

SCREENING AND MANAGEMENT OF KIDNEY COMPLICATIONS

Complications: Nephropathy

- Diabetic nephropathy is detected clinically by the presence of persistent microalbuminuria or proteinuria.
- The peak incidence of nephropathy is usually 15-25 years following onset of diabetes in type 1 but may be present at diagnosis in type 2.
- Development of renal disease occurs with poor glycaemic control, hypertension and smoking
- The presence of nephropathy is an independent and powerful predictor of macrovascular disease.
- Screening is vital as early detection and effective treatment can slow progression of nephropathy therefore significantly delaying end stage renal failure.
- The possibility of non-diabetic renal disease should be considered if atypical features, including haematuria and absence of retinopathy, are present

The natural course of diabetic renal disease may be summarised as follows:

| Stages | Laboratory Features |
|---------------|---|
| Stage 1: | Normal urinary albumin excretion rate Normal serum creatinine |
| Stage 2: | Increased urinary albumin excretion rate (microalbuminuria) Dipstick negative for proteinuria Normal serum creatinine |
| Stage 3: | Dipstick positive proteinuria Serum creatinine normal or minimally elevated |
| Stage 4: | Progressive decline in renal function Rising serum creatinine |
| Stage 5: | End stage renal failure |

MICROALBUMINURIA & PROTEINURIA

- **Microalbuminuria** refers to urine albumin concentrations that are below the limit of detection of routine urine dipsticks (**i.e. dipstick negative proteinuria**).
- **Proteinuria** refers to urine albumin concentrations that are detectable by routine dipsticks (**i.e. dipstick positive**).
- In Type 1 diabetic patients, persistent microalbuminuria, is a marker of early nephropathy.
- In Type 2 diabetic patients, microalbuminuria correlates with macrovascular disease and underlying hypertension and is a marker for nephropathy.

- Microalbuminuria in Type 2 diabetes should be viewed as an additional and independent cardiovascular risk factor. Co-existing CHD risk factors should be treated aggressively in Type 2 diabetic patients who are microalbumin positive.
- In both types of diabetes, improved diabetic control (**Target HbA1c \leq 7.0%**) and particularly aggressive anti-hypertensive therapy may retard the progression of nephropathy.
- All patients with nephropathy should be treated with a statin and strongly advised to stop smoking.

Who should be tested?

Test ANNUALLY for microalbuminuria in patients who are dipstick negative as follows:

- Type 1 diabetic patients, aged >12 years, with duration of diabetes of more than 5 years
- Type 2 patients

Which sample should be sent?

- First voided morning urine sample in a clean universal container. This is for measurement of urinary albumin:creatinine ratio (ACR). An ACR > 2.5 mg/mmol in men or >3.5 mg/mmol in women equates to microalbuminuria on 2 out of 3 occasions. An ACR > 30 mg/mmol indicates diabetic nephropathy. (Samples should **NOT** be sent from patients who have evidence of UTI (nitrite positive). For those who display dipstick positive proteinuria (more than ++) or haematuria a spot urine should be sent)
- Random urine sample may be used but has a higher false +ve rate.

Interpretation of Results

| DIAGNOSIS | | ACR (mg/mmol) | ACTION |
|------------------|--|--------------------------------|---|
| Negative | | <2.5 men <3.5 women | Repeat annually. |
| Microalbuminuria | | 2.5 – 30 men 3.5 – 30 women | Repeat to confirm persistently abnormal result. |
| Proteinuria | | >30 | Repeat to confirm persistently abnormal result. |

Management of Diabetic Renal Disease

Prevention:

- Good blood glucose control (HbA1c <7.5%), good blood pressure control (BP 140/80mmHg)

Treatment:

- Apply aggressive targets for control of hypertension
 Type 1 diabetes <120/70mmHg
 Type 2 diabetes <130/80 mmHg

- Encourage smoking cessation
- Improve glycaemic control
- Introduce an ACE Inhibitor in patients with Type 1 diabetes with microalbuminuria or overt proteinuria, regardless of BP. Remember the possibility of teratogenesis in females of childbearing age.
- Introduce an ACE Inhibitor or ARB in patients with Type 2 diabetes, as 1st-line therapy. Remember the possibility of co-existing renovascular disease
- In all patients, co-existing cardiovascular risk factors should be managed aggressively.
- Refer to dietitian for dietary assessment and advice in relation to protein and sodium intake

Criteria for Referral to Hospital Diabetic Clinic

Patients with any of the following:

- Persistent microalbuminuria
- Overt proteinuria
- Elevated serum creatinine (>150 μ mol/L)

Microalbuminuria Screening in People with Diabetes

