SHORT ARTICLES

ASPERGILLUS FUMIGATUS ENDOCARDITIS OF AN AORTIC HOMOGRAFT WITH ANEURYSM OF THE ASCENDING AORTA

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PLATE CXLVII

Fungal endocarditis is an uncommon complication of cardiac surgery. *Candida* endocarditis following open heart surgery was first reported by Koelle and Pastor (1956) and since then 24 cases have been recorded. Nineteen cases were reviewed by McConnell and Roberts (1967) and three cases of their own were added. Two more cases have been reported since, one by Newsome, Lea and Russell Rees (1967) and the other by Khan, Kane and Dean (1968).

The fungi isolated from these 24 cases were *Candida albicans* in 14, other *Candida* species in seven, *Aspergillus* in two and *Paecilomyces* in one (Uys et al., 1963). The first case of *Aspergillus* endocarditis following open heart surgery was reported by Newman and Cordell (1964).

This present paper presents a case of *Aspergillus fumigatus* endocarditis on an aortic valve homograft.

CLINICAL PRESENTATION

The patient was a 40-yr-old female who was admitted to Baguley Hospital with a history of rheumatic fever at the age of 9 yr and breathlessness and palpitation for 8 yr. A diagnosis of aortic incompetence was made.

Her pre-operative Hb. was 12.6 g per 100 ml, WBC 5000 per mm³; occasional leucocytes were present in the urine, but no organisms were isolated on culture.

Aortic valve replacement by a homograft was performed with the use of an extracorporeal circulation technique. The homograft was cultured before insertion, but no organisms were isolated.

The immediate post-operative recovery was satisfactory, but the homograft valve did not appear to function satisfactorily and the patient was not relieved of her dyspnoea and palpitations.

In view of the unsatisfactory clinical condition a second operation was carried out 8 mth after the first, and the homograft valve was replaced by another one.

Three days after the second operation the patient developed a left-sided hemiplegia and intermittent pyrexia. Repeated blood cultures remained sterile. The urine contained 30–60 RBC and 8–12 WBC per high-power field, but was sterile on culture. Despite the sterile blood cultures, the patient was treated as a case of bacterial endocarditis with Rifamide (Lepetit) 150 mg and sodium fusidate (Leo Laboratories) 500 mg 6-hourly. Her general condition gradually deteriorated and she died 3 mth after the second operation.

SURGICAL SPECIMEN

The surgical specimen from the second operation showed a satisfactory attachment of the homograft to the surrounding aortic ring. The sutures were surrounded by firm tissue of fibrous consistency. The valve cusps showed thickening of their free margins.

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microscopical examination there was no inflammatory-cell infiltration nor were organisms present. No bacteria or fungi were isolated on culture of the specimen.

**NECROPSY**

The heart (770 g) (fig. 1) was enlarged from hypertrophy of both ventricles. The myocardium showed scattered areas of fibrosis, the largest, in the left ventricle, measuring 8 mm in diameter. The homograft aortic valve was in a satisfactory position and its sutures were intact. There was a saccular aneurysm of the ascending aorta (6 x 5 x 5 cm) just above the homograft. The sac communicated with the lumen of the aorta by an ostium 3 cm in diameter. Large friable vegetations covered the cusps of the homograft and filled the sac of the aneurysm. One of the cusps was completely destroyed and replaced by vegetations. At the junction of the proximal end of the aneurysm and the aorta there was an abscess cavity containing about 10 ml of thick pus. The coronary arteries and the remaining heart valves showed no abnormality.

Both lungs were congested and on section the cut surface showed oedema, but there was no evidence of cavitation, necrosis or abscess formation. The bronchi were thick-walled and contained mucus. The brain (1377 g) was oedematous, but on section showed no evidence of softening or haemorrhage. The spleen (485 g) was enlarged, soft and congested and on section showed two areas of recent infarction each measuring 2 x 2 x 1 cm. There were two recent infarcts in each kidney.

**Histological and bacteriological examination.** Microscopical examination of the vegetations on the aortic homograft show numerous branching septate hyphae together with fibrin and red cells (fig. 2). The wall of the aneurysm is formed by fibrous tissue in which there are elastic fibres and a few muscle bundles. Its cavity is filled with fibrin and fungal hyphae similar to those on the homograft. *Aspergillus fumigatus* grew on culture of the vegetations.

Sections of the lungs show marked congestion and thickening of the alveolar walls, but no inflammatory changes are present. The brain shows generalised congestion with occasional small perivascular haemorrhages. Small fibrin thrombi are seen in a few vessels. No fungi or bacteria are demonstrated in serial sections of these thrombi. The infarcted areas in the spleen and kidneys show necrosis of the tissue surrounded by a zone of congestion. No organisms are demonstrated microscopically in the lungs, spleen or kidneys.

**DISCUSSION**

*Aspergillus fumigatus* is a widely distributed organism and regarded as being of low pathogenicity for man. Debilitated patients and those receiving long-term antibiotics or steroids are at greater risk of infection with this organism. Patients undergoing open heart surgery come into this category since they are usually debilitated and almost invariably receive a long course of post-operative antibiotic therapy.

The source of the infection is difficult to demonstrate. It may be introduced at the operation by contamination of the replacement valves themselves, or of the pump, oxygenator or other equipment used. The use of homograft valves in open heart surgery presents a special problem in sterilisation. At this hospital a technique is used in which the valves are sterilised, immediately after dissection from the cadaver, by immersion in an antibiotic fluid containing penicillin, streptomycin and neomycin. After sterilisation the valves are stored at -20°C. Cultures for bacteria and fungi are made from the valves at the time of their dissection, prior to cold storage, and again immediately before insertion into the patient. All cultures in over 130 cases have been sterile (Mr G. D. Jack, personal communication).

Clinical distinction between bacterial and mycotic endocarditis is extremely difficult. The successful treatment of fungal endocarditis is very much dependent on early diagnosis. Merchant *et al.* (1958) and Jamshidi, Pope and Friedman (1963) reported cases in which fungi were isolated from the urine although the blood cultures remained sterile. For this
Fig. 1.—The heart showing the aortic homograft valve covered by large friable vegetations. × 0·35.

Fig. 2.—Vegetation from the aortic valve showing hyphae of Aspergillus fumigatus. × 400.
reason, when there is any suspicion of fungal infection in cardiac surgery, reliance should
not be placed on blood culture alone, but efforts should also be made to recover the organ-
isms from cultures of the sputum and urine.

**SUMMARY**

A case of fungal endocarditis of an aortic valve homograft with aneurysm of the ascending
aorta is described. The causative organism, *Aspergillus fumigatus*, was isolated from the
large friable vegetations found on the valve cusps and filling the aneurysmal sac. No organisms
were recovered from repeated blood cultures.

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