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Clinicopathological Study of a Case of Heart Transplantation

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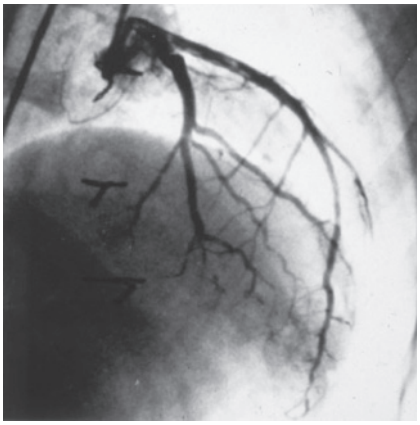

Fig. 1

Fig. 2

Organ transplantation is the only effective treatment for a terminally failing organ. However, a significant obstacle to transplantation is the recipient' immune response to the transplanted organ. If an immunologically incompatible organ is transplanted, it is recognized as a foreign body and is rejected. Rejection can be classified as either acute or chronic. We describe the clinicopathological findings of a patient who underwent heart transplantation but died at JR Tokyo General Hospital.

Case

The patient was a 7-year-old Japanese boy who had been born in Europe and had Kartagener syndrome and transposition of the great vessels. When he was 4 months old, he underwent the Jatene procedure, but cardiac insufficiency developed. Three months after this operation, the patient underwent heart transplantation. Immunosuppressive therapy had been administered since transplantation.

After 5 uneventful years since transplantation, T-cell lymphoma (posttransplant T-cell proliferative disease) developed. The immunosuppressive therapy was stopped, and chemotherapy was begun. The lymphoma gradually disappeared but recurred when immunosuppressive therapy was resumed. Immunosuppressive therapy was finally discontinued after the lymphoma recurred.

After the patient returned to Japan at the age of 6 years, cardiac insufficiency recurred. Cardiac catheterization showed a stricture of a coronary artery **(Fig. 1)**. The possibility of a second of heart transplantation was being discussed when acute cardiac insufficiency developed as the patient was walking with his father. He was rushed to our hospital but died.

Pathological and Anatomical Findings

Gross examination of the transplanted heart showed marked fibrous thickening of the epicardium and thickening and stenosis of the coronary arteries **(Fig. 2 and 3)**. High-magnification microscopic examination showed foamy cells, invasive lymphocytes, and fibrous outgrowth on the tissue under the tunica intima. With elastica van Gieson stain, the lamina elastica interna appeared to be well maintained **(Fig. 4)**. Therefore, pathological alterations, such as atherosclerosis, of the coronary arteries were seen. A diffuse area of infarction of the myocardium was found. We concluded that chronic rejection (transplant vasculopathy) had caused stricture of the coronary arteries, which resulted in myocardial infarction.

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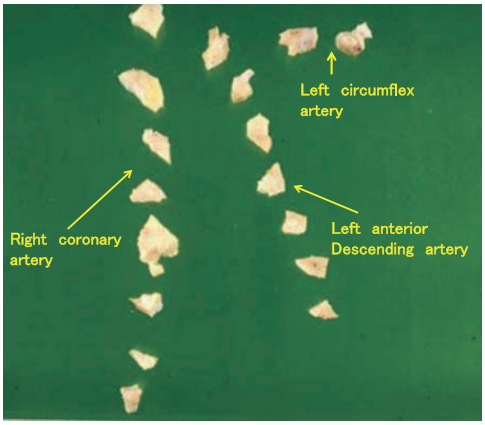

Fig. 3

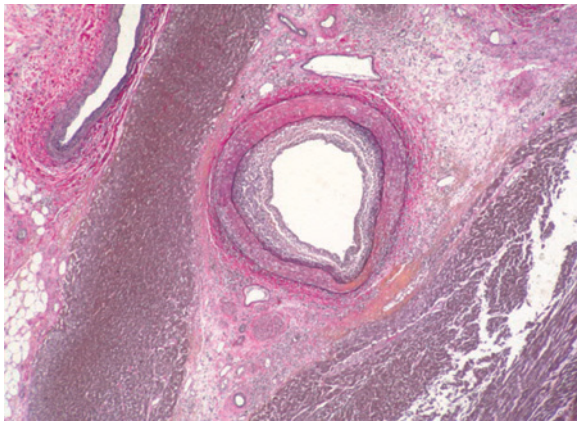

Fig. 4

Discussion

Rejection can be classified as either acute or chronic[1,2]. We examined the present case according to this classification.

a) Acute rejection.

Acute rejection is indicated by alterations of vessels and interstitial tissue in the transplanted organ. It generally occurs 2 to 3 weeks after transplantation. Acute rejection can be suppressed with immunosuppressive therapy, which has increased the success rates of transplantation.

After examination of the patient's medical records, we concluded that acute rejection had been prevented by immunosuppressive therapy.

b) Chronic rejection

Chronic rejection occurs from several months to several years after transplantation. Chronic rejection causes graft vasculopathy, which is a type of chronic arterial vascular lesion that is histologically similar to atherosclerosis. Arterial occlusion develops over time, and infarction eventually occurs[1,2].

In the present case, thickening of the tunica intima of the coronary arteries was observed. Although lymphocyte infiltration and fibroblasts were found within the tunica intima, elastic van Gieson staining showed that the lamina elastica interna was well maintained **(Fig. 4)**. After heart transplantation, the coronary arteries usually display fibrous thickening of the tunica intima, which spreads distally and diffusely from the initial lesion. Based on similar pathological findings in this patient, we concluded that he had chronic rejection. The patient's sensory nerves were turned off at the time of heart transplantation. As a result, he was unable to feel the pain that is a sign of myocardial infarction due to coronary artery stenosis and suddenly died.

Summary

We have reported pathological findings from a case of heart transplantation. Myocardial infarction due to chronic rejection (transplant vasculopathy) resulted in the death of the patient.

Fig. 1 Coronary angiography of the left coronary artery showing stenosis and irregularity of the peripheral portions.

Fig. 2 The transplanted heart.

Fig. 3 Coronary arteries (Left circumflex artery, Left anterior artery, Right coronary artery)—Up to 90% stenosis.

Fig. 4 Coronary artery (Elastic van Gieson stain) shows stenosis and preservation of the internal and external elastic layers.

References

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