Hospital admissions in chronic kidney disease and comparison to those with normal renal function

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Background

Those with chronic kidney disease (CKD) suffer much mortality and morbidity. Part of this morbidity may be experienced as an in-patient in hospital. Admission to hospital is a major health event with implications for patients, carers and the health service. The admission burden that might be attributable to CKD is not clear.

Objectives

We aimed to describe the hospital admission burden in the first and fifth year after a baseline measurement of renal function, categorising patients by their baseline level of renal function.

Methods

A large population based cohort (GLOMMS-II) was constructed using data linkage of patients' laboratory data to hospital episode and registry data.

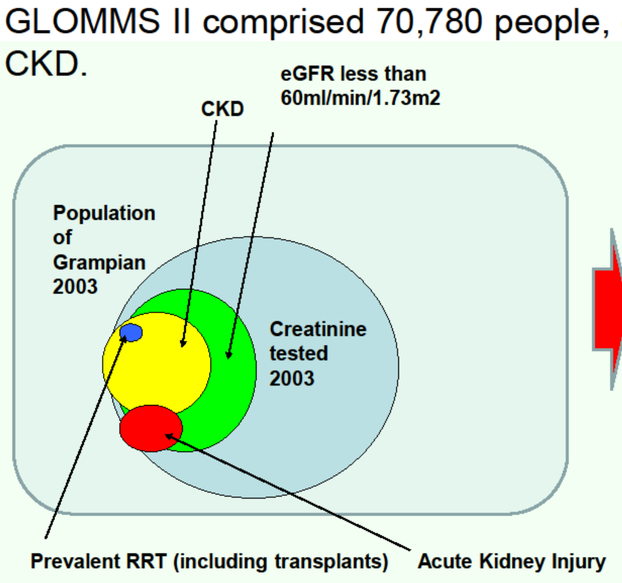
GLOMMS-II contained all individuals with a low eGFR (<60ml/min/1.73m^2) measured in the Grampian health board region in 2003 (in 2/3 of these with "CKD" the low eGFR was present for at least 90 days, in 1/3 with "impaired eGFR" it was not); all those with raised PCR and ACR; all those receiving RRT and a 20,000 sample of those with only normal eGFR measurements in 2003. A sample of ~20,000 of those who had no measurement of renal function in 2003, but samples in both 1999-2002 and 2004-2009 were also available to allow assessment of the effect of a clinical indication for sampling or otherwise.

Data-linkage to hospital episode statistics for the first and fifth subsequent years for each individual allowed a simple count of the number of admissions of all those still alive at the beginning of the first and fifth subsequent year to be made and the percentage with none, 1 to 5 and 6 or more admissions to be calculated. Those with stage 3-5 CKD (low eGFR for >90 days) and normal renal function are presented in detail here.

Results

GLOMMSII Population

GLOMMS II comprised 70,780 people, of which approximately 19,000 had CKD.



GLOMMS-II total	**70,780**
RRT	**345 (All)**
CKD 1-2	**1,007 (All)**
CKD 3a-5	**18,687 (All)**
Low eGFR not CKD	**10,857 (All)**
Normal 2003	**19,834 (Sample)**
Not measured 2003	**20,050 (Sample)**

Demographics

As shown in table 1, those with CKD described here, as in other CKD cohorts worldwide were older and more likely to be female than those with normal renal function.

Table 1

		Not CKD	All CKD 3-5 n(%)	CKD Stage 3a n(%)	Stage 3b n(%)	Stage 4 n(%)	Stage 5 n(%)
Number		19834	18687	12346	4951	1246	144
Sex	Males (%)	(47.1)	(35.2)	(36.0)	(32.7)	(35.8)	(47.2)
	Females (%)	(52.9)	(64.8)	(64.0)	(67.3)	(64.2)	(52.8)
Age (years)	Mean (95% CI)	52.1 (51.8- 52.3)	74.4 (74.3- 74.6)	73.1 (72.9- 73.3)	77.2 (76.9- 77.5)	77.5 (76.8- 78.2)	77.5 (76.8- 78.2)

Admissions

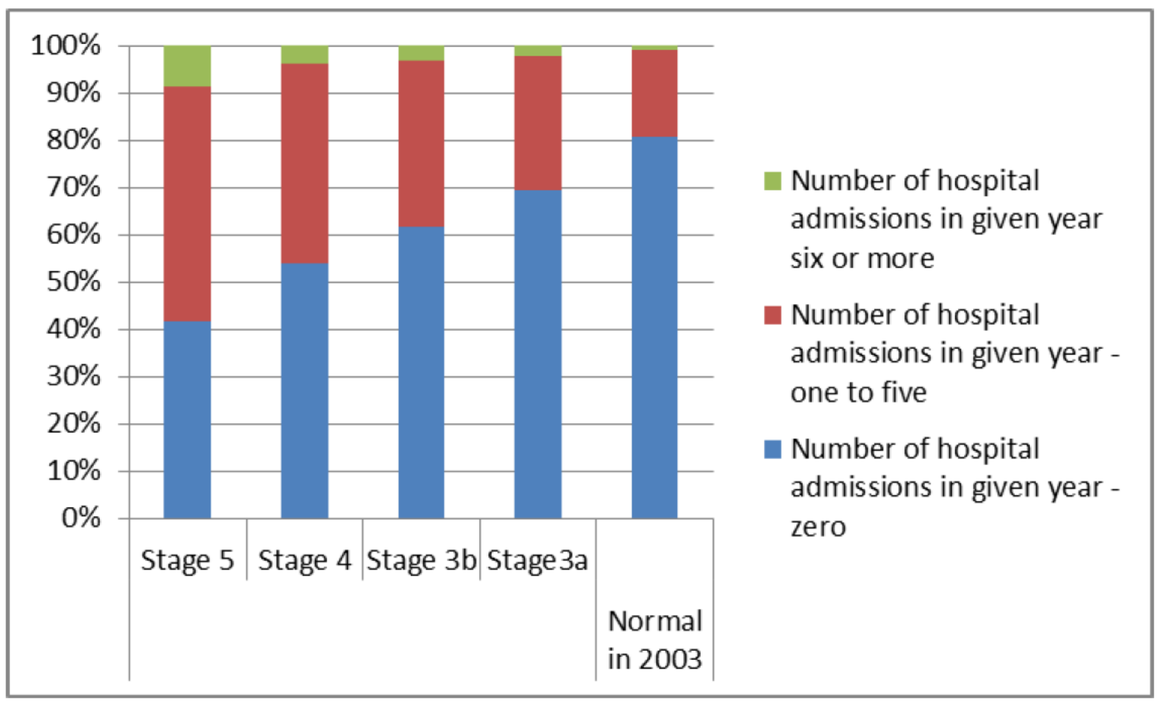
Of the 18687 with stage 3-5 CKD, 18137 were still alive at 1.1.2004 and 13091 at 1.1.2008. For the 19834 with normal renal function in 2003, the equivalent figures were 19595 and 18334.

Table 2

	2004 % of individuals: Number of hospital admissions in given year 0	1 - 5	6+	Total number of individuals	2008 % of individuals: Number of hospital admissions in given year 0	1 - 5	6+	Total number of individuals
CKD stage 3-5	(66.3)	(31.2)	(2.5)	18137	(65.8)	(31.7)	(2.5)	13091
Stage 5	(41.9)	(49.6)	(8.5)	129	(44.0)	(45.3)	(10.7)	75
Stage 4	(53.9)	(42.4)	(3.7)	1147	(52.2)	(43.2)	(4.6)	567
Stage 3b	(61.7)	(35.0)	(3.3)	4773	(60.9)	(36.0)	(3.1)	3061
Stage3a	(69.6)	(28.4)	(2.1)	12088	(68.4)	(29.5)	(2.2)	9388
Normal in 2003	(80.7)	(18.2)	(1.0)	19595	(80.7)	(18.4)	(1.0)	18334

In table 2 the percentage of each renal risk group that had none, 1 to 5 or 6 and more admissions are shown. Overall 66% of those with stage 3 to 5 had no admissions in both 2004 and 2008, however this varied with level of renal function – only ~43% of stage 5 and ~69% of stage 3a. This is compared to ~81% of those with a normal measurement of renal function in 2003. In figure 1 the percentages of each renal risk group who had admissions in 2004 is shown.

Figure 1 – Break down of admissions in 2004



Conclusions

Those with CKD have a higher number of hospital admissions than those with normal renal function. Hospital admissions are higher with more advanced CKD, and this pattern is sustained over time. For the current time, CKD prevalence in a region could be used to augment health-care service planning, as a marker of potential health-care service use. In the future, exploration of reasons for admission could potentially identify alternative ways of managing these individuals that may not necessitate hospital admission. Further exploration of the effect of co-morbidities and age and sex over that of CKD alone is needed. However for simple healthcare planning the numbers requiring admission with CKD and CKD prevalence in a region could be used for healthcare planning

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