Necrotizing Glomerulonephritis and Renal Cholesterol Embolization

T.		Hannedouche ^a
M.		Godin ^a
H.		Courtois ^b
T.		Ducastelle ^c
A.		Delpech ^c
J.		Tayot ^c
J.P.		Fillastre ^a

Departments of ^aNephrology, ^bInternal Medicine and Pathology, School of Medicine, Rouen, France

Prof. J.P. Fillastre, Département de néphrologie, Hôpital de Bois-Guillaume, F-76230 Bois-Guillaume (France)

Dear Sir,

Renal cholesterol embolization as a direct cause of necrotizing glomerulonephritis has recently been described by Goldman et al. [1]. This condition is exceedingly rare, and we wish to report a case of similar nature.

A 79-year-old woman with a 10-year history of hypertension and a 3-year history of peripheral vascular disease was hospitalized for generalized malaise, severe myalgia, and weight loss of 12 kg in 7 months. Her only medication was atenolol 100 mg a day. On examination her blood pressure was 160/80 mm Hg. The cardiopulmonary exam was unremarkable. Both temporal arteries were difficult to palpate, and no pulses were felt in the lower limbs. Bilateral femoral bruits were heard. Subcutaneous nodules, 2–3 cm in diameter, were present over the flanks, arms and thighs. Peripheral edema was not noted. Laboratory investigations revealed: normocytic normochromic anemia (Hb = 5.2 mmol/l, erythrocyte sedimentation rate of 102 mm at 1 h, total protein = 48 g/l, serum albumin = 26 g/l). Renal function had deteriorated rapidly, the serum creatinine at the time of hospitalization was 950 µmol/l, having been 230 and 123 µmol/l and 5 months previously. Proteinuria (2 g/24 h) and hematuria (2 million RBC/min) were present.

Abdominal ultrasound revealed normal-sized kidneys, an aortic aneurysm 32 mm in diameter, and bilateral iliac artery stenosis. Complement concentrations were: CH50 = 125 U/ml (80–120), C3 = 0.50 g/l (0.60–1.20), C4 = 0.19 g/l (0.20–0.40). Circulating immune complexes were detected using the PEG technique. Antinuclear antibodies were present at 1/500 homogeneous. Circulating anti-glomerular basement antibodies were not detected. Temporal artery and muscle biopsies were normal. A biopsy of the skin lesions showed capillary dilatation in the superficial and intermediate dermis with red blood cells filling the vascular lumina, and pericapillary polynuclear

infiltration. No cholesterol crystals were seen, and no necrosis was present. The clinical picture suggested systemic arteritis although a specific diagnosis could not be made. Prednisone 1 mg/kg and cyclophosphamide 2 mg/kg were prescribed. Oligoanuria ensued and alternate day hemodialysis was instituted. Open renal biopsy was performed. Twenty-six of 30 glomeruli

showed segmental or global extracapillary proliferation without fibrosis or necrosis. Moderate interstitial inflammation was present. Necrotizing arteritis was absent, but two small spindle-like crystals were seen, one in the lumen of an interlobular artery, the other in the lumen of a glomerular capillary. Intense linear staining with anti-IgG antibody was seen in all glomeruli examined. Weak fixation of anti-C3 and antifibrinogen was noted in 2 glomeruli. Electron microscopy revealed marked epithelial proliferation that completely obliterated the normal structure of the glomerular tuft. Only a small, central area containing shrunken and retracted basement membrane remained. One interlobular artery contained a crystal which was partially embedded in the vessel wall. The underlying endothelial cells were necrotic but the surrounding cells were normal. The patient's renal function continued to deteriorate. She died of cardiac failure approximately 10 weeks after hospitalization. At autopsy, extensive calcific, ulcerated atheromatous disease was present in the thoraco-abdominal aorta. An aneurysm was located 3 cm below the origin of the renal arteries, and both iliac arteries were stenosed. Extracapillary glomerulonephritis was again noted, as were arteriolar and arterial endarteritis. Nonspecific tubulo-interstitial lesions were present. Multiple cholesterol emboli obstructed the interlobular arteries. They were also found in the vessels of the adrenals, pancreas, spleen, gastric wall, and distal esophagus where they were associated with mucosal ulceration. Multiple foci of hemorrhagic alveolitis were identified in the lungs.

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Spontaneous renal cholesterol embolization is a rare manifestation seen in renal biopsies of approximately 1% of men over 50 years of age [2]. In this series, all of the patients had recent clinical evidence of decreased renal function, severe hypertension and diffuse atherosclerotic disease. Cholesterol emboli generally occlude the lumina of arcuate and interlobular arteries and evoke endothelial proliferation. Glomerular lesions are frequent, particularly ischemic retraction of the tuft and wrinkled basement membranes. Necrotizing glomerulonephritis probably related to renal cholesterol embolization has recently been described [1].

Our patient had both severe diffuse atheroembolic disease and a diffuse extracapillary glomerulonephritis. Linear anti-IgG fluorescence was an unusual and unexpected finding suggestive of an associated antiglomerular basement membrane-mediated process. It is conceivable that ischemic glomeruli express antigenically altered structures that elicit an anti-GBM response.

References

Goldman, M.; Thoua, Y.; Dhaene, M.; Toussaint, C.: Necrotizing glomerulonephritis associated with cholesterol microemboli. *Br. med. J.* 290:205–206 (1985).