis are diseases whose geographic distribution is determined by the evolutive cycle of each fungus. **The Histophasma capsulatum** in its environmental infecting phase lives in areas of mild humidity, warm and fertilized by birds' excrements. In Argentina, these areas correspond to the so called humid Pampa. The **Coccidioides immitis,** on the contrary requires semiarid land with seasonal rains. These conditions only occur in a semidesertic strip that stretches from North to South along the Andes range.

The **Cryptococcus neoformans** is a cosmopolitan yeast, mainly appearing in soil contaminated by pigeons' excrements [8,9].

Man gets infected by living or going through these areas and inhalin spores which provoke a mycotic parenchymatous and ganglionary primoinfection. This injury, localized most of the times, heals spontaneously, and in this case the only permanent immunologic sign is the positivity of delayed hypersensitivity cutaneous tests which may last through life. Therefore, these tests are most useful to study endemic areas.

Epidemiologic surveys on histoplasmosis and coccidioidomycosis were carried out in the province of Córdoba (NÓBILE et al. 1966)[6], obtaining 2.29% positivity for coccidioidin and 3.44% for histoplasmin, whereas QUINTEROS et al[7] obtained figures which varied from 17% to 42% for histoplasmin.

No previous epidemiologic data about cryptococcin are known in the country due to the lack of an appropriate antigen. In U.S. (Oklahoma), MUCHMORE et al[4], made a survey which showed 26/82 positive cutaneous reactions. In Brazil, MELHEM and LACAZ found a positivity index of 4,38% in two epidemiologic studies made in São Paulo on 388 people. The finding of indigenous clinical cases of histoplasmosis, coccidioidomycosis and cryptococ-

Cátedra de Parasitologia y Micología. Departamento de Bioquímica Clínica. Facultad de Ciencias Químicas. Universidad Nacional de Córdoba. Ciudad Universitaria. Casilla de Correo 61 Suc. 16. 5016 — Córdoba — ARGENTINA.

cosis in the city of Córdoba led us to perform an epidemiologic survey in different places, preferably in the areas where the patients came from.

Description of the Region Studied. The province of Córdoba is situated in the centre of the Argentine Republic, 480 Km from the Atlantic Ocean and 520 Km from the Pacific.

It is more or less clearly divided into two regions: in the south east, a plain devoted almost completely to agriculture and cattle raising. In the north west, plains and low hills with authoctonous vegetation on the xerophilous type.

The mean annual temperature ranges from 16°C to 18°C, the maximum mean from 20°C to 25°C and the lower mean from 9°C to 11°C.

Rainfall is predominant in summer. In the areas studied it is higher than 500 mm annually, with figures of 600 mm up to 800 mm in all areas except in San Francisco where they are higher than 900 mm annually.

MATERIAL AND METHODS

Delayed hypersensitivity tests with histoplasmin, coccidioidin and cryptococcin were performed on people from five different areas of the province of Córdoba. These areas were: 1) The capital of Córdoba and its sorroundings up to 40 Km, which included Alta Gracia and Jesus María, 2) The Rio III basin which included the cities of Villa María, Rio III and some small towns in the sorroundings. 3) San Francisco and small neighboring villages. 4) Rio IV and its sorroundings and 5) Traslasierra. (Fig. 1).

Patients from both sexes were selected, with ages ranging from 16 to 60 years old, who were considered to have no immunologic compromise, that is to say people who were not carriers of diabetes, neoplasias, corticoid or citostatic treatments or states of extreme caquexia. Positive reactiors to tuberculin were selected.

All the antigens were elaborated by professor Ricardo Negroni in the Mycology Center of the National University of Buenos Aires.

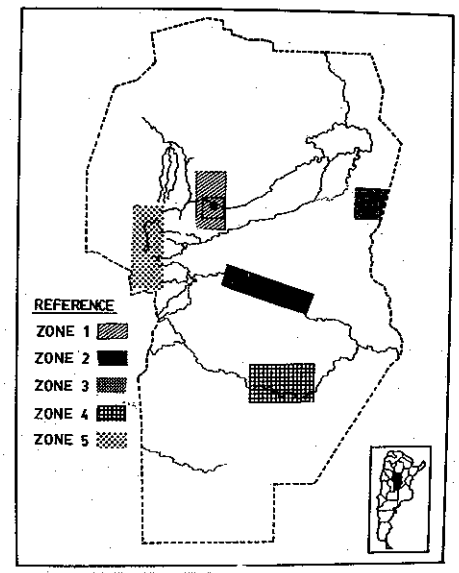

Fig.1 — Zone of Province of Córdoba.
Zone 1: Río III basin (Villa María, Río III).
Zone 2: San Francisco.
Zone 3: Rio IV.
Zone 4: Villa Dolores (Translasierra).

The aplication technique was conventional: 0.1 ml in the anterior side of the forearm, reactions were read between 24 and 72 h later and all induration greater than 8 mm was considered positive.

All persons with positive skin test were studied with X-ray films of the chest. Besides, double radial immunodiffusion with the homologous antigen was performed.

RESULTS

A total of 556 cutaneous tests were made, 180 with coccidioidin, 185 with histoplasmin and 191 with cryptococcin; 48 tests were positive for coccidioidin (26.7%), 76 were positive for histoplasmin (41.1%) and 27 were positive for cryptococcin (14.1%).

The results for the different geographic areas are shown in Table N.° 1.

Complementary studies carried out with positive reactors (thorax X-ray and double immunodiffusion) were negative in all cases.

DISCUSSION

The primary goal of this paper was to stu-

TABLE 1
Cutaneous tests *

Zone	Cryptococcin		Histoplasmin		Coccidioidin	
District Capital and sorroundings	2/38	(5.3%)	5/34	(14.7%)	2/32	(6.3%)
Río III Basin (Villa María, Río III)	0/30	(0.0%)	16/30	(53.3%)	7/30	(23.3%)
San Francisco	1/13	(7.7%)	3/13	(23.1%)	3/12	(25.0%)
Río IV	2/41	(4.9%)	3/41	(7.3%)	14/41	(34.1%)
Villa Dolores (Traslasierra)	22/69	(31.9%)	49/67	(73.1%)	22/65	(33.8%)
Totals in the Province of Córdoba	27/191		76/185		48/180	

* Induration greater than 8 mm was considered positive.

dy the geographic distribution of infection by Histoplasma, **Coccidioides** and **Crypococcus** in the province of Córdoba.

Percentages of positivity obtained for histoplasmin and for coccidioidin were 41.1% and 26.7% respectively. The distribution of infection areas is most relevant: for histoplasmin there are two areas with high positivity, the Río III basis (53.3%) and Traslasierra (73.1%). These figures are far higher than the averages in the rest of the country[5]. In contrast, Río IV, situated right in the humid pampa, which might mean greater infection, only has 7.3%. For coccidioidin, infection figures in Río IV and Traslasierra were somewhat higher than expected, specially taking into account that these areas do not have semiarid climate. Their vicinity with San Louis could be a plausible explanation, since this province has shown a high percentage to coccidioidomycosis infection[1].

As regards the indexes of cryptococcosis infection, they coincide with the ones found by the authors previously cited, with the exception of Traslasierra where this index is 31.9%. Since both the histoplasmin and cryptococcin results were very high in this area, a search was carried out to find patogenous fungi in the soil. It was possible to isolate **Cryptococcus neoformans** and **Coccidioides immitis**, which will be subject matter for another publication.

RESUMEN

Estudio epidemiológico para micosis broncopulmonares en la provincia de Córdoba, Argentina

Se presenta un estudio epidemiológico para histoplasmosis, coccidioidomicosis y criptococosis realizado en cinco zonas de la provincia de Córdoba. Los datos obtenidos demonstraron una positividad global de 41.1% para histoplasmina, 26.7% para coccidioidina y 14.1% para criptococcina.

En algunas regiones, cuenca del Río III y Traslasierra los índices de infección para histoplasmosis fueron mucho más altos, 53.3% y 73.1% respectivamente. También las intradermorreacciones para criptococosis en Traslasierra fueron muy elevados: 31.9%.

ACKNOWLEDGMENTS

The authors are thankful for the help given by Dr. Carlos A. Pacagnini in the preparation of this paper.

REFERENCIAS

1. BONARDELLO, N. M. & GUIÑAZÚ DE GAGLIARDI, C. — Intradermoreaccione con coccidioidina en distinatas poblaciones de la Provincia de San Luis. **Sabouraudia, 17:** 371-376, 1979.

2. LACAZ, C. da S. & MELHEM, M. — Ensaio imunoalérgico com criptococina em recrutas de um batalhão policial de São Paulo (Brasil). **Rev. Hosp. Clín. Fac. Med. S. Paulo, 33:** 49-51, 1978.

3. MELHEM, M. & LACAZ, C. da S. — Inquérito imunoalérgico com criptococina. **Rev. Inst. Med. trop. S. Paulo, 18:** 349-356, 1976.

4. MUCHMORE, H.; FELTON, F.; SALVIN, S. & RHOADES, E. — Delayed hypersensitivity to cryptococcin in man. **Sabouraudia, 6: 285-288, 1968.**

5. NEGRONI, R. — Las micosis broncopulmonares en la República Argentina, **Torax, 19: 67-75, 1970.**

6. NOBILE, R.; NOBILE VILCHEZ, Z. & RAMACCIOTTI, N. — Pesquisa de histoplasmosis y coccidioidomicosis en enfermos pulmonares. In: JORNADAS ARGENTINAS DE MICOLOGÍA, 1., Rosario, 1966. **Actas.**

7. QUINTEROS, C.; GALLINO, N.; PONS, J.; HORVATH, D. & SILIONE, S. — Investigación de enfermedad micótica. Comparación entre dos histoplasminas. In: JORNADAS ARGENTINAS DE MICOLOGÍA, 3., Cordoba, 1968. **Actas.**

8. RUIZ, A.; FROMTLING, R. A. & BULMER, G. S. — Distribution of **Cryptococcus neoformans** in a natural site. **Infect. Immun., 31: 560-563, 1981.**

9. RUIZ, A.; NEILSON, J. B. & BULMER, G. S. — A one year study on the viability of **Cryptococcus neoformans** in nature. **Mycopathologia (Den Haag), 71: 117-122, 1982.**

Recebido para publicação em 02/6/86.