# Assessing the Prevalence of Cardiovascular Risk Factors amongst Patients with Diabetes and Chronic kidney disease

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## Background

Patients with diabetes and chronic kidney disease (CKD) have an increased risk of cardiovascular mortality (1,9). The cardiovascular risks increase as eGFR decreases and albuminuria increases (1). This may be due to increased atherosclerosis due to renal insufficiency, increased hypertension associated with renal disease, an atherogenic lipid profile (with raised LDL) and, raised inflammatory mediators. Thus there is a need to focus on and intensively manage cardiovascular risk factors.

## Methods

Our diabetes electronic database (CIPTS) was used to identify patients for inclusion in the study. Between January 2013 to January 2015, 509 patients were identified aged above 19 years with either an eGFR < 60 ml/min or raised urine albumin creatinine ratio (Urine ACR) [> 3.5 mg/mmol in F, > 2.5 mg/mmol in M]. Data was analysed using Graphpad Prism. Averages are given as mean ± standard deviation.

## Results and Discussion

The majority of patients were male (61 %) with type 2 diabetes (82 %). The mean duration of diabetes was 20 ± 11 years.

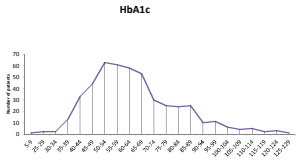
We found that some documentation of care processes was poor

- **65 % had smoking status recorded**
- **46 % had foot examination documentation**
- **32 % had documentation of retinal screening**

It is likely that these care processes are being checked in primary care, however, not relayed to secondary care. Without this information we cannot accurately risk stratify or appropriately intensify treatment. It may also influence the patient's perception of the seriousness of modifiable risk factors such as smoking if not discussed by a specialist.

In contrast, documentation of renal assessment was good

- **100 % had eGFR recorded**
- **89 % had urine ACR recorded**

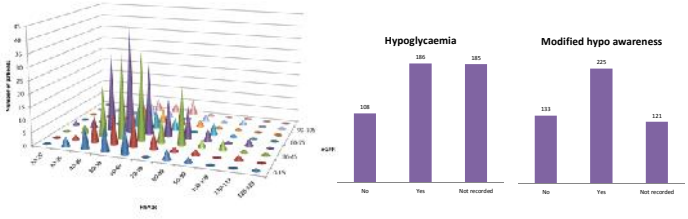



## Glycaemic control

In the National Diabetes Audit (NDA) – only 32.3 % of T1D and 68.2 % of T2D achieved an HbA1c of < 58 % (7). In our patients these figures were 27 % of T1D and 40 % of T2D achieving an HbA1c of < 58 %.

## Hypoglycaemia

There is a U-shaped relationship between glycaemic control and cardiovascular risk with patients experiencing hypoglycaemia at a significantly increased risk. Patients with CKD have an increased risk of hypoglycaemia. We found a significant number of patients with low HbA1c, including in the most vulnerable group of patients with a low eGFR. Despite this, only 39 % of the patients had measures of hypoglycaemia recorded and 47 % had modified hypoglycaemic awareness recorded.




## Blood pressure targets

In CKD and DM the target BP is < 130/80 (1). Nationally the attainment of BP targets is poor. A cross-sectional survey of the UK NDA found < 37.8 % of patients achieved a target systolic BP of < 140. **In our patients** BP was recorded in 85 % of patients and was within target (< 130/80) in 38 %. The systolic range was 89 – 228 and the diastolic range 36 – 130. The NDA demonstrated higher systolic BP at lower eGFR, however, we were unable to find a similar pattern in our cohort of patients.

## ACE inhibitors and ARB

ACEI/ARB should be offered to all patients with diabetes and urine ACR > 3 (1) as evidence shows that this delays progression of nephropathy and reduces cardiovascular risk. **In our patients** 50 % of patients were on ACE inhibitors and 22 % on ARB. The reason for omission was only documented in 3 patients.

ACKNOWLEDGEMENTS

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## Cholesterol and Statins

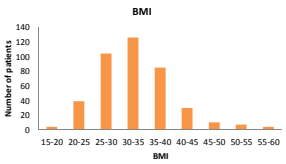
Hyperlipidaemia may accelerate progression of diabetic nephropathy through various mechanisms, such as renal atherosclerosis and lipotoxicity to mesangial cells. In addition, raised LDL is associated with increased cardiovascular risk. The target [based on NICE lipid guidance] is to achieve a non HDL cholesterol < 2.5 (3). Patients with diabetes and CKD should be offered a high intensity statin. Previously, two large studies in dialysis and CKD patients showed no benefit of statins on cardiovascular mortality, this may be due to vascular calcification and arteriosclerosis (4). However, the SHARP trial found a reduction in the incidence of atherosclerotic events in CKD (8). In addition, a recent meta-analysis showed a decrease in albuminuria in patients on statins compared to controls (5).

**In our patients**

- 99 % had cholesterol measured and 79 % were on a statin
- In the 21 % of patients not on a statin, the reasons for omission was poorly documented.

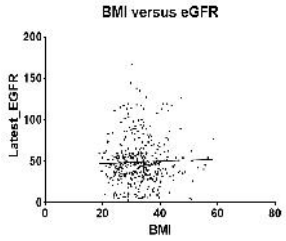
## Obesity and BMI

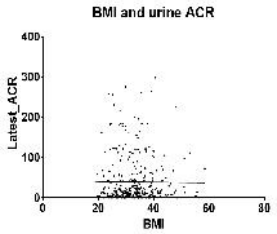
Obesity has been associated with the development of kidney disease both in the presence and absence of diabetes (2). Previous cross-sectional studies have demonstrated a strong association between obesity and kidney disease in T1D and T2D (2).




**The majority of our patients are obese or morbidly obese and the range of BMI was from 18.8 to 58.5. The average BMI was 32.9 ± 6.8.**

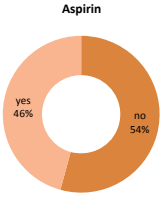
We were unable to find any association between BMI and eGFR or urine ACR using simple correlation or linear regression.




## Anti-platelet agents

NICE recommend that anti-platelet drugs are offered to patients with CKD in the absence of a significant bleeding risk to reduce the risk of CVD (1). Only 46 % of our patients were on aspirin. This compares to a figure of 33.8 % of patients with renal disease and diabetes in the Network of the Italian Association of Clinical Diabetologists audit (6).




## Conclusions

We found an increased prevalence of obesity and hypertension amongst our patients with diabetes and CKD, compounding the risk of cardiovascular disease. Despite this, less than half the patients were on aspirin and a significant percentage were not on lipid lowering treatment or ACE inhibitors/ARB.

This gap between the ideal and achieved standards of care is a local, national and international issue. Risk factor modification is unsatisfactory in up to 50 % of patients with diabetes (6). A holistic approach to care should involve intensive management of all cardiovascular risk factors to reduce morbidity and mortality. This audit has helped us to identify areas in our practice which we can target to reduce the risk of cardiovascular disease in our patient population.

REFERENCES

1. NICE CG182, (2014) Chronic kidney disease in adults: assessment and management
2. Hill, C.J. et al (2013). Obesity and kidney disease in type 1 and type 2 diabetes: an analysis of the National Diabetes Audit. QJM, 106 (10): 933-942
3. NICE CG181 (2014) Cardiovascular disease: risk assessment and reduction, including lipid modification.
4. Wanner, C. et al (2005). Atorvastatin in patients with type 2 diabetes mellitus undergoing haemodialysis. NEJM 353: 238 - 248
5. Shen, X. et at (2016) Efficacy of statins in patients with diabetic nephropathy: a meta-analysis of randomised controlled trials. Lipids in Health and Disease 15: 179
6. De Cosmo, S. (2015) Achievement of therapeutic targets in patients with diabetes and chronic kidney disease: insights from the Associazione Medici Diabetologi Annals initiative. Nephrol Dial Transplant 0:1-8
7. Hill, C.J. (2013) Chronic kidney disease and diabetes in the National Health Service: a cross-sectional survey of the UK National Diabetes Audit. Diabetic Medicine DOI: 10.1111/dme12312
8. Baigent, C. (2011) The effects of lowering LDL cholesterol with simvastatin plus ezetimibe in patients with chronic kidney disease (Study of Heart and Renal Protection): a randomised placebo-controlled trial. The Lancet 377: 2181-2192
9. Perkovic, V. (2016) Management of patients with diabetes and CKD: conclusions from a "Kidney Disease: Improving Global Outcomes" KDIGO Controversies Conference. Kidney International 90: 1175-1183.