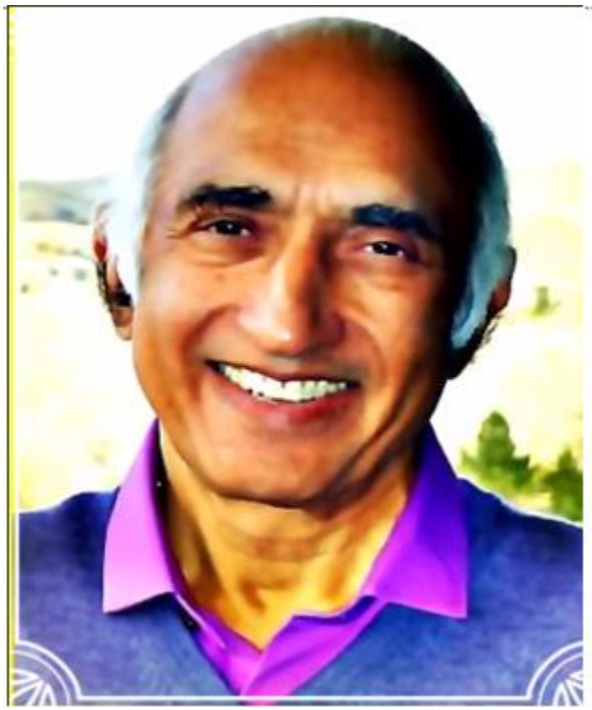
MANCHESTER ROYAL INFIRMARY JOINT DIABETIC RENAL CLINIC

PROF RAM GOKAL and PROF ANDREW BOULTON



BACKGROUND TO DIABETIC NEPHROPATHY

Diabetic nephropathy (DN) is an ever increasing problem globally that affects patients with both Type 1 and Type 2 diabetes mellitus. It is a serious complication. In the United States, about 1 in 3 people living with diabetes have diabetic nephropathy. Similar figures prevail in UK and Europe. DM is an important cause of ESRD (about 40-50% of a dialysis population).

Diabetic nephropathy entails micro/macro proteinuria, nephrotic syndrome, hypertension and gradual reduction in GRF leading to ESRD requiring dialysis and transplantation. Microalbuminuria develops in 2-5% per year; 20-40% will progress to overt proteinuria and 20-50% of these will progress to ESRD.(Alder et al Kidney Int 2003;63:255 Morgenson NEJM 1984;310:356). Rate of progression is variable from 5ml/min/month to 0.2ml/min/month (normal' decline is 0.1ml/min/month; Jones etal Lancet 1979).It can take up to 25 years after onset of DM for ESRD to develop..By 2030, if current incidence rates continue to increase, it is projected that over 643 million persons world-wide will have Type 2 DM (1 in every 10 adults) (International Diabetes Federation. IDF Diabetes Atlas, 10th edn. Brussels, Belgium: 2021. Available at: https://www.diabetesatlas.org.)

Based on current rates in developed countries, it can be estimated that 3,000,000 persons world-wide will require treatment for ESRD due to Type 2 DM by 2025. Projected cost for this could amount to $1.1trillion in the coming decade.

Harmful factors for progression of DN are hypertension, proteinuria, hyperglycaemia. hyperlipidaemia and smoking. The best way to prevent or delay diabetic nephropathy is by maintaining a healthy lifestyle, appropriate diet and managing the risk factors for progression.

DIABETIC –RENAL CLINIC AT MANCHESTER ROYAL INFIRMARY (1987 – current).

It is well recognised that intensive treatment can alter the progression of established diabetic nephropathy to end-stage renal failure (Feest et al QJM 1999;92:275-82; Joss et al Quart J Med 2004;97:219-227). With this in mind we, Prof Andrew Boulton (special interest diabetic nephropathy, neuropathy and foot ulceration) and Prof Ram Gokal (special interest in ESRD management) agreed to setting up a combined multidisciplinary service in 1987, that entailed seeing a patient with DN (all stages) in one location. This is almost certainly the first such setup in UK (and probably Europe), with a nephrologist and a diabetologist seated in one room to review the patient. Also present were junior medical staff, dietician (versed in both renal and diabetes diets), nurses from both disciplines, an ophthalmologist (later moved back to the eye hospital –see below), foot care nurses, social worker, and ancillary staff (secretarial etc). **Our first report** from the D-R clinic was in 1987 (Boulton AJM, Gokal R, Masson EA. The formation of a diabetic nephropathy clinic-Report of the first six months experience. Postgraduate Medical Journal.1988;64:84-86).

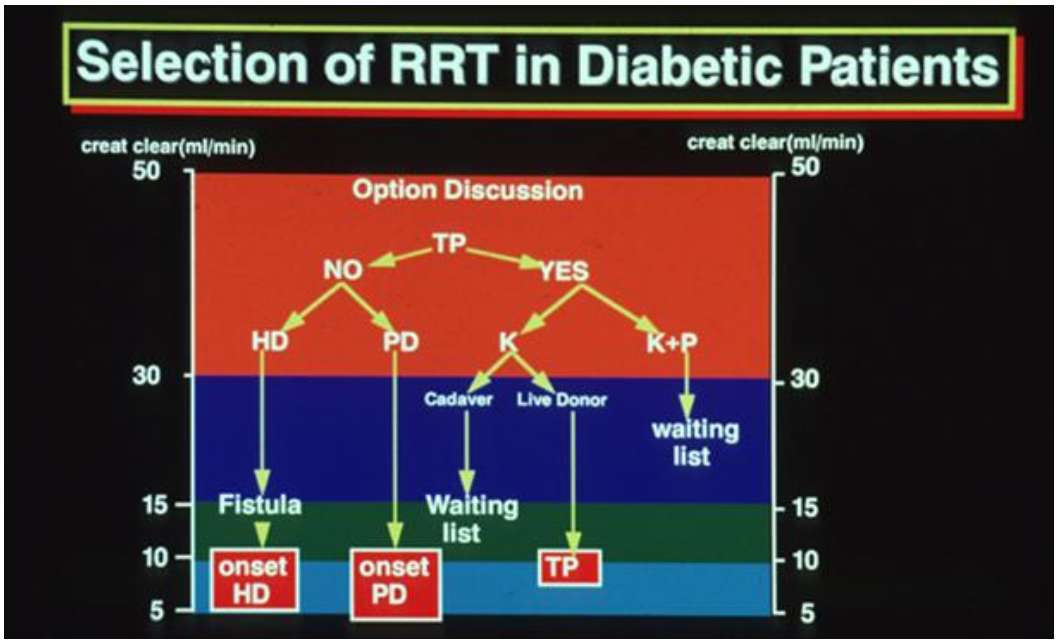
D-R Clinic Team. Prof Gokal (extreme left) Prof Boulton (extreme right) with team members. -1988.

In April 1988, the clinic moved to newly opened Manchester Diabetes Centre, aimed at providing high quality care and education for patients with diabetes throughout the North West of England – being , in addition to patient care, active in teaching, training and research.

It is important to emphasise that D-R clinic was a great innovation for better patient care and management. From the patients point of view (they loved it!!) , they were seen at one clinic visit (instead of maybe 4-5 different ones) to get a uniform set of advice, management and care of complications, and changes in medication, diets, life-style (quality of life especially impotence) . We were also fortunate to have an interested /dedicated ophthalmologist (initially worked in the clinic but then moved back to her clinic in adjacent Eye hospital, where she had access to expert examination facilities –same time on Wednesday mornings as our D-R Clinic).

The aim of the clinic was to provide the best known care in these areas:

- Prevention of progression (focusing on factors mentioned above, especially hypertension, diet, blood sugar control, life-style changes)
- Management of complications (neuropathy, retinopathy, foot care, cardiovascular problems hypertension, proteinuria, progressive renal failure, Uraemia and acidosis, Bone disease/ vascular calcification, Anaemia, gastric and GI Tract
- Selection and preparation of patients when approaching ESRD - what mode of dialysis and transplantation. (algorhythm –see figure)
- Management of all diabetic ESRD patients (PD, HD, Transplant).
- Other aims were: training and teaching (junior doctors, nurses, dieticians, overseas fellows), and undertake clinical research (with publications).
- Advice to physicians/diabetologists in District General Hospitals(DGH) especially when to refer: (When Patient has significant renal problems
    - creatinine >150umol/l
    - proteinuria >1g/24hrs
    - creatinine clearance <40ml/min based on by Cockcroft and Gault formula)



The Outcomes:

There was great camaraderie between all who worked in the clinic. (Prof Boulton provided the humour with his incredible array of jokes!!). The ethos was patient care and well being and avoid conflicting advice from otherwise multiple other clinics in the 'old system'.

Report on D-R Clinic (1)

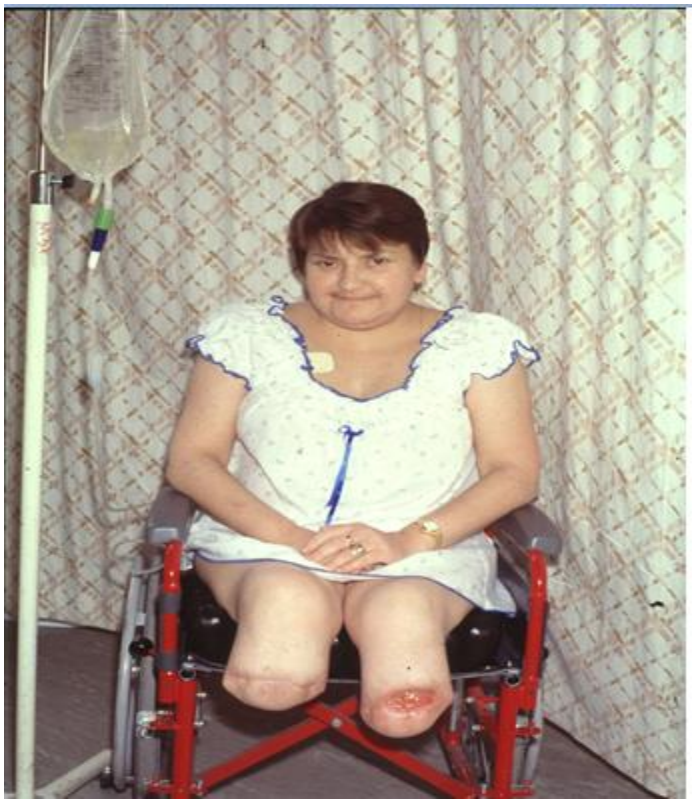
Care and management of hypertension and other complications: autonomic problems, neuropathy (2,4,5,7)

Pre-emptive foot care, assessment and advice will have prevented many an amputations (3,6)

There was improvement in morale of patients and quality of life (8,9,11).

We were able to slow down progression of renal parameters by controlling the risk factors (10).

Case Studies – 2 examples



Diabetic Type 1 patient:

- 11 years on PD.
- Bilateral amputee.
- Blind
- Yet her perceived Q of L was very good; wanted to live inspite of everything
- Good supportive family

Case Study – Mrs MH aged 54

- 1960 -Type I DM aged 10 (poor glycaemic control)
- 1984 – retinopathy + trace of protein in urine
- 1987 – peripheral neuropathy
- 1987 – hypertensive + proteinuria
  - nephrotic syndrome
- 1989 – renal impairment (GFR 20ml/min)
- 1990 – Seen in Combined Diabetic Renal Clinic at MRI with problems of:
  - dyspnoea and ankle swelling
  - uraemic symptoms
  - bone pains
  - frequent hypo's
  - vomiting, diarrhoea/constipation
  - visual impairment

Inv- hypertension (180/110)
- proteinuria (5g/24hrs – serum alb 22g/l)
- acidosis (HCO3 17mmol/l)
- anaemic (Hb 8.9g/dl; ferritin 30ug/l)
- Ca 1.9mmol/l; phos 2.1; PTH 523pg/ml

1990 -1993 renal function was stable
But bone pains worse inspite of Vit D

1994 – parathyroidectomy
- ESRD – commenced CAPD

1995 – Cadaveric Transplant

1998 – angina IHD – CABG

2000 – foot ulceration – vascular+neuropathic

2003 – transplant graft failure – restarted CAPD.

PEER-REVIEWED PUBLICATIONS AND RESEARCH FROM THE D-R CLINIC

1. Boulton AJM, Gokal R, Masson EA. The formation of a diabetic nephropathy clinic- Report of the first six months experience. Postgraduate Medical Journal.1988;64:84-86).
2. Boulton AJM, Gokal R. Diabetes and ACE inhibitors. Journal of Human Hypertension. 1990; 4 (Suppl 4):63-6; discussion 66-7
3. Fernando DJ, Hutchison A, Veves A, Gokal R, Boulton AJ. Risk factors for non-ischaemic foot ulceration in diabetic nephropathy. Diabetic Med. 1991;8:223-5. doi: 10.1111/j.1464-5491.1991.tb01576.x.
4. Kumar S, Merchant MR, Dyer P, Martin S, Hutchison AJ, Johnson RW, Boulton AJ, Gokal R Increased mortality due to cardiovascular disease in type 1 diabetic patients transplanted for end-stage renal failure. Diabetic Med. 1994;11:987-91. doi: 10.1111/j.1464-5491.1994.tb00259.x.
5. Shaw JE, Parker R, Hollis S, Gokal R, Boulton AJ. Gustatory sweating in diabetes mellitus.Diabet Med. 1996 Dec;13(12):1033-7. doi: 10.1002/(SICI)1096-9136(199612)13:12<1033::AID-DIA280>3.0.CO;2-B.
6. Shaw JE, Boulton AJ, Gokal R. Management of foot problems in diabetes Perit Dial Int. 1996;16 Suppl 1:S279-82.PMID: 8728207.
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8. Apostolou T, Gokal R. Neuropathy and quality of life in diabetic continuous ambulatory peritoneal dialysis patients. Peritoneal Dialysis International 1999;19 (suppl 2):S242-7.
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11. Apostolou T, Hutchison AJ, Boulton AJ, Chak W, Vileikyte L, Uttley L, Gokal R Quality of life in CAPD, transplant, and chronic renal failure patients with diabetes Ren Fail. 2007;29(2):189-97. . doi: 10.1080/08860220601098862.