4323

Studies on the Etiology of Splenomegaly of Unknown Origin. (Splenic Mycosis?)

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Recent reports from widely separated sources indicate a renewed interest in the etiology of primary splenomegaly with cirrhosis of the liver and anemia (Banti's disease). Gibson[1] and Fawcett and Gibson[2] have isolated a streptothrix-like organism (Nocardia) from the spleen which they believe to be the causative agent. Pinoy and Nanta in Algiers[3] and Emile-Weil, Gregoire and Flandrin in Paris[4] and others have cultivated a fungus, Aspergillus, from a high percentage of spleens from cases of splenomegaly with anemia and have applied the terms "splenic mycosis" and "mycotic splenomegaly" to the disease.

These views have not been generally accepted. Although Oberling[5] and Jaffe and Hill[6] were convinced that certain thread-like elements found in the siderotic nodules in the spleen were mycotic filaments, in harmony with the interpretations set forth by other investigators, they found the same structures in other diseases as well, *f. i.*, leukemia, sickle cell anemia, etc. They suggested that the fungus was a secondary invader in a previously damaged spleen. Other observers, Gamna,[7] Langeron[8] and da Fonseca and da Area Leao[9] believed the so-called mycelium found in the nodules to be degenerated tissue fibers and that no connection between the fungus and the disease exists.

In northern China splenomegaly with cirrhosis of the liver, ascites, anemia and leucopenia is a common disease. A clinical study of this group of cases will be published elsewhere. We have recently had the opportunity of examining 4 spleens and portions of

[1] Gibson, A. G., *Quart. J. Med.*, 1914, vii, 153.

[2] Fawcett, J., and Gibson, A. G., *Lancet*, 1928, I, 1171

[3] Pinoy, E., and Nanta, A., *Compt. Rend. Soc. Biol.*, 1927, xcvii, 67.

[4] Emile-Weil, Gregoire and Flandrin, *Bull. et Mem. Soc. Med. d. Hôp.*, 1927, No. 17, 713.

[5] Oberling, Ch., *Presse Med.*, 1928, i, 2.

[6] Jaffe, R. H., and Hill, L. R., *Arch. Path.*, 1928, vi, 196.

[7] Gamna, C., *Presse Med.*, 1928, xxiii, 357.

[8] Langeron, M., *Ann. Parasitol. Hum. et Comp.*, 1928, vi, 211.

[9] Da Fonseca, O., and de Area Leao, A. E., *Suppl. das Mem., Inst. Oswaldo Cruz*, 1928, i, 16.

liver from 3 cases of splenomegaly and from 1 case of primary cirrhosis of the liver. The specimens were removed by operation.

By inoculating the crushed splenic pulp on Sabouraud's medium we were able to cultivate a fungus from each spleen. Tubes inoculated with portions of liver remained sterile. The fungus derived from the first case was classified as an uncommon form of Penicillium (Fig. 1). It was pathogenic for mice, guinea pigs and rabbits. The fungus recovered from the other 3 spleens (Fig. 2) is still unclassified and does not conform to the description of any of

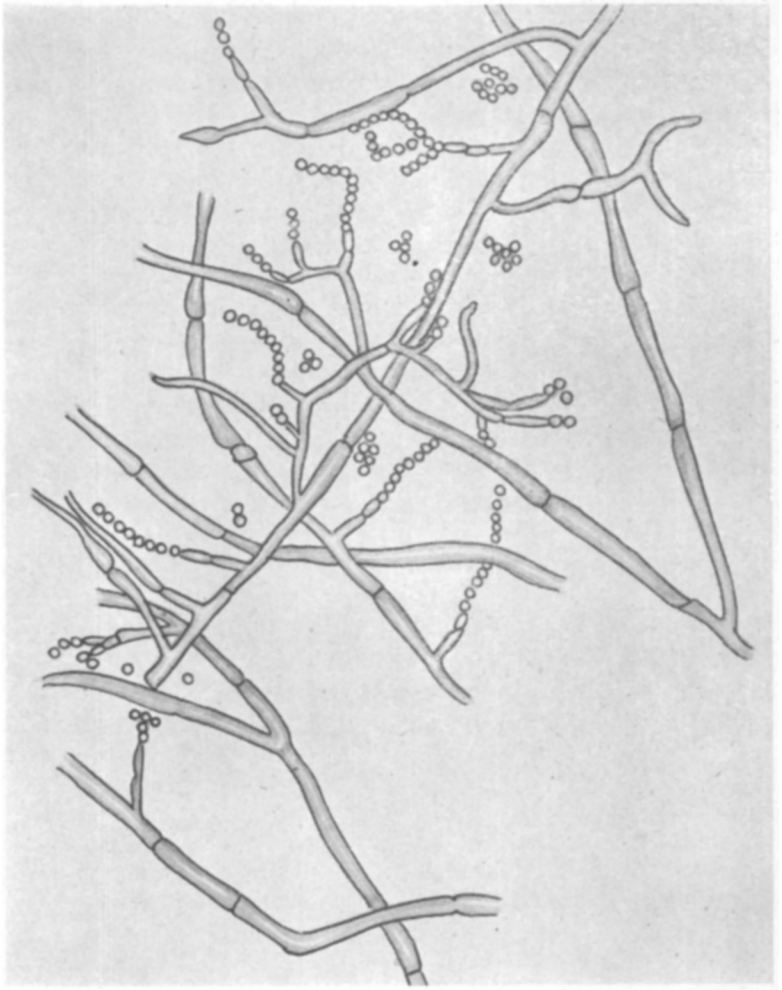

FIG. 1.

Camera lucida drawing of a microculture of Penicillium derived from Case 1. Methylene blue stain, about X 760.

the varieties recovered by the other investigators. It was not pathogenic for laboratory animals. It grows readily at 37° C. and forms large snow white colonies which became dark brownish with age. The growth is aerial and does not penetrate into the medium. In microcultures the filaments are from 1.5 to 2 microns thick. The mycelial threads are segmented and show slight constrictions at each joint. Large conidia are born directly upon the terminal ends of the hyphae. Thick, slightly curved, detached bodies appear to be the spores of the fungus.

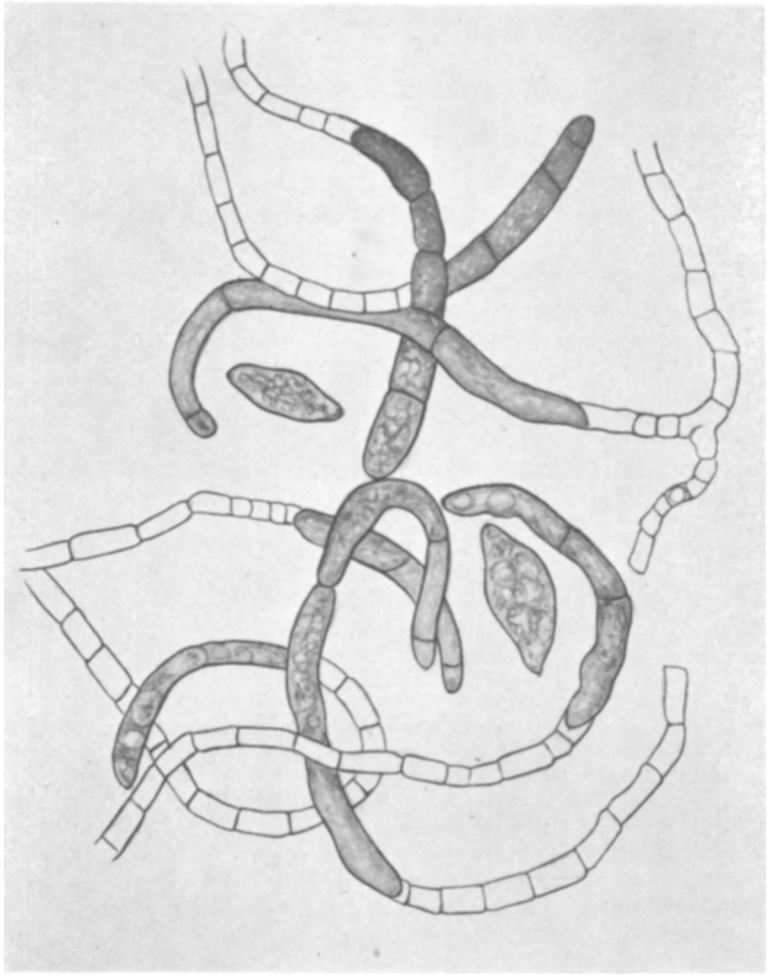

FIG. 2.
Camera lucida drawing of a microculture of the fungus derived from Cases 2, 3 and 4. Methylene blue stain, about X 1500.

Cultures of spleen and liver on other types of media to detect the presence of bacteria or other organisms remained sterile.

Experiments to ascertain the relationship between primary splenomegaly and the presence of the fungus in the spleen are in progress.

4324

Filaments in Siderotic Nodules of Spleen in Cases of Splenomegaly of Unknown Origin.

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In the recent studies concerning primary splenomegaly, much attention has been given to the presence in the spleen of the siderotic, so-called Gandi-Gamna nodules. Several observers[1, 2, 3, 4, 5] claimed that these siderotic or iron pigment deposits in the spleen were the direct result of the growth of a fungus. They considered the thread-like structures found in the nodules to be mycelium and were able to recognize club-like branches and fructification organs. The cultivation of fungi from a number of spleens from cases of primary splenomegaly seemed to confirm these views. On the other hand, many of the German pathologists since 1920 as well as several recent investigators[6, 7] believed that the filamentous structures composing the pigment deposits were degenerated tissue fibers.

We have made histological examinations of the spleens removed at operation from cases of primary splenomegaly and have compared the filaments found in the siderotic nodules as described by others, with the two varieties of fungi cultivated from the same spleens in this laboratory.[8] Upon close examination of sections stained in the usual manner certain structures were found in the

[1] Gibson, A. G., *Quart. J. Med.*, 1914, vii, 153.

[2] Fawcett, J., and Gibson, A. G., *Lancet*, 1928, i, 1171.

[3] Emile-Weil, P., Gregoire, R., and Flandrin, P., *Bull. et Mem. Soc. Med. d. Hôp.*, 1927, No. 17, 713.

[4] Emile-Weil, P., Gregoire, R., and Flandrin, P., *Le Sang*, 1927, i, 509.

[5] Jaffe, R. H., and Hill, L. R., *Arch. Path.*, 1928, vi, 196.

[6] Gamna, C., *Presse Med.*, 1928, No. 23, 357.

[7] Da Fonseca, O., and de Area Leao, A. E., *Suppl. d. Mem., Inst. Oswaldo Cruz*, 1928, No. 1, 16.

[8] Reimann, H. A., Kurotchkin, T. G., and Tso, E., PROC. SOC. EXP. BIOL. AND MED., 1929, xxvi, 410.