Amyloidosis of saphenous coronary bypass graft

Peer reviewed clinical letter

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Saphenous vein bypass graft (SVBG) is widely accepted as the surgical treatment of choice for severe coronary artery disease [1]. The short and long term complications and morphological changes of these grafts in the post-operative period are well documented. [2, 3] Amyloidosis of SVBGs appears to be exceptional thus warranting the presentation of this case with a review of the literature.

In June 1995, a 76-year-old man was admitted in severe cardiac failure following a left pertrochanteric hip fracture. In 1960, he had suffered a left antero-lateral myocardial infarction. In 1980, he had undergone a triple autologous saphenous vein bypass graft. Five years later, marked stenoses of the anterior and first diagonal grafts warranted a fourth autologous venous graft implantation on the second left diagonal. In 1991, owing to sinus bradycardia a two-phase pacemaker had been implanted. Three years later he became anorexic and lost 15 kg in weight, accompanied by generalized cardiac enlargement, marked peripheral oedema and anasarca. He died 7 days after admission.

At autopsy, the heart (700 g) was globally dilated and hypertrophied. The coronary arteries were conspicuous, tortuous, revealing on section extensive, focally calcified, atherosclerotic lesions with marked stenoses of their lumens. The first three SVBGs were thickened while the fourth was dilated, rigid and partially calcified. Histologically, several sections taken from the SVBGs implanted in 1980 showed the lesions generally observed in such grafts after long term implantation [3, 4] while those on the second diagonal (1985) were fibrotic and somewhat hyalinised with calcified areas. In addition, Congo red revealed scattered positive staining for amyloid, (figure 1) showing the characteristic apple green birefringence under polarized light (figure 2). There was no birefringence after treatment with $KMnO_4$ and staining with Congo red, indicating that the deposits were not of the AA type. This was confirmed by immunohistochemistry using a monoclonal anti-human amyloid A component antibody. With the exception of a few splenic arteries, the myocardium, coronary arteries and veins, as well as sections from several other organs, revealed no further amyloid deposits.

In a previously documented case of amyloidosis of SVBGs [5] a monoclonal band was already present on admission and amyloidosis of the aortic valve removed at surgery, was demonstrated, indicating that the condition existed prior to surgery.

Some authors [6] have also attempted to show the importance of taking myocardial biopsies at the time of coronary artery bypass grafts (CABG) as a means of evaluating the prognosis in order to predict any cardiac deterioration that may subsequently occur. This approach could also be rewarding in cases of cardiac transplantation [7].

In the latter report [5] the pathological findings were consistent with that of amyloid light chain (AL) generally associated with immune dyscrasia or primary amyloidosis. Most patients presented with an increased number of plasma cells in the bone marrow. In the present case, the vertebral bone marrow was sampled and contained plasma cells, which, although not in strikingly increased numbers, does not, therefore, exclude this possibility. The fact that amyloid deposits were observed only in small splenic arteries and in the markedly hyalinised graft would suggest that the condition may have been at an early stage and/or that the graft implanted five years after the others, was already morphologically altered: high arterial pressure may have further accelerated its modification, thus facilitating the deposits and accumulation of amyloid fibrils in that graft. In CABG surgery and cardiac transplantations, the search for monoclonal antibodies and/or free light chains (Bence-Jones proteins) in serum and urine may be useful in determining the outcome.

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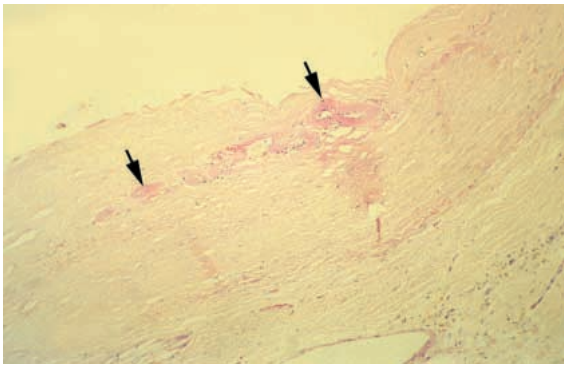

Figure 1

Hyalinised, thickened saphenous vein graft showing amyloid deposits, orange (→).
(Congo Red, × 40).

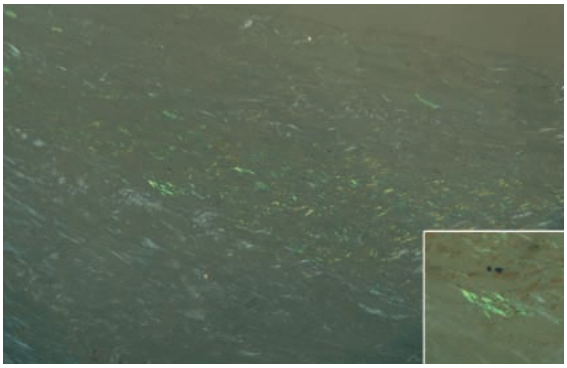

Figure 2

Diffuse green fluorescent under polarized light of amyloid deposits in the modified venous graft. (→).
(Congo Red, × 63).

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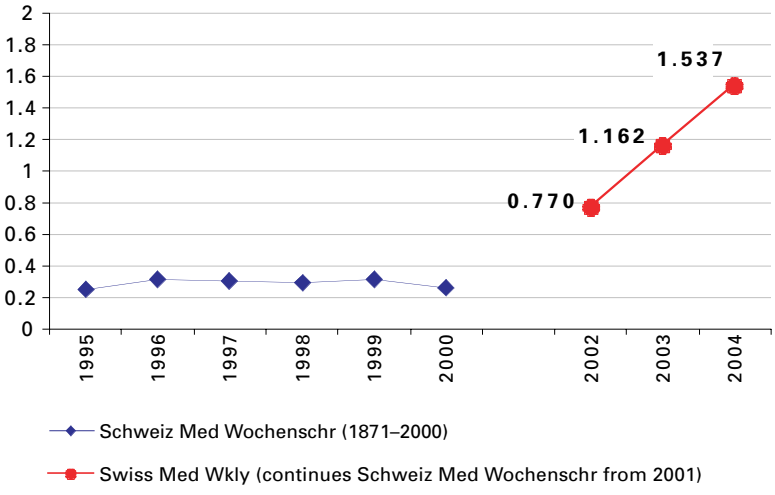

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