

hydrocephalus. The solitary intraventricular cysticercus is, however, not the only cause of acute obstructive hydrocephalus.

Bickerstaff *et al.*⁶ describe a racemose form of cysticercosis, which is apt to form at the base of the brain and, being a mobile structure sometimes with a long pedicle, is capable of intermittent blocking of the roof foramina of the fourth ventricle. Disturbance of equilibrium and spasmodic ataxia may accompany attacks of obstructive hydrocephalus; more progressive disturbance of equilibrium without marked ataxia of the limbs when supine accompanies posterior fossa racemose cysticercosis, simulating a tumour of the vermis of the cerebellum.

Lesions in the ventricular system or in the posterior fossa, followed by long-standing raised intracranial pressure, may lead to impairment of vision and consecutive atrophy of the optic disc. Involuntary movements of different localization and grand mal seizures have been described as consequences of cerebral cysticercosis. Changes in personality in patients suffering from cerebral cysticercosis have been noted.

CONCLUSION

Two cases of generalized cysticercosis with cerebral infestation are reported in immigrants to Canada. In one, evidence of myocardial infestation was obtained; in the other a personality pattern disturbance was brought to light. The importance of an accurate personal history in regard to soil and seed of the infestation and the manifold symptoms is considered. The diagnostic value of radiography of the thighs, a selective site of calcific densities of cysticercosis, is pointed out. The need for awareness of the possibility of cerebral cysticercosis in immigrants from South America, Mexico, Eastern and Southern Europe and India is stressed.

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RESIDUAL PULMONARY COCCIDIOIDAL GRANULOMA*

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COCCIDIOIDOMYCOSIS is an acute or chronic pulmonary infection caused by the fungus *Coccidioides immitis*. It is endemic in parts of the southwestern United States and Central and South America. Most cases which occur elsewhere can be traced to residence or travel in the endemic regions, as in the case reported here, or to contact with materials from these regions, as in the Canadian case reported by McLetchie *et al.*¹

That coccidioidomycosis may occur in an unapparent or asymptomatic form and leave residual pulmonary granulomata has recently become better appreciated.² However, in areas where coccidioidomycosis is not ordinarily encountered, the coccidioidal residual may be overlooked in the differential diagnosis of so-called "coin lesions". Attention to a history of residence or travel in endemic areas and application of the coccidioidin skin test may supply leads.

The etiological diagnosis of chronic granulomata in surgical specimens by routine histological techniques often presents considerable difficulty. Simple techniques for the identification of possible etiological agents are, therefore, of considerable interest. In the present case, the diagnostic spherules of *Coccidioides* were demonstrated in a pulmonary granuloma by a concentration method hitherto not applied for this purpose.

Mr. E.O., a 35-year-old farmer, was referred to the University of Alberta Hospital on June 19, 1955, because of a single discrete chest lesion discovered on a film taken by the mobile x-ray unit on April 18, 1955. His only complaint was of a productive morning cough which had been present for years and had not changed.

He had worked in Arizona from February 1951 to February 1952, and stated that "valley fever" was prevalent in this region. He could recall no fever or illness during this period.

His temperature and sedimentation rate were normal. His chest was clinically clear. Chest x-rays and tomograms confirmed the presence of a single discrete opacity about 2 cm. in diameter in the apical segment of the left lower lobe (Fig. 1). Sputum smears were negative

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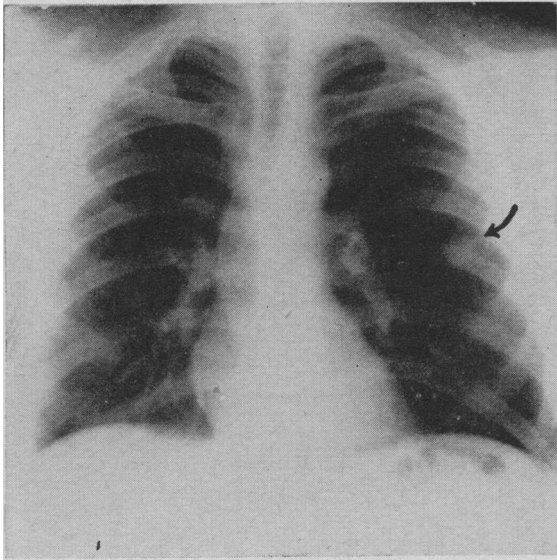


Fig. 1.—Discrete spherical opacity in apical segment of left lower lobe. Residual pulmonary coccidioidal granuloma.

for tumour cells and for tubercle bacilli. Sputum cultures grew a few *H. influenzae*, but cultures were negative for *M. tuberculosis*. The haemoglobin value was 16.5 g. per 100 c.c. The white cell count was 8,600 with a normal differential. The tuberculin skin test was negative to 1/20 and 1/10 mg. of old tuberculin. The coccidioidin skin test was positive.

Barium enema, barium examination of the stomach and duodenum, and sigmoidoscopic examination had been negative on investigation prior to his referral. Intravenous pyelograms showed poor filling on the left side, but retrograde pyelograms were normal. Bronchoscopic examination and bronchograms added no further information.

Thoracotomy was performed on June 27, 1955, and the lesion was removed by wedge excision.

LABORATORY DIAGNOSIS

The operative specimen consisted of a wedge of lung tissue 5 x 3 x 2 cm. Two surfaces and one margin were covered by thin, smooth, shiny pleural membrane. Bisection of the specimen revealed a discrete, raised, firm, grey nodule 1.5 cm. in diameter. The cut surface had an appearance of peripheral lamination with a central area of caseation necrosis.

Half of the specimen was placed in 10% formalin and the remainder was subjected to bacteriological examination for tubercle bacilli.

Histology.—Sections of the spherical lesion stained by haematoxylin and eosin and by the periodic acid-Schiff (PAS) method showed a necrotic centre surrounded by a narrow zone of fibrosis. Peripherally there was a narrow margin of lymphocytic infiltration including a few localized lymphoid nodules, some of which contained germinal centres. Adjacent pulmonary alveoli contained small collections of mononuclear macrophages filled with reddish-brown, granular pigment. Scattered about the lung tissue were small collections of fixed histiocytes filled with carbon pigment. The central portions of the nodule were eosinophilic and structureless, except for the ghost-like outlines of a few necrotic blood vessels.

Careful search of the necrotic tissue revealed a few ill-defined spherules, the size and morphology of which were suggestive of *Coccidioides immitis*. The best of these is shown in Fig. 2. Meticulous examination was required to locate the structures, and in the many sections examined none of the spherules seen contained structures suggestive of endosporulation.

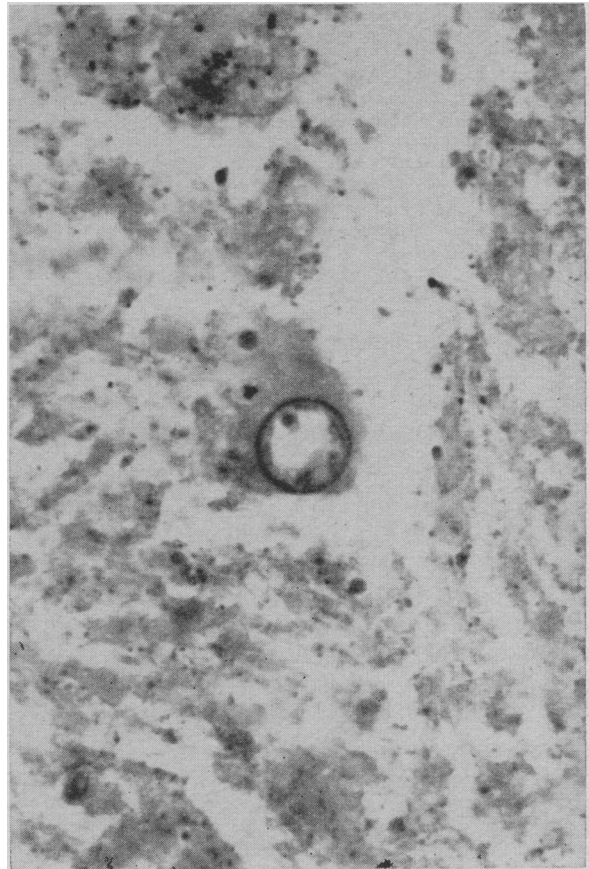


Fig. 2.—Spherule in necrotic central portion of granuloma; suggestive of *C. immitis* but shows no evidence of endosporulation. (H. and E. section. $\times 800$.)

Bacteriological examination.—The portion of the specimen reserved for bacteriological study was ground up in a mortar, digested with approximately two volumes of 4% NaOH for 30 minutes at 37° C., neutralized with 8% HCl to pH 7 (Beckman pH meter) and centrifuged. Most of the supernatant fluid was discarded. Smears were prepared from the sediment and two Löwenstein slants were inoculated. No acid-fast organisms were seen in the smears, and there was no growth on the Löwenstein slants in eight weeks.

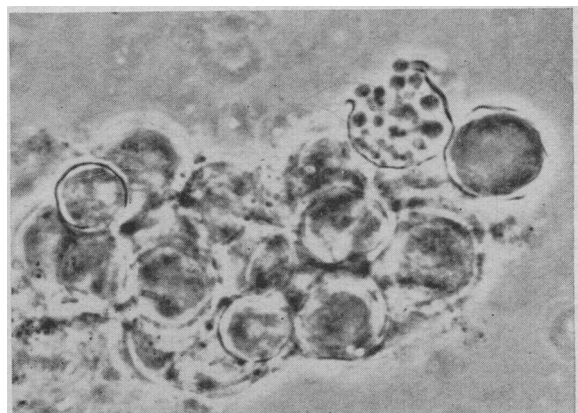


Fig. 3.—Group of spherules of *C. immitis* in sediment from alkali digestion procedure. Endosporulation is evident. (Lacto-fuchsin mount. Phase contrast. $\times 800$.)

Mycological examination.—A portion of the sediment from the digestion procedure was used for the inoculation of Sabouraud's, Littman's OSCV and blood agar media. No growth had occurred in three weeks. The remainder of the sediment was used in the preparation of wet mounts and permanent mounts in lacto-fuchsin.³ These preparations revealed numerous spherules, some containing endospores diagnostic of *C. immitis* (Fig. 3). Whereas the few organisms seen in histological sections stained by H and E or by PAS techniques were considered suggestive, the mycological preparations were diagnostic.

COMMENT

Attempts to demonstrate etiological agents in chronic granulomata by examination of microscopic sections stained by various techniques are often unsuccessful, particularly in inactive lesions of long standing. The obvious desirability of supplementing such investigation by bacteriological and mycological cultural techniques requires no comment. The latter procedures may require from several days to weeks for definitive identification of the etiological organism. Therefore, procedures permitting more rapid diagnosis are of great value. In the case of *C. immitis*, use of the alkali digestion and concentration method described above may allow definitive diagnosis on the same day the specimen is received at the laboratory.

In the case of granuloma-evoking fungi other than *C. immitis*, the use of digested specimens would yield suggestive results only, since these organisms cannot be identified with certainty by their tissue phase alone. Further, none of the pathogenic fungi (with the possible exception of *Cryptococcus neoformans*) survives alkali digestion.⁴ Therefore, a conscientious laboratory examination for the diagnosis of any chronic granuloma requires the routine inclusion of fungus cultures from fresh material as well as the usual pathological and bacteriological examinations.

SUMMARY

Residual pulmonary coccidioidal granuloma must be included in the differential diagnosis of so-called "coin lesions" in the chest, even in non-endemic regions. There may be no history of a related clinical illness.

The etiological diagnosis of chronic granulomata of long standing is often difficult, and in the case of *C. immitis*, demonstration of diagnostic spherules showing endosporulation may be difficult. By a simple alkali digestion and concentration technique large numbers of typical organisms can be demonstrated from lesions

in which they are very difficult to identify by ordinary histological techniques.

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INFECTION WITH PASTEURELLA MULTOCIDA FOLLOWING CAT BITE*

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IT HAS BEEN SHOWN in recent years that household pets, particularly cats, can be the source of somewhat unusual infections. A recently discovered disease entity, namely cat-scratch disease, first reported by Debré,¹ has overshadowed another infection frequently transmitted through the bite of a cat but not confined to this species of animal. This infection, with *Pasteurella multocida*, was first reported in the English literature in 1942 by Allin.²

Since this report in the literature about 60 cases altogether must have been recorded. Many cases, we are sure, have not been recognized because they were not examined bacteriologically or because many physicians are not aware of this type of infection. It seems, therefore, worth while to briefly report another case.

A 65-year-old woman was admitted to St. Joseph's Hospital after having been bitten by a cat in the right ankle five weeks before admission. The injured area had never healed and there was considerable inflammation in spite of treatment with penicillin, sulfonamides and aureomycin. The patient also used linseed poultices and hot foot-baths without success. On admission to hospital there was a fairly large swelling anteriorly over the right ankle with considerable erythema and a central opening through which pus drained freely. The abscess was surgically drained and at this time a culture was submitted to the laboratory. Organisms grown from this culture were Gram-negative bacilli which showed the cultural and biochemical characteristics of *Pasteurella multocida*. The organisms seemed highly sensitive to tetracycline, chlortetracycline, chloramphenicol and oxytetracycline, but were resistant to streptomycin and polymyxin. In spite of the surgical drainage the abscess

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