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Prevalence of Glomerulonephritis in the U.S: Insights from a Large Administrative Dataset

Introduction

- Glomerulonephritis (GN) is serious disorder which can lead to end stage renal disease (ESRD), other major morbidity, or death

- However, little is know about the epidemiology of GN, since no large-scale examination of GN incidence and prevalence has ever been undertaken

- Using a large employer group health plan administrative dataset from Optum Clinformatics, our objective was to determine incidence and prevalence of GNs (either primary or as the result of systemic autoimmune disease), incidence of progression to ESRD, and hospitalization burden due to GNs

Methods

- The Optum Clinformatics employer group health plan database, comprising > 8 million individuals annually, was utilized for this retrospective cohort study of individuals from 2007-11 (inclusive)

- Adults (age > 18 years) only were studied

Methods (con't)

- We divided GNs into those arising from 2 "sources": a systemic immunologic disease (e.g., systemic lupus erythematosus) versus those that were primary in nature (that is, presumably limited to the kidney)

- To identify primary GNs, we used a relatively specific approach in which two ICD-9 claims ≥ 30 days apart for a GN, plus an additional claim for a manifestation of renal disease (e.g., hematuria, proteinuria) were required

- To identify GNs from systemic immunologic disorders, we required ≥ 3 claims at least 3 days apart, plus 2 claims for a GN or manifestation of renal disease ≥30 days apart

- We calculated the prevalence of GN's per 100,000 patients by dividing the number of GN cases by the total number of individuals in the database from 2007-11

- For patients who were enrolled in the plan > 1 year and who had no GN claims within that year, incidence rates were calculated by dividing cases of newly-diagnosed GNs by total follow-up time. Follow-up started from 1 year after enrollment

- Censoring occurred at the end of plan enrollment, development of ESRD, or end of the final year of observation (2011)

- Newly-diagnosed GN patients were followed for development of ESRD or for hospitalization

Results

- Mean age of enrollees was 41.0 ± 14.1 years

- Mean age of prevalent patients with a primary GN was 51.3 ± 14.2 years, while incident patients were 53.0 ± 13.7 years old

- Mean age of prevalent patients with a GN from a systemic immunologic disease was 55.2 ± 15.8 years; for an incident patient, 58.0 ± 15.0 years

- Overall, 50.6% of the cohort was female. For primary GNs, 41.7% of prevalent and 40.4% of the incident patients were female

- For GNs from a systemic immunologic disease, 69.0% of prevalent and 58.0% of incident patients were female

Table 1. Incidence and prevalence of glomerulonephritis, 2007-2011, by GN category (primary vs secondary)

Prevalence	Total enrollees (n)	Primary GNs Cases	per 100,000 persons	GNs from systemic immunologic d/o Cases	per 100,000 persons
Period, 2007-11	13,712,946	9,575	69.8	7,176	52.3
end-of-year point, 2007	6,792,778	3,376	50.2	3,521	52.3
end-of-year point, 2008	6,512,206	4,299	66.0	4,242	65.1
end-of-year point, 2009	6,052,818	4,711	77.8	4,586	75.8
end-of-year point, 2010	5,767,962	4,748	82.3	4,191	72.7
end-of-year point, 2011	5,159,790	4,303	83.4	3,530	68.4

Incidence	Total patient-years	Cases	per 100,000 person-yrs	Cases	per 100,000 person-yrs
Total, 2007-11	17,848,285	3,553	19.9	—	—
Total, 2007-11	17,850,897	—	—	1,693	9.5

*A 1-year look-back period was required to assure there were no GN claims in order to determine "true" incidence; therefore, incidence was not calculated for 2007.

d/o: disorders

Table 2. Rate of ESRD in incident GN patients, per 1000 patient-years, by category (primary versus secondary)

Etiology of GN	Cases (n)	Cases reaching ESRD (n)	ESRD rate*
Primary GNs	3,553	279	36.2
GNs due to systemic immunologic disorders	1,693	65	15.9

* Per 1000 patient-years

Table 3. Hospitalization rates in incident patients with GN, per 1000 patient-years, by category (primary versus secondary)

Etiology of GN	Number of GNs	Number of 1st hospitalizations	Total number of hospitalizations	1st hospitalization rate*	Total hospitalization rate*
Primary GNs	3,553	1,454	3,336	335.6	570.3
GNs due to systemic immunologic diseases	1,693	1,016	3,120	535.7	968.8

* Per 1000 patient-years

Table 4. Hospitalization burden, in days, in incident patients with GN, by category (primary versus secondary)

	Total days	Mean ± SD	25th percentile	Median	75th percentile
Primary GNs*	19,659	13.5 ± 24.9	3	6	14
GNs due to systemic immunologic diseases**	24,411	24.0 ± 34.0	4	11	28

*mean follow-up was 607 ± 369 days
**mean follow-up was 708 ± 371 days

Conclusions

- For the first time in a large, population-based administrative dataset, incidence and prevalence of GNs have been estimated

- Primary GNs are about 1/3 more prevalent than GNs resulting from systemic immunologic diseases

- However, progression to ESRD in incident patients with a primary GN is more than twice as common compared to patients with a GN from a systemic immunologic disease

- Hospitalization burden in GNs is substantial, with patients who have systemic immunologic diseases spending an average of 24 days in the hospital over less than two years. Total hospitalization rate was nearly twice as high in incident patients with GNs due to systemic immunologic diseases

- More work investigating the epidemiology of GNs, including patterns of drug use in GNs, is ongoing

- Limitations of this study include the fact that detailed, patient-level data from the medical record is not available in this administrative dataset. Also, mortality data and race classification is not available

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