Renal protein loss in DM *(and CKD)*

Ref: NICE CG87; Management of Type 2 diabetes.
Ref: SIGN 103; Diagnosis and management of chronic kidney disease
Ref: Local Renal Clinic guidelines (http://www.derby-egfr.co.uk/)

Background

- Renal protein loss is a sign of renal damage, nephrosclerosis, with leakage of protein from the basement membrane.
- Renal protein loss is a recognised risk factor for Cardiovascular disease.
- Albumin is a smaller protein molecule and offers a more sensitive test for earlier detection of renal damage. NICE recommends the use of urine albumin:creatinine ratio (uACR) for monitoring renal function in diabetes.
- Proteinuric CKD is more likely to progress towards end-stage renal failure (ESRF)
- Proteinuric CKD and microalbuminuria progression can be reduced by using ACEi or ARB.
- Proteinuric CKD responds to blood pressure control.
- Test for proteinuria/microalbuminuria should be preferably on an early morning sample to exclude postural protein loss. False positive can also occur with UTI, heavy exercise and a large protein meal.
- Once overt (clinical significant) proteinuria has developed ***uACR>30; it is better to use urine protein:creatinine ratio (uPCR)*** because you have established DIABETIC NEPHROPATHY and management needs to be as per the CKD rather than diabetes guidelines. uACR measurement is probably a waste of time

Definitions

MICRO-albuminuria: uACR between 30-300mg/mmol

MACRO-albuminuria: uACR >300mg/mol

In DIABETES: Clinically significant Microalbuminuria: uACR 2.5(♂) or 3.5(♀) to 30mg/mmol

In CKD: Clinically significant Proteinuria : uACR >30mg/mmol in people without diabetes

Persistent proteinuria is defined as two or more positive tests within 12 weeks of each other.

Dipstick	24hr Protein excretion (g/24hr)	uACR (mg/mol)	uPCR (Mg/mol)	Notes
Negative	< 0.15	< 2.5 ♂ < 3.5 ♀	< 15	Normal
Trace	0.15 - 0.49	3.5 - 29	15 - 49	• **DIABETIC:** Start ACEi or ARB regardless of BP • **Non-Diabetic:** Satisfactory
+	0.50 - 0.99	30 - 69	50 - 99	SIGNIFICANT : Optomise BP (<135/80 mmHg), other CVD risk factors & DM control. **Diabetic Nephropathy**
++	1.0 - 3.0	70 - 210	100 - 300	UNSATISFACTORY: Control BP (<125/75 mmHg) and Refer to Renal clinic
+++	> 3.0	> 210	> 300	POSSIBLE NEPHROTIC: Urgently refer to Renal clinic

preferred method of monitoring renal protein loss (uACR /uPCR)

Risk of Proteinuria

1. CKD, diabetes, Hypertension, CVD
2. Multi-system disease like SLE
3. Structural renal tract disease

Suspect renal disease (and refer) if:

- The blood pressure is very high and not responding to treatment
- Previous normal ACR but then a sudden significant proteinuria of > 100mg/mol
- Haematuria
- Rapidly reducing eGFR
- The patient is ill

Consider referral to Renal Clinic if:

- Diagnosis unclear (this is especially the case for a person <65 years old)
- Progressive fall in eGFR by > 5% per annum
- Presence of significant proteinuria (greater than 0.5 grams/day) but see table above
- Symptoms suggestive of a multi system disease (e.g. SLE, vasculitis) or risk factors for renovascular disease
- Genetic renal disease (e.g. Adult polycystic kidney disease, Alports syndrome)
- Difficult to control blood pressure

Blood Pressure Control in CKD stages 1-4

- Control of hypertension in CKD / Diabetic nephropathy slows the rate of decline in renal function.
- Target BP should be < 130/80mmHg in all patients with CKD
- Some evidence suggests a lower target of <125/75 mmHg if uPCR >100mg/mol (1g/day)
- ACEI or ARB should be the first line anti-hypertensive therapy for patients with CKD
- Treatment goal is to reduce protein loss to uPCR <100mg/mol
- Add diuretic to ACEI /ARB if BP or protein loss is not controlled
- REFER to renal clinic if dual therapy is not working as ACEI + Diuretic + ARB may be needed

Management of a urine ACR/PCR result

- See the algorithm on page 3
- If nurse is looking at the results then follow the diagram and carry out the actions on the algorithm numbered No1 to No5.
- The doctor to review or assess the patient and/or notes and consider the recommendations listed with the actions numbered (No1 to No5)
- Remember diabetic nephropathy and CKD are not synonymous (a patient can have diabetic nephropathy with protein loss without a reduction in eGFR)
- Management of CKD patients with proteinuria (uPCR of 50 or more) can be treated using recommendations listed under the actions (No3 to No5) but obviously without the diabetes related actions but see the CKD guidelines for more information

Renal protein monitoring algorithm
Osmaston Surgery

(No5) TCI GP ASAP

POSSIBLE NEPHROTIC: Assess and urgently refer to Renal clinic

(No1) FILE results

Routine review in Diabetic clinic

uACR: > 210
uPCR: > 300

Diabetic (DM) patient uACR / uPCR result from path lab.

uACR < 2.5 ♂ / < 3.5 ♀

uACR : 70- 210
uPCR: 100-300

uACR : 30 - 69
uPCR: 50 - 99

uACR : 3.5 -29
(uPCR: 15-49)

Known to have Diabetic nephropathy and on optimum treatment ?

Known to have Micro-albuminuria ?

On an ACEI or ARB ?

Yes

No

Repeat uACR and uPCR within 2 weeks

Repeat uACR and uPCR within 2 weeks

Yes *Go to No1*

Repeat uACR x2 over 4-12 weeks

Persistently raised uACR : 30- 69 or uPCR : 50 - 99 ?

Persistently raised uACR : 30- 69 or uPCR : 50 - 99 ?

Persistently raised uACR : 2.5/3.5 - 29 ?

No *Go to No3*

No *Go to No2*

No *Go to No1*

(No4) Arrange TCI & Reassign results to GP

- UNSATISFACTORY result
- Refer to Renal Clinic & also
- Start ACEI / ARB if not already on it
- Optimise BP to target (125/75mmHg)
- Optimise DIABETES control *(DM clinic)*
- Medication review *(e.g. rationalise NSAID /codeine) esp in CKD*
- Monitor renal protein using **uPCR**

(No3) Reassign results to GP

- Record as ***Diabetic Nephropathy***
- Start ACEI / ARB if not already on it
- Optimise BP to target (135/80mmHg)
- Optimise CVD risk *(e.g. smoking, lipids)*
- Optimise DIABETES control *(DM clinic)*
- Medication review *(e.g. rationalise NSAID /codeine)*
- Monitor renal protein using **uPCR**

(No2) Reassign results to GP

- Record as ***Diabetes with persistent microalbuminuria*** *(if needed)*
- Start ACEI / ARB regardless of BP
- Optimise CVD risk *(e.g. smoking, lipids)*
- Optimise DIABETES control *(DM clinic)*
- Monitor renal protein using **uACR**