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AORTIC ANEURYSM DUE TO TUBERCULOUS LYMPHADENITIS

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The term "mycotic aneurysm" was first used by Osler in 1885 when he described a patient with multiple aneurysms of the aorta secondary to what he termed "malignant mycotic endocarditis." Since then a group of diseases have been named the mycoses, and so the word "mycotic" has been given another meaning in addition to its original one. To-day the accepted definition of a mycotic aneurysm is one due to septic infection in the wall of an artery; it is usually associated with bacterial endocarditis. The mode of formation of a mycotic aneurysm depends upon whether it is of the embolic or of the erosive type. If embolic, an infected embolus lodges in the vessel or in one of its vasa vasorum, and the inflammation, by weakening the arterial wall, causes it to give way with the formation of an aneurysm. If erosive, the inflammation spreads from the aortic valve or from a coarctation to the adjoining aorta, or, much less frequently, it comes from an extravascular source and weakens the vessel wall by spreading from the adventitia inwards.

In this paper we describe a case in which a mycotic aneurysm of the abdominal aorta developed owing to erosion of the aortic wall by tuberculosis of the pre-aortic lymph nodes.

Case Report

The patient was aged 59. Two months before admission to St. Mary's Hospital he noticed a pain in his back; this was a constant ache, worse at night, and was gradually getting more severe. He also suffered from pain in his calves and feet; this was worse when he stood up and relieved by rest in bed. He had occasional attacks of vomiting. Two weeks before admission he noticed a pulsatile swelling in his abdomen which was rapidly enlarging. He consulted Mr. A. Emllyn Williams at the Hampstead General Hospital, who considered that he had an aneurysm of the abdominal aorta and referred him to us for treatment.

He gave a past history of two bouts of pulmonary tuberculosis occurring respectively nine years and two years previously. Nine months before admission he had a cold abscess of the chest wall treated surgically at the Brompton

Hospital. One of his brothers had died of pulmonary tuberculosis and one of his daughters also suffered from this disease.

On admission the scar of the operation on the chest wall was soundly healed and x-ray examination showed no evidence of an active pulmonary lesion. He was seen by Dr. W. D. W. Brooks, who considered that the pulmonary disease was quiescent. Examination of the abdomen revealed a slightly tender mass in the epigastrium situated just above and to the left of the umbilicus; this pulsated in an expansile manner and was considered to be an aneurysm of the aorta. Apart from a mild urinary infection, no other abnormality was detectable on clinical examination. Aortography (performed by Dr. David Sutton) demonstrated an aneurysm of the abdominal aorta between the renal arteries and the aortic bifurcation (Fig. 1).

FIG. 1.—Pre-operative aortogram showing an aneurysm of the abdominal aorta.

At this stage the patient exhibited two unusual features as compared with the usual case of abdominal aortic aneurysm which we treat with a blood-vessel graft. He had an evening temperature of 100° F. (37.8° C.) and the aneurysm was unusually large clinically when compared with the size shown on the aortogram. The pyrexia was at first thought to be due to the urinary infection, but although this infection cleared with treatment the pyrexia persisted. In view of these findings and his previous medical history it was considered possible that he suffered from tuberculosis of the abdominal lymph nodes as well as an aneurysm of the aorta.

At operation a large mass of caseating tuberculous lymph nodes was found to be adherent to the anterior and lateral walls of an aortic aneurysm. At one point the aneurysm was very thin walled and about to rupture. The whole mass and the aneurysm were resected, the inferior mesenteric artery was tied, and continuity was restored by means of a prosthesis of "orlon" cloth. Orlon cloth was used in preference to an arterial homograft because the graft bed consisted in part of tuberculous tissue, and it was felt that this might spread and involve a graft.

The patient made a satisfactory recovery from the operation, and was discharged from hospital to a convalescent home one month later. There he completed a twelve-weeks course of streptomycin and P.A.S.

On examination of the specimen the resected portion of aorta was seen to have a moderate degree of atheroma; many enlarged caseating lymph nodes surrounded a saccular aneurysm. Microscopical examination demonstrated tuberculous granulation tissue with much central caseation abutting on the outer surface of the aorta, replacing the adventitia

and media in places, so that there was only thickened intima between the tuberculous tissue and the lumen of the aorta. In view of these findings we consider that this patient had a mycotic aneurysm of the abdominal aorta of the extra-vascular erosive type, the tuberculous disease in the lymph nodes having destroyed the adventitia and media of the aorta so that an aneurysm resulted.

Aortography performed one month after operation showed that there was good filling of the aorta, the orlon prosthesis, and the iliac arteries (Fig. 2). The patient has returned to work in his city office.

FIG. 2.—Post-operative aortogram showing the orlon cloth prosthesis in position.

Previous Reported Cases

In 1913 Haythorn reviewed the literature on tuberculosis of arteries and reported finding only one record of an aneurysm of the abdominal aorta due to erosion of the arterial wall by tuberculous granulation tissue. Since then occasional cases have been reported, and by 1933 Gellerstedt and Säfwenberg were able to collect 21 cases of aneurysm of the abdominal aorta due to erosion by tuberculous granulation tissue. The literature since 1933 contains reports of two more cases (Owens and Bass, 1944; Scott, Maxwell, and Grimes 1949), so it appears that, including our patient, only 24 cases of tuberculous mycotic aneurysm of the abdominal aorta have been recorded. Also, as the other reports were based upon material obtained at necropsy, ours is the first record of the diagnosis of this lesion with the subsequent recovery of the patient.

Summary

A case is reported of an aneurysm of the abdominal aorta due to erosion of the aortic wall by tuberculous granulation tissue from caseating abdominal lymph nodes. Treatment, which included resection of the aneurysm followed by reconstruction of the aorta with a prosthesis of orlon cloth, has enabled the patient to return to work.

Of 23 such cases previously reported in the literature, all were fatal.

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THE NUCLEIC ACID CONTENT OF BONE-MARROW CELLS IN PERNICIOUS ANAEMIA

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The understanding of disordered processes of cell development has in the past depended mainly on the observation of morphological differences between cells at various stages of their life-cycle. By modern chemical and histochemical methods it is possible to analyse, in certain of the chemical constituents of cells, changes that are probably the underlying cause of alterations in morphology. The disordered cell development that occurs in pernicious anaemia is particularly worthy of study, for the cells are easily accessible, and, furthermore, the disease process is one that can be corrected by appropriate treatment. Of the therapeutic agents that restore the bone-marrow picture to normal, the most potent is vitamin B₁₂, which appears to be closely connected with the synthesis of nucleic acids that accompanies growth (Wright *et al.*, 1948; Rose and Schweigert, 1952). In spite of the fact that, from bacterial and animal experiments, much has been learned about the biological activity of vitamin B₁₂, very little is known of its mode of action in pernicious anaemia. There is as yet no real understanding of the nature of the cellular defect that is apparently remedied by vitamin B₁₂, but it seems possible that it may be a defect in nucleic acid metabolism.

It has been demonstrated that the deep basophilia of the cytoplasm of early megaloblasts is due to the presence of ribonucleic acid (Thorell, 1947; White, 1947); it has also been shown by chemical analysis that the mean amount of ribonucleic acid phosphorus (R.N.A.P.) per cell is much greater in megaloblastic marrows than in normal marrows (Davidson *et al.*, 1951). Accumulation of ribonucleic acid in the cell cytoplasm appears, therefore, to be a specific feature of megaloblastic haemopoiesis. That abnormalities may also occur in the cellular content of deoxyribonucleic acid (D.N.A.) was suggested by La Cour (1944), who, by histological methods, demonstrated chromosomal abnormalities in both the red-cell and the white-cell series in pernicious anaemia. The mean deoxyribonucleic acid phosphorus (D.N.A.P.) per cell is, in fact, greater in megaloblastic marrows than in normal marrows (Davidson *et al.*, 1951, 1953). On the other hand, it has been shown by microspectrophotometric techniques that the D.N.A. content of individual megaloblasts is no greater than that of normoblasts of comparable nuclear size (Reisner and Korson, 1951; Marinone, 1951).

In this paper we present the results of chemical estimations of the nucleic acid content of bone-marrow cells in pernicious anaemia, and make an attempt to assess the significance of the findings, particularly with regard to the cellular content of D.N.A.P. Quantitative changes in nucleic acids during *in vitro* culture will be described elsewhere.