Non-Diabetic Renal Disease in Diabetic Patients

Sawsan M. Jalalah
Pathology Department, College of Medicine, King Abdulaziz University,
Jeddah, Kingdom of Saudi Arabia

ABSTRACT. The occurrence of non-diabetic renal diseases (NDRD) in diabetic patient is well recognized. Different frequencies for NDRD have been reported from different parts of the world. This is a retrospective study of 16 renal biopsies from diabetic patients. The biopsy samples were all examined by light, immunofluorescence and electron microscopy. Non-diabetic renal diseases were encountered in eight cases (50%). Membranous glomerulonephritis (MGN) was the most common NDRD seen in three of the eight cases (37.5%). Immunoglobulin A nephropathy (IgAN), membranoproliferative glomerulonephritis type I (MPGN) and postinfectious glomerulonephritis (PIGN) were seen in one case each (12.5%). Interstitial nephritis was seen in two cases representing 25% of NDRD. In conclusion, the current study demonstrates the occurrence of NDRD in diabetic patients and the most frequently encountered lesion was MGN. Thus, renal biopsy in diabetic patients may prove to be helpful in identifying an underlying NDRD for better management.

Introduction

Renal biopsies are not routinely performed in diabetic patients; it is indicated however, in patients who develop sudden onset proteinuria, hematuria, and/or rapid deterioration of renal function. Non-diabetic renal disease (NDRD) may be present with or without diabetic glomerulosclerosis. The frequency of NDRD occurring in diabetic patients is not very well established few sporadic studies from different parts of the world have reported variable frequencies of wide range of NDRD. This is the first report from Saudi Arabia documenting the frequency of NDRD in a biopsy-based study.

Subjects and Methods

Archived renal biopsies over a period of 19 years between 1988 till 2007 were reviewed retrospectively. A total of 16 renal biopsies performed on diabetic patients were selected out of a total of 905 biopsies submitted to our hospital and research center. These biopsies
were re-examined for the presence of an NDRD; out of the 16 cases studied, eight cases were diagnosed to have NDRD. The clinical presentation at the time of biopsy ranged from heavy proteinuria, nephrotic syndrome and rapid renal function deterioration.

All cases were processed routinely for light microscopy, immunofluorescence and electron microscopy. Renal tissue submitted for diagnosis was divided into three portions; one piece was fixed in buffered formalin and processed into paraffin blocks for light microscopy examination. Sections were stained with hematoxylin and eosin, periodic acid Schiff (PAS), silver methanamine, Masson trichrome and Congo red. The second piece of tissue was frozen for direct immunofluorescence studies with fluorescein isothiocyanate (FITC) conjugated antibodies for IgG, IgA, IgM, C3, C4, C1q and fibrinogen. The third piece was fixed in Trump’s EM fixative and processed into resin blocks; ultrathin sections stained with uranyl acetate and lead citrate were then examined with the transmission electron microscope.

**Results**

A total of 16 renal biopsies were received from diabetic patients of which, eight, were diagnosed to have superimposed NDRD constituting 50% of the biopsies studied (Table 1). The other eight biopsies showed only diabetic glomerulosclerosis, nodular or diffuse.

The most frequent NDRD seen was membranous glomerulonephritis (MGN) encountered in three patients; in two of these cases, the MGN
MGN was superimposed on diabetic glomerulosclerosis (Figure 1) while the third case was not accompanied by any histological changes suggestive of diabetic nephropathy. The other NDRDs included IgA nephropathy (IgAN), membranoproliferative glomerulonephritis and post-infectious glomerulonephritis in one case each (Table 1).

The biopsies showing IgAN showed mild diabetic sclerotic changes in the glomeruli accompanied by small dense deposits in the mesangium as seen by electron microscope (Figure 2); the deposits were positive for IgA by immunofluorescence. The case with MPGN was also associated with diabetic changes in the glomeruli in addition to immunecomplex deposits in subendothelial and mesangial areas (Figure 3). The case with PIGN demonstrated diffuse infiltration of glomeruli by neutrophils, with occasional hump-like deposits in subepithelial areas (Figure 4) on a background of nodular glomerulosclerosis.

Interstitial nephritis was diagnosed in two cases; both had this lesion in addition to the findings of diabetic glomerular sclerosis.

The patients are all adults with their age ranging from 34-70 years; there were five females and three males. All three patients with MGN were females.

Discussion

The occurrence of NDRD in diabetic patients is reported in several studies from around the world. The frequency of NDRD is reported at widely variable range 63-33% of the total renal biopsies of diabetic patients. In our study, NDRD was seen in 50% of all the diabetic renal biopsies included in this series. The most commonly diagnosed NDRD in these biopsies was MGN which represents 18.75% of diabetic renal biopsies; the frequency of IgAN, MPGN and PIGN was 6.26% each.

IgAN is reported in many studies as the most common NDRD among their diabetic patients; while MGN is not so commonly encountered. Similarly the study by Mak et al showed that IgAN is the most common NDRD in diabetics and they have reported that IgAN is also the most common GN in adult biopsies of non-diabetics in the same population.
However, other studies performed on autopsies of diabetic patients showed that NDRD is not common as reported in the literature; in fact there was only one case of IgAN and no MGN out of 210 autopsy cases. This discrepancy in the frequency of NDRD between biopsy proven studies and systematic autopsy studies may be explained by the bias while including cases in the investigation; this may have resulted in the overestimation of NDRD in biopsy based research.

The pathogenesis of NDRD is not well understood. Whether there are common etiologic factors in relation to diabetes or it is mere coincidence is not clear. However, it is important to acknowledge the co-existence of NDRD in diabetic patients.

It has been suggested in some studies that the co-existence of IgAN in diabetic patients is not a coincidence and that there may be a common pathogenesis. It is important to conduct more comparative studies on the frequency of NDRD in diabetics versus the frequency of GN in non-diabetics of the same population to better understand the association between NDRD and diabetes.

In conclusion, this study reports that MGN is the most common NDRD encountered among diabetic renal biopsies. No similar studies are published from Saudi Arabia; this would be the first report of NDRD in diabetics.

Investigation of diabetic patients with suspected NDRD clinically should include complete studies of the renal biopsies to rule out the possibility of NDRD. This is of great importance in the management and prognosis of such patients.

References