Research Article

Incidence of Renal Diseases in Tanta University Hospital: Review of a Regional Renal Biopsy Database

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ABSTRACT

Glomerulonephritis is as a major cause of morbidity and mortality from renal disease in Egypt and many parts of the world. To date, there is very few studies on the prevalence of the glomerulonephritis in Egypt.
Although several registries collecting data of patients with kidney diseases exist, there are only a few registries which specifically collect data relating to renal biopsy.
The spectrum of diseases found on percutaneous renal biopsies varies greatly depending on multiple factors such as age, gender, race, geographical location, and the nature of biopsy indications. Moreover, there is evidence of change in many parts of the world in the spectrum of renal diseases. Therefore, it is of considerable interest to identify the prevalence of glomerular disease in Tanta University Hospital, which represent tertiary referral for most of the delta region, based on retrospective analysis of renal biopsies obtained over two years from January 2014 to December 2015. (1, 2) Because it helps in the recognition of specific risk factors and subsequent planning for adequate prevention.
Our study included 182 patients during January 2014 to December 2015 in El-Gharbia area were adequate for processing to light microscopy, 41.2% where processed to IHC. The most common age interval during which renal biopsy was done was 20-30 years (32.1%). Female gender (63%) was slightly more prevalent than male gender (37%), the higher relative frequency of SGN in females may be explained by the fact that systemic lupus erythematosus was the most common SGN and it occurs more frequently in women.
The main indication for renal biopsy was nephrotic syndrome followed by Proteinuria; primary GN was more common than secondary GN.
Diabetic kidney disease constituted 15 cases 8.1% of the total RBs done, classical features of DN were found in 9 cases 60%, other non-diabetic renal diseases were also found in the 6 cases 40%.
Lupus nephritis was the most common cause of secondary GN and constituted 47 of the total RBs done and, L.N class IV represented the most common histopathological pattern, followed by pure class III.

Key words: *Incidence, Renal Diseases,Renal Biopsy*

INTRODUCTION

Glomerular disease may have a wide variety of etiologies and clinical presentations, some glomerular diseases are given the generic title of glomerulonephritis, which implies an immune or inflammatory pathogenesis, (3) Racial factors seem to play an important role, not only in influencing incidence, but also in defining the pattern, severity and progression of the glomerular response. (4) Also environmental factors may also be involved as modifiers of the glomerular pathology in different geographical regions. (5)

Although a specific diagnosis can be made in some patients based on clinical presentation and different laboratory tests, in most patients, a renal biopsy is useful for both classification and prognosis; the biopsy should be examined by light microscopy, immunofluorescence and in some cases electron microscopy. (6) Using this approach, a histologic pattern can be diagnosed. Some histologic patterns can be coupled with other laboratory tests to identify a specific etiology, but in many cases, the condition is idiopathic. However, because treatments are often developed for specific histologic patterns, this approach is currently favored in the management of patients with glomerular disorders.

Ideally, analysis of a renal biopsy sample should identify a specific diagnosis, reflect the degree of disease activity, and provide information that allow informed decisions about planned treatment. Although not always able to fulfill these criteria, the renal biopsy remains a valuable clinical tool and is of particular benefit in the clinical situations as nephrotic syndrome, irreversible acute kidney injury, systemic disease with renal dysfunction, non-nephrotic proteinuria, isolated microscopic hematuria, unexplained chronic kidney disease, familial renal disease and renal transplant dysfunction. (7)

MATERIAL AND METHODS

   In a retrospective study, we analyzed the clinical and pathological data of all renal biopsy samples that were performed during the period from Jan 2014 to Dec 2015 at the Tanta University Hospitals, Egypt. Tanta University Hospitals are the largest tertiary referral hospitals in El-Gharbia governorate, playing a major role in the health care management.

Age, gender, indication for renal biopsy and pathological findings were recorded for analysis. The renal biopsies were processed for light microscopy ± immunoflurescence examination which was not performed routinely in all cases for financial reasons. The main indications for renal biopsy include the nephrotic syndrome (urinary protein excretion >3.5 g/day), nephritic syndrome (active urinary sediments with/without azotemia), sub-nephrotic proteinuria (<3.5 g/day), combined proteinuria and hematuria, renal failure (acute and chronic) and isolated hematuria.

RESULTS

Our renal biopsy registry represents an important contribution to understanding the epidemiology of renal diseases in El-Gharbia area. We are hoping that this registry will be the basis for developing a national registry. The most common age interval during which renal biopsy was done was 20-30 years (32.1%). Female gender (63%) was slightly more prevalent than male gender (37%). Immunohistochemistry was done on (41.2%) of specimens. N.S was the most common indication for renal biopsy, and memberanous GN was the most common primary pathological entity observed while Lupus nephritis was the most common secondary glomerulonephritis. Tubulointerstitial diseases constituted 21.8% of all renal biopsies, where ATIN was more common than CTIN; as well vascular nephropathy represented 7.1% of all biopsies where TMA was the most common pathology in group. As HCV is endemic in EGYPT the percent of HCV related GN was 15.9% MPGN with or without cryoglobulinemic lesions was the most common pathology in this group. Diabetic patients constituted 8.1% of all renal biopsies where DN was more common than NDRD, where in the latter FSGS and MN ware the most common pathology.

DISCUSSION

The introduction of kidney biopsy is one of the major events in the history of nephrology. With the use of real-time ultrasound and automated biopsy needles, ≥99% of biopsies are diagnostic. The success of the procedure depends on the ability to obtain adequate tissue together with safety profile(8, 9, 10).

Renal biopsy is essential for diagnosis of various renal diseases especially in glomerular diseases that are considered the most common renal diseases and have great variation in the presentation of across the globe(11).

There is evidence of change in many parts of the world in the spectrum of renal diseases during the recent past. It is therefore imperative to accurately document the spectrum of renal diseases prevalent in a particular area over a particular period of time. (12)

Many countries now have their own databases about renal biopsy and the epidemiology of specific glomerular diseases in these countries like the Italian renal biopsy registry database (IRBRD), the Japanese renal biopsy registry database (J-RBRD) and others(13).

Yet there is no established renal biopsy registry or documentation of the incidence and prevalence of various pathological patterns in our country.

Our aim was to document the prevalence and the incidence of different types of nephropathies in El-Gharbia area, and developing a renal biopsy registry.

In our study, a total number of 184 renal biopsies {RBs} were collected over the years 2014-2015 in EL-Gharbia area. This total number in our study is significantly lower in comparison with most registries worldwide, where it was 13,835 in Italy (14), 9617 in Brazil (15), 4004 in the Czech Republic (16), 2126 in Japan(13),and 2362 in the Serbian registry. This lower incidence of renal biopsies might be explained by different factors. Firstly, the time frame considered by each report was different whereas in some reports like the Olmsted County, the renal biopsy study encompassed a 30-year-observation (1974-2003) while in our report, it was 2 years. Secondly, many nephrologists adopted a conservative approach. That conservative approach was a consequence of the opinion of most physicians to perform a biopsy only when they felt that the pathology could alter the therapy or when patients had signs of progressive renal disease. Thirdly, the economic factor plays a role in this low incidence. Fourthly, the availability of specialized nephropathologist in some areas represents a non-solved problem. Lastly, some patientsare never shownagain with their biopsy reports even because they follow up with other centers or any other reason (19).

In our study the most common age interval during which renal biopsy was done was 20-30 years (32.1%) and only 4.3% of the included biopsies were done above the age of 60, this is partly explained by the lower tendency to perform renal biopsy in elderly patients except in severe cases.

Similar results were seen in many registries all over the world as in the IRBR, Serbian registry and the Korean registry where they rarely did renal biopsies above the age of 65,and the most common age interval was 20-40 years in this series(14,18,19).

On the contrary, the J-RBR showed a peak distribution in the seventh decade of life and this was explained by the increased incidence of secondary glomerular disease in elderly patients (13).

We recorded a female predominance in our study of native kidney diseases, this was probably due to the higher number of females among patients biopsied for SLE.

This goes with the Malaysian registry in 2010 where more females 59.9% had native kidney biopsy compared to males 40.1%, they also explained this as there was higher number of females among patients biopsied for SLE (20).

On the contrary, several published renal biopsy registers, male was predominant in primary GN while in secondary GN, there was female predominance, where lupus nephritis represented the most common cause of secondary GN (16,18,20).

In our study, the 184 renal biopsies were mainly evaluated by light microscopy where the percent of immunohistochemistry was 41.2% from 182 adequate specimens.

More than other results were seen in many reports; Only 15.3% out of all samples were evaluated by IF in Nepal(199), Where as in a Japanese study, it was 56.5% (13), 78% in Denmark(22) and 89.5% in Italy(14).

Electron microscopy is rather expensive and unavailable in all centers so it was not used in this study, although it is a crucial diagnostic tool in some circumstances, e.g. establishing the diagnosis of MCD and TBM. The frequency of electron microscopy differed compared with other reports worldwide (~30% of all samples) (23). The very small percent of specimens proceeded to EM, made it difficult to obtain good results about final diagnosis to very large number of patients and made it difficult to compare with other studies.

NS was the most frequent indication for renal biopsy in our study, which is similar to the majority of published renal biopsy registers (24- 26). On the contrary, some studies noted AUA as proteinuria as the most frequent indication for renal biopsy which was the second most common indication for renal biopsy in our study (14).

AKI/RPGN was the third most common indication for renal biopsy which was against some studies that noted AKI as the least indication partly because they grouped more than one clinical syndrome in one patient, also the Czech series explained this as the etiology of AKI is detected early by clinical examination and renal function recovers fast after the induction of therapy and also due to the policy of some clinics (16, 18).

We found in our study, 119 (64.7%) of the 184 cases with reported renal function tests had impaired renal functions at time of biopsy, and 65 (35.3%) had normal renal functions.

On the contrary, in the Malaysian registry, a total of 2908 (52.9%) patients had normal renal function at time of biopsy, {35.9%} had impaired renal function and for the remaining 11.3%, they were not reported(27).

Blood pressure concerning the reported cases patients with HTN at time of renal biopsy were (57.6%), while non-HTN patients were (42.4%).

Other studies showed that non HTN patients were more common {56.8%} than HTN ones {45.2%} at the time of renal biopsy as in the Czech registry (16).

In our registry, the renal specimen was inadequate in 2 patients {1.1%} during the years 2014 to 2015. Where in the Italian registry, 3% was reported as inadequate samples and in the Czech registry, was 4.6%, but this low incidence of inadequate renal biopsy may be due to retaking new RB of inadequate ones and neglecting them or may be increasing experience over the time, and the emerging specialty of interventional nephrology (180).

In our study, primary GN was more predominant constituting (44.3%), while secondary GN constituted (42.8%). This goes with most series where primary GN was more predominant than SGN (14, 18,27).

Membranous (9.9%) was the most common pathological pattern among the primary GN, followed by FSGS (9.3%) and MCD (9.3%).

Our results were much different from many other registries, where IgA nephropathy was the most common disease in 8 national registries (Scotland, Japan, Italy, Czech Republic, Australia, France, Denmark, Spain) (13,14,22,33,34). Our lower prevalence of IgAN in our series might be explained by the lower rate of renal biopsies in patients with AUA and the incomplete evaluation by IF in most of cases (14, 28).

In our study,Tubulointerstitial diseases were recorded 40 cases (21.8%), Out of them 72.5% were ATIN and 27.5% were CTIN. Unlike our results, the Czech registry showed only 4.4% incidence of TIN and in the Serbian registry, it was 5.2% (14, 18).

On the contrary to our results, CTIN was more common than ATIN in the Serbian registry and IRBR; this was explained by the decrease percentage of renal biopsy in patients with AKI suspected to have ATIN as diagnosis of ATIN is mainly based on clinical background and by procedures less invasive than renal biopsy (14, 16,18).

In our series, vascular nephropathy {VN} constituted 13 cases (7.1%), where TMA represented 84.6% of the vascular diseases and HTN nephrosclerosis represented 15.3%. This is probably due to the lower trend to biopsy patients with long history with HTN especially in elderly patients.

In other registries like IRBR, VN represented only 4.7% and again TMA was the most frequent pathology. Where as in the Serbian registry, HTN nephrosclerosis was the most common pathology in VN group (14, 18).

In this study, the percent of HCV related GN was 15.9% (29 cases), this percent is due to HCV endimicity in Egypt. The most common pathology in HCV positive patients was MPGN either with or without cryoglobulinemic lesions; other lesions were noted in HCV positive patients like MN, amyloidosis and FSGS.

In all the revised registries, the incidence of HCV related GN wasn't mentioned and this might be due to the lower incidence of HCV in these countries.

Other studies showed as well MPGN as the most common pathological pattern in HCV positive patients, they also described other pathological patterns like MN, IgA nephropathy, fibrillary and immunotactoid GN (29-31).

In our study, 8.1% {15 cases} were suffering from DM at time of renalbiopsy, out of these pathological characteristics of diabetic nephropathy, iy was found in 60%, where as non-Diabetic renal diseases{NDRD} were diagnosed in the remaining 40%. MN and FSGS were the most common pathological patterns among these NDRD, other pathological pattern was MPGN.

Diabetic patients are usually not biopsied unless there are doubts about the role of diabetes in the causation of renal disease, as in the case of absence of DR, rapidly progressive renal failure, and significant proteinuria in the setting of short duration of diabetes.

In a retrospective analysis from China, for diabetic patients who had undergone renal biopsy during a 6-year period, there was a high prevalence of NDRD in the diabetic population. Sixty-nine patients were investigated, 52.2% were diagnosed as NDRD and 47.8% as DN. Focal segmental glomerulosclerosis was the most common lesion found in patients with NDRD. They determined that the absence of DR, a lower fasting blood glucose level is useful in differentiating NDRD from DN in diabetic patients with overt proteinuria(32).

Another recent Chinese study showed even a high prevalence of NDRD over DN among Type 2 DM patients who had renal biopsy due to different indications. Where data of 244 patients with T2DM were retrospectively analyzed. There were 20 cases (8.2%) with a pathologic diagnosis of DN, 205 cases (84%) with NDRD and 19 cases (7.8%) had both pathological patterns of DN and NDRD. The patterns of co detected pathological patterns in those patients associated with DN was IgA nephropathy in 10/19 cases, TIN in 4/19 cases, MPGN in 3/19, MN in 2/19 cases (33).

Also a high incidence of NDRD was observed in a recent study done in India by Uttara Das, where data of patients with type 2 DM who underwent renal biopsy in their institute from 1990 to 2008 were analyzed retrospectively. A total of 75 patients were included. Nephrotic syndrome (38.7%) was the commonest clinical presentation. Forty-eight (64%) cases had NDRD and 27 (36%) had DN. The commonest NDRD was minimal change disease (12.5%). Three (6.3%) patients had lupus nephritis. Tubulointerstitial nephritis has been observed in 10.4% patients(34).

In Europe, similar results were seen where in Poland, data of 76 patients with type 2 diabetes who underwent renal biopsy and were diagnosed in the Department of Nephropathology, where NDRD was found in 38 patients (50%), non-diabetic renal disease superimposed on underlying diabetic nephropathy was diagnosed in 11 patients (14.5%), and isolated diabetic nephropathy was seen in 27 patients (35.5%). The most common glomerular lesion found in NDRD and the mixed group was FSGS (35).

As well in Czech registry, 12.2% were diabetic patients, out of them, DN was found in 42.4% and non-diabetic renal diseases (NDRD) in 47.5%, where 10.1% of samples were non-diagnostic. Among NDRD, the most frequent diagnoses were IgAN and MGN (16, 27).

In our study, Lupus nephritis was the most common cause of secondary GN (60.2%), and 47 Lupus nephritis RBs were reported. The most common histopathological pattern was L.N class IV (53.2%), followed by class III representing (17%).

Similar data was seen in almost all registries worldwide, where LN was the most common cause of secondary GN; in IRBR, Serbia, Czech as well as in many Arabian countries; Bahrain, Saudi Arabia and united Arab Emirates (14, 16,18,36,37).

Class IV+V was the most common pathological pattern in the Malaysian registry (174) while in Saudi Arabia class IV was the most common type (37.1%), followed by Class II (18.1%), and Class V (11.7%) (38).

There was a little difference reported in a recent USA study, where they reported LN Class III as the most common pathological type followed by class II and lastly class IV in their series of LN cases (39).

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