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5345

Studies on the Etiology of Rheumatoid Arthritis. I. Bacteriological Investigations on Blood, Synovial Fluid and Subcutaneous Nodules in Rheumatoid Arthritis.*

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The clinical evidence pointing to an infective origin of rheumatoid arthritis has led numerous investigators to seek a bacterial agent to which etiological significance could be ascribed. A wide variety of such agents has been reported, but lack of uniformity in the results obtained has confused rather than clarified the issue. Cecil, Nicholls and Stainsby,[1] by the use of a special technique, claim to have demonstrated the presence of streptococci in the blood-stream in 61.5% of a series of 78 cases examined. Because of the unusual nature of this report and the importance of such a finding the present investigation was undertaken.

The greatest care was exercised to follow their technique. The type of patient selected in all cases presented the characteristic clinical syndrome of rheumatoid arthritis. Cases of osteo-(hypertrophic, degenerative) arthritis were not included.

One hundred and five separate blood cultures were done on 80 patients. In the majority of instances the specimens of blood obtained at each vene puncture were divided into 2 portions so that in all 204 samples of blood were cultured. Eighteen selected patients were cultured on 2 occasions, 3 on 3 occasions and one on 6 occasions.

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* The term "Rheumatoid Arthritis" is synonymous with the terms "Chronic Infectious" and "Atrophic Arthritis".

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[1] Cecil, R. L., Nicholls, E. E., and Stainsby, W. J., *Arch. Int. Med.*, 1929, **43**, 571.

As a control 31 samples of blood were obtained from 16 normal individuals and subjected to similar methods of culture. Sixteen tubes of sterile, autoclaved agar were subjected to the same manipulations and cultured by the same technique.

The results may be summarized as follows: (1) In spite of the greatest care to conduct all manipulations under sterile precautions the technique was so involved as to call into serious question the significance of all bacterial growth encountered. (2) Blood cultures on patients suffering from rheumatoid arthritis failed to yield results which could be considered of etiological significance. (3) No essential difference was found in the variety and character of the bacteria encountered during the culture of specimens of blood from patients with rheumatoid arthritis and of the control material. (4) On 2 occasions colonies of typical *Streptococcus viridans* appeared during the culture of specimens of sterile agar subjected to similar manipulations.

Joint Cultures.—Twenty-three samples of synovial fluid, obtained from 19 patients suffering from rheumatoid arthritis, were cultured both aerobically and anaerobically in a variety of media which included the following: blood broth, hormone broth, meat broth, dextrose ascitic broth and dextrose ascitic agar. All the specimens were incubated for at least 30 days and carefully examined for the presence of bacterial growth at 4 to 5 day intervals during that time. The aerobic and anaerobic cultures of these 23 samples of synovial fluid failed to yield organisms which could be considered of etiological significance.

Cultures of Subcutaneous Nodules.—It has been pointed out[2] that the subcutaneous nodules frequently seen in rheumatoid arthritis constitute a classical lesion of this disease. Careful bacteriological studies were carried out on a series of 16 subcutaneous nodules obtained from 11 patients suffering from rheumatoid arthritis. Aerobic and anaerobic cultures of these nodules in a wide variety of media failed to yield organisms which could be considered of etiological significance.

[2] Dawson, M. H., and Boots, R. H., *J. Lab. and Clin. Med.*, 1930, **15**, 1065; *J. Am. Med. Assn.*, 1930, **95**, 1894.