RENAL COMPLICATIONS

- Diabetic nephropathy is detected clinically by the presence of albuminuria (24h urine albumin >300mg; first pass morning urine albumin/creatinine ratio >30mg/mmol) and is a leading cause of end-stage renal failure.

- The time course to diabetic nephropathy is usually 15-25 years following the onset of diabetes. It may appear shorter in type 2 patients as diabetes may have been undetected for several years.

- Risk factors for the development of diabetic nephropathy include poor glycaemic control, family history, hypertension, black race (type 2 DM), male sex, advancing age, dyslipidaemia and smoking.

- Early detection and effective treatment can slow progression of nephropathy, therefore screening is vitally important.

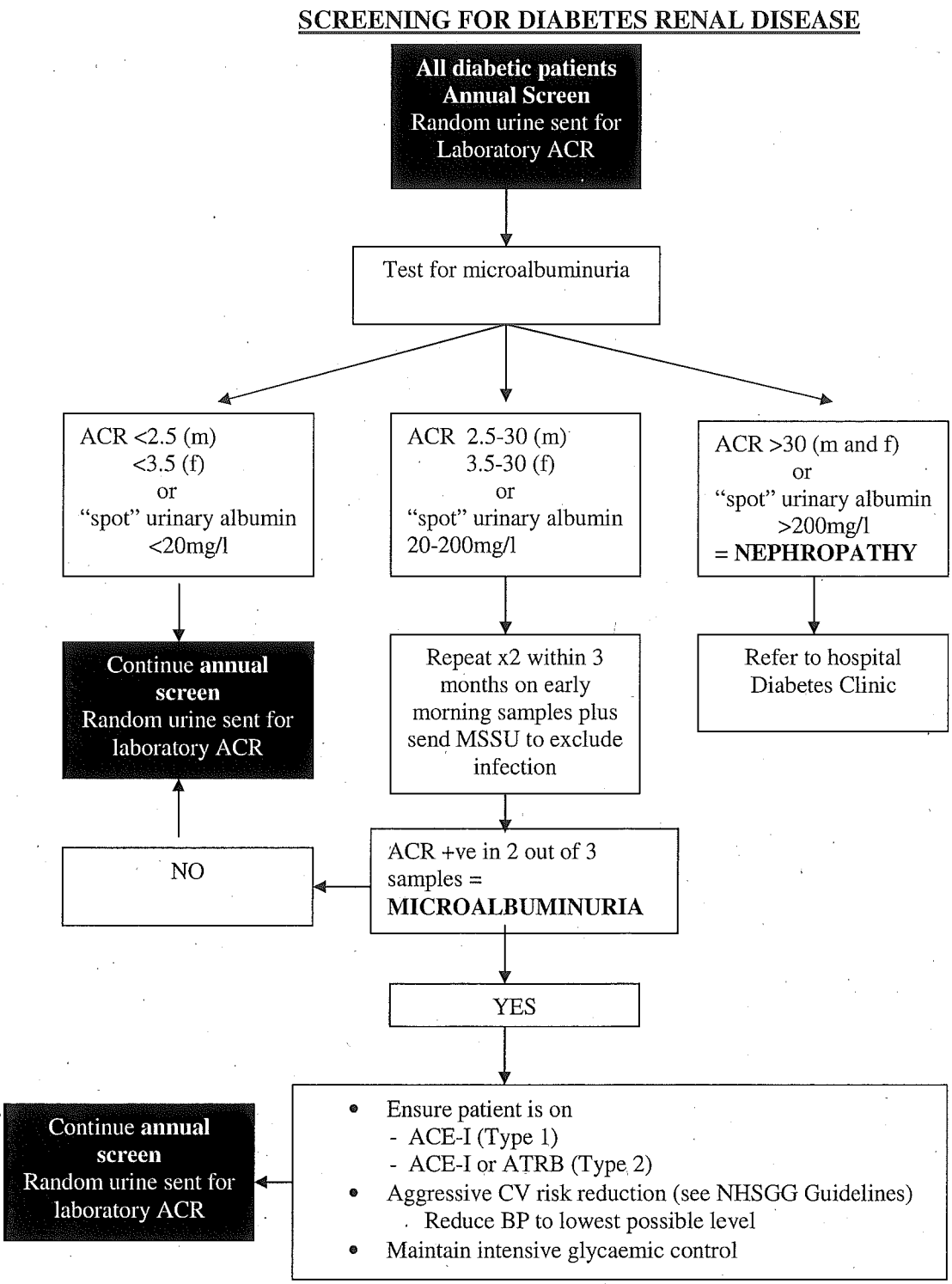
- The possibility of non-diabetic renal disease should be considered if atypical features are present: rapid onset; absence of retinopathy; asymmetric kidneys on ultrasound scanning; haematuria; drop in eGFR of >30% after initiation of ACE-I or ARB.

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

Stage 1	<u>Renal hyperperfusion and hypertrophy</u> Occurs at time of diagnosis of type 1 diabetes mellitus. Serum creatinine and urine albumin excretion normal.
Stage 2	<u>Asymptomatic</u> Lasts around 10 years. GFR increased.
Stage 3	<u>Microalbuminuria</u> (Alb/Creat Ratio >2.5mg/mmol [male], >3.5mg/mmol[female]; 24h urine albumin 30-300mg). Untreated, 80% will progress to overt nephropathy (type 1). Serum creatinine typically normal although eGFR may be reduced.
Stage 4	<u>Albuminuria</u> (Alb/Creat Ratio >30mg/mmol). Dipstick positive proteinuria. Occurs around 15-20 years after diagnosis of diabetes. Untreated, eGFR drops by around 10ml/min/year.
Stage 5	End-stage renal failure

SCREENING

1. All patients with diabetes mellitus should have screening for microalbuminuria and measurement of eGFR annually.
2. First pass morning urine should be sent in a clean (white top) universal container to biochemistry for albumin/creatinine ratio.
3. An abnormal result should be confirmed as soon as possible with a second sample along with MSSU to exclude concurrent infection.
4. Microalbuminuria in type 2 diabetes is also a marker for increased cardiovascular risk



Note: Formulary restriction to use of ATRBs: see hypertension prescribing guidelines (available within the guidelines on the management of cardiovascular risk factors).

Individuals with diabetes and mild to moderate chronic kidney disease should be managed in a setting that can provide appropriate investigation, monitoring and intensive clinical management.

TREATMENT (WHEN MICROALBUMINURIA OR ALBUMINURIA CONFIRMED)

1. Apply aggressive blood pressure targets:
   Type 1 diabetes <120/70 mm/Hg;
   Type 2 diabetes <130/80 mm/Hg (lower if heavy proteinuria).
   Reduce blood pressure to the lowest achievable level.

2. Start ACE-I if not already in use or contraindicated. Titrate to the maximum tolerated dose. Consider angiotension receptor blocker (ARB) if ACE-I not tolerated or type 2 diabetes with late nephropathy (albuminuria).
   (Remember the possibility of foetal loss and teratogenesis in females of child-bearing age).

3. If BP target not achieved on maximum dose of ACE-I or ARB, add a calcium channel blocker.

4. Maintain intensive glycaemic control.

5. Smoking cessation advice.

6. Introduce statin; and aspirin as per risk assessment explained in the NHS GGC Antiplatelet Guidelines (available on Staffnet)

7. Dietary advice on salt intake and weight loss.

MANAGEMENT OF ANAEMIA

Patients with diabetes and chronic kidney disease stage 3 – 5 should have their haemoglobin checked at least annually. Patients with symptomatic anaemia and a haemoglobin <100g/L might benefit from an erythropoiesis stimulating agent (ESA) as long as other causes of anaemia including iron deficiency have been excluded.

CRITERIA FOR REFERRAL TO RENAL CLINIC

1. Suspicion of non-diabetic renal disease:
   - Microscopic or macroscopic haematuria;
   - Rapid decline in eGFR;
   - Rapid onset of proteinuria;
   - Fall in eGFR of >30% after initiation of ACE-I or ARB;
   - Asymmetric kidneys on ultrasound scanning;
   - Clinical features of vasculitis or systemic disease e.g. rash, positive ANF;
   - No diabetic retinopathy (progressive stage 3 CKD).

2. Stage 4 or 5 CKD (eGFR <30ml/min).

3. Stage 3 CKD (eGFR 30-59ml/min) with progressive decline in eGFR.

4. Stage 3 CKD with other features e.g. microscopic haematuria, problematic hypertension, electrolyte disturbance, acidosis.

5. Significant proteinuria (protein/creatinine ratio >45mg/mmol;) or nephrotic syndrome.

If in doubt, discuss with local nephrologists.